Academic Regulations-M.C.A. 2009-10

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
ACADEMIC REGULATIONS FOR THE AWARD OF FULL TIME M.C.A. DEGREE
(WITH EFFECT FROM THE ACADEMIC YEAR 2009-10)

The Jawaharlal Nehru Technological University Anantapur shall confer M.C.A Post Graduate degree to candidates who are admitted to the Master of Computer Applications Programs and fulfill all the requirements for the award of the degree.

1.0 ELIGIBILITY FOR ADMISSIONS:

Admission to the above programme shall be made subject to the eligibility, qualifications and specialization prescribed by the University for each programme, from time to time.

1.1. Admissions shall be made either on the basis of merit rank obtained by the qualified candidates at an Entrance Test conducted by the University or on the basis of ICET score, subject to reservations prescribed by the University or Government policies from time to time.

2.0 COURSE WORK:

2.1 A Candidate after securing admission must pursue the M.C.A course of study for Six Semesters duration.

2.2 Each semester shall be of 20 weeks duration including all examinations.

2.3 A candidate admitted to a programme should complete it within a period equal to twice the prescribed duration of the programme from the date of admission.

3.0 ATTENDANCE:

3.1 A candidate shall be deemed to have eligibility to write end semester examinations if he has put in at least 75% of attendance on cumulative basis of all subjects/courses in the semester.

3.2 Condonation of shortage of attendance up to 10% i.e., from 65% and above and less than 75% may be given by the college on the recommendation of the Principal.

3.3 Condonation of shortage of attendance shall be granted only on genuine and valid reasons on representation by the candidate with supporting evidence.

3.4 If the candidate does not satisfy the attendance requirement he is detained for want of attendance and shall reregister for that semester. He / she shall not be promoted to the next semester.

4.0. EVALUATION:

The performance of the candidate in each semester shall be evaluated subject wise, with a maximum of 100 marks for Theory and 100 marks for practicals, on the basis of Internal Evaluation and End Semester Examination.

4.1 For the theory subjects 60% of the marks will be for the External End Examination. While 40% of the marks will be for Internal Evaluation, based on the better of the marks secured in the two Mid Term-Examinations held, one in the middle of the Semester (I-IV units) and another immediately after the completion of instruction (V-VIII) units with Three questions to be answered out of four in 2 hours, evaluated for 40 marks.

*****Note: All the Questions shall have equal weightage of 10 marks and the marks obtained for 3 questions shall be extrapolated to 40 marks, any fraction rounded off to the next higher mark.

4.2 For practical subjects, 60 marks shall be for the End Semester Examinations and 40 marks will be for internal evaluation based on the day to day performance.

4.3 For Seminar there will be an internal evaluation of 50 marks. A candidate has to secure a minimum of 50% to be declared successful. The assessment will be made by a board consisting of HOD and two internal experts at the end of VI semester instruction.

4.4 A candidate shall be deemed to have secured the minimum academic requirement in a subject if he secures a minimum of 40% of marks in the End Examination and a minimum aggregate of 50% of the total marks in the End Semester Examination and Internal Evaluation taken together.

4.5 In case the candidate does not secure the minimum academic requirement in any subject(as specified in 4.4) he has to reappear for the Semester Examination either supplementary or regular in that subject, or repeat the course when next offered or do any other specified subject as may be required.

5.0 RE-REGISTRATION FOR IMPROVEMENT OF INTERNAL EVALUATION MARKS:

Following are the conditions to avail the benefit of improvement of internal evaluation marks.

5.1 The candidate should have completed the course work and obtained examinations results for all six semesters pending Project work submission.

5.2 He should have passed all the subjects for which the Internal evaluation marks secured are more than 50%.

5.3 Out of the subjects the candidate has failed in the examination due to Internal evaluation marks being secured being less than 50%, the candidate shall be given one chance for each Theory subject and for a maximum of **three** Theory subjects for Improvement of Internal evaluation marks.

5.4 The candidate has to re-register for the chosen subjects and fulfill the academic requirements.

5.5 For each subject, the candidate has to pay a fee equivalent to one third of the semester tuition fee and the amount is to be remitted in the form of D.D. in favour of ‘the Registrar, JNTUA’ payable at Anantapur along with the requisition through the Principal of the respective college.

5.6 In the event of availing the Improvement of Internal evaluation marks, the internal evaluation marks as well as the End Examinations marks secured in the previous attempt(s) for the reregistered subjects stand cancelled.

6.0 EVALUATION OF PROJECT WORK:

Every candidate shall be required to submit thesis or dissertation after taking up a topic approved by the college/ institute.

6.1 Registration of Project work: A candidate is permitted to register for the project work after satisfying the attendance requirement of all the courses (theory and practical courses of I to V Sem)

6.2 An Internal Departmental Committee (I.D.C) consisting of HOD, Supervisor and one internal senior expert shall monitor the progress of the project work.

6.3 The work on the project shall be initiated in the penultimate semester and continued in the final semester. The candidate can submit Project thesis with the approval of I.D.C. at the end of the VI semester Instruction as per the schedule. Extension of time within the total permissible limit for completing the programme is to be obtained from the Head of the Institution.

6.4 The student must submit status report at least in two different phases during the project work period. These reports must be approved by the I.D.C before submission of the Project Report.

6.5 The viva-voce examination may be conducted for all the candidates as per the VI semester examination schedule.

6.6 Three copies of the Thesis / Dissertation certified in the prescribed from by the supervisor and HOD shall be presented to the H.OD. One copy is to be forwarded to the University and one copy to be sent to the examiner.

6.7 The college shall submit a panel of three experts for a maximum of every 5 students. However, the viva voce examiners will be nominated by the University.

6.8 If the report of the examiner is favorable viva-voce examination shall be conducted by a board consisting of the Supervisor, Head of the Department and the examiner who adjudicated the thesis / dissertation. The board shall jointly report candidates work as:

1.	Very Good	Grade A
2.	Good	Grade B
3.	Satisfactory	Grade C
4.	Not satisfactory	Grade D

If the report of the viva-voce is not satisfactory (Grade D) the candidate will retake the viva-voce examination after three months. If he fails to get a satisfactory report at the second viva-voce examination he will not be eligible for the award of the degree unless the candidate is permitted to revise and resubmit the thesis.

7.0 AWARD OF DEGREE AND CLASS:

A candidate shall be eligible for the award of respective degree if he satisfies the minimum academic requirements in every subject, Seminar and secures 'satisfactory' or higher grade report on his thesis/dissertation and viva-voce. Based on overall percentage of marks obtained, the following class is awarded.

First class with Distinction:	70% or more
First class	below 70% but not less than 60%
Second class	below 60% but not less than 50%

8.0 WITH – HOLDING OF RESULTS:

If the candidate has not paid dues to the university or if any case of in-discipline is pending against him, the result of the candidate shall be withheld and he will not be allowed / promoted into the next higher semester. The issue of degree is liable to be withheld in such cases.

9.0 TRANSITORY REGULATIONS:

Candidates who have discontinued or have been detained for want of attendance or who have failed after having undergone the course in earlier regulations and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to 4.5 and 2.3 sections.

10.0 GENERAL:

i. **The academic regulations should be read as a whole for purpose of any interpretation**.

ii. **Disciplinary action for Malpractice/improper conduct in examinations is appended.**

iii. **There shall be no places transfer within the constituent colleges and affiliated colleges of Jawaharlal Nehru Technological University Anantapur.**

iv. **Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".**

v. **In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.**

vi. **The University may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the University.**

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RULES FOR DISCIPLINARY ACTION FOR MALPRACTICE / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/Improper conduct	Punishment
	If the candidate	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.

4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
6.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.

7.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the impostor is an outsider, he will be handed over to the police and a case is registered against him.
8.	Refuses to obey the orders of the Chief Superintendent/Asst.Superintendent/ any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.

9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions : (if the squad reports that the college is also involved in encouraging malpractices)

(i) A show cause notice shall be issued to the college.

(ii) Impose a suitable fine on the college.

(iii) Shifting the examination centre from the college to another college for a specific period of not less than one year.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, ANANTAPUR
Master of Computer Applications

MCA I Year -I-Semester

S. No.	Course code	Subject	Th	lab	credits
1	9FBS101	Probability and Statistics	4	-	4
2	9FHS102	English Language Communication Skills	4	-	4
3	9FHS103	Accounting and Financial Management	4	-	4
4	9F00104	Mathematical Foundations of computer science	4	-	4
5	9F00105	Data Structures	4	-	4
6	9F00106	Data Structures through C-lab	-	3	2
7	9F00107	IT Workshop	-	3	2
8	9FBS108	English Language Communication Skills Lab	-	3	2
		contact periods/week	20	9	
		total	29		26

MCA I Year-II-Semester

S. No.	Course code	Subject	Th	lab	credits
1	9FHS201	Organization Structure and Personnel Management	4	-	4
2	9F00202	Object Oriented Programming	4	-	4
3	9F00203	Computer Organization	4	-	4
4	9F00204	Operating Systems	4	-	4
5	9F00205	Operations Research	4	-	4
6	9F00206	Programming in C++- lab	-	3	2
7	9F00207	Computer Organization Lab	-	3	2
8	9F00208	Operating Systems Lab	-	3	2
		contact periods/week	20	9	
		total	29		26

MCA II Year-I-Semester

S. No.	Course code	Subject	Th	lab
1	9F00301	Database Management Systems	4	-
2	9F00302	Computer Networks	4	-
3	9F00303	Linux Programming	4	-
4	9F00304	Software Engineering	4	-
5	9F00305	Java Programming	4	-
6	9F00306	Database Management Systems Lab	-	3
7	9F00307	Java and Linux Programming Lab	-	3
		contact periods/week	20	6
		total	26	

MCA II Year-II-Semester

S. No.	Course code	Subject	Th	lab
1	9F00401	Management Information Systems	4	-
2	9F00402	Web Technologies	4	-
3	9F00403	Data Warehousing and Mining	4	-
4	9F00404a 9F00404b 9F00404c	**Elective – I** Information Security NET Technologies Computer Graphics	4	-
5	9F00405a 9F00405b 9F00405c	**Elective – II** Distributed Systems Social Networks and Semantic Web Artificial Intelligence	4	-
6	9F00406	Web Technologies Lab	-	3
7	9F00407	Data Warehousing and Mining Lab	-	3
		contact periods/week	20	6
		total	26	

MCA III Year-I-Semester

S. No.	Course code	Subject	Th	lab
1	9F00501	Mobile Application Development	4	-
2	9F00502	Software Testing	4	-
3	9F00503	Object Oriented Analysis and Design (using UML)	4	-
4	9F00504a 9F00504b 9F00504c	Elective-III Software Project Management Human Computer Interaction Information Retrieval Systems	4	-
5	9F00505a 9F00505b 9F00505c	Elective – IV Web Services Multimedia and Rich Internet Applications Design Patterns	4	-
6	9F00506	Mobile Application Development Lab	-	3
7	9F00507	Software Testing Lab and UML Lab	-	3
		contact periods/week	20	6
		total	26	

MCA III Year-II-Semester

S. No	Course code	Subject	
1	9F00601	Seminar	6
2	9F00602	Dissertation/Thesis (Excellent/Good/Satisfactory/Not-Satisfactory)	15

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MCA Semester-I **Th 4**

(9FBS101) PROBABILITY AND STATISTICS

UNIT –I

Probability: Sample Space and events-probability-The axioms of probability-Some Elementary theorems-Conditional probability-Baye's theorem.

UNIT- II

Random variables: Discrete and continuous –Distribution –Distribution function.

UNIT – III

Distribution: Binomial, Poisson and Normal distribution – related properties.

UNIT- IV

Sampling Distribution: Populations and samples-Sampling distributions of mean (known and unknown) proportions, sums and differences.

UNIT –V

Estimation: Point estimation-interval estimation-Bayesian estimation

UNIT- VI

Test of hypothesis: Means and proportions-Hypothesis concerning one and two means-Type I and Type II errors. One -tail, two -tail tests.

UNIT – VII

Tests of significance: Student's t-test, F-test, $\chi 2$ – test, Estimation of proportion.

UNIT-VIII

Curve fitting: The method of least squares – Interfaces based on the least squares estimations – Curvilinear regression – multiple regressions- correlation for univariate and bivariate distributions.

REFERENCES:

1. **Probability and statistics for MCA**, T.K.V.Iyengar, B.krishna Gandhi, S.Ranganathan, M.V.S.S.N.Prasad, S.Chand and Company Ltd.
2. **Mathematical Statistics**, Gupta, Kapoor , S.Chand.
3. **Probability and Its Applications**, Murray R Spiegel,Schaum Series,TMH
4. **Engineering Mathematics**, B.V.Ramana, TMH., 2002,
5. **Introduction to probability and statistics**, J.S.Milton, Jesse C.Arnold, 4/e, TMH.

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MCA Semester-I **Th 4**

(9FBS102) ENGLISH LANGUAGE COMMUNICATION SKILLS

Unit –I: Vocabulary building-Synonyms and Antonyms, Word roots, One-word substitutes, Prefixes and Suffixes, Idioms and phrases

UNIT-II: Informal conversation Vs Formal expression - Verbal and non-verbal communication, barriers to effective communication – kinesics

UNIT-III: Types of Communication - Oral, aural, Writing and reading - Word-Power - Jargons - rate of speech, pitch, tone - Clarity of voice

UNIT-IV: Technical presentations - types of presentation –video conferencing-- participation in meetings - chairing sessions.

UNIT-V: Formal and informal interviews – Pre-interviewing planning - ambiance and polemics - interviewing in different settings and for different purposes e.g., eliciting and giving information, interview through tele and video conferencing, recruiting, performance appraisal

UNIT-VI: Written communication - differences between spoken and written communication - features of effective writing such "as clarity, brevity, appropriate tone clarity, balance etc.- GRE, TOEFL models

Unit–VII: Letter-writing - business letters – pro forma culture - format - style – effectiveness, promptness - Analysis of sample letters collected from industry - email, fax.

Unit–VIII: Technical Report writing - Business and Technical Reports – Types of reports - progress reports, routine reports - Annual reports - formats - Analysis of sample reports from industry - Synopsis and thesis writing

REFERENCES:

- **Effective Technical Communication**, M Ashraf Rizvi, Tata Mc.Graw-Hill Pub,company Ltd
- **Basic Communication Skills for Technology**, Andrea J. Rutherford: Pearson Education Asia, New Delhi.
- **GRE and TOEFL; Kaplan and Baron's English in Mind**, Herbert Puchta and Jeff Stranks, Cambridge
- **Technical Communication by Meenakshi Raman and Sangeeta sharma**, Oxford Univ.Press.
- **Communication Skills, Lenne Sen, Prentice** –Hall of India Pvt. Ltd., New Delhi.
- **Communicating at work, Ronald B. Adler**, Seanne Marquardt Elmhurst ,Mc Graw Hill international editions.

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MCA Semester-I	**Th** **4**

(9FHS103) ACCOUNTING AND FINANCIAL MANAGEMENT

UNIT I:
Introduction to Accounting: Principles, concepts and conventions, double entry system of accounting, classification of accounts and debit-credit rules.

UNIT II:
Financial Statements: Introduction to basic books of accounts, journal and ledger – trial balance – preparation of final accounts: trading account, profit and loss account and balance sheet.

UNIT III:
Introduction to Financial Management: Meaning and scope, role of financial manager, objectives of time value of money – goals of financial management, leverages: operation, financial leverage and combined leverage.

UNIT IV:
Capital Structure: Cost of capital: cost of equity, preference shares, bonds – weighted average cost of capital – capital gearing – overcapitalization and undercapitalization, sources of finance.

UNIT V:
Financial Analysis through ratios: Ratio Analysis – classification of ratios – short term solvency and long term solvency – profitability ratios – analysis and interpretation of financial statements through ratios of liquidity, solvency and profitability.

UNIT VI:
Funds Flow and Cash Flow Analysis: Meaning, Importance, statement of changes in working capital, statement of sources and application of funds. Cash flow analysis: cash flow statements: preparation, analysis and interpretation.

UNIT VII:
Break Even Analysis: Concept of Break Even Point, Cost-Volume-Profit Analysis, Determination of Break Even Point, Margin of Safety and P/V ratio, Impact of changes in cost or selling price on BEP, Practical applications of Break Even Analysis.

UNIT VIII:
Capital Budgeting: Capital and its significance, types of capital, estimation of fixed and working capital requirements, methods and sources of raising capital. Capital budgeting: features, proposals, methods of capital budgeting, payback method, accounting rate of return (AAR), Net Present Value Method(NPV) and Internal Rate of Return (IRR) -simple problems.

REFERENCES:

1. **Financial Accounting**, S.N.Maheshwari, Sultan Chand, 2009.
2. **Financial Management and Policy**, Van Horne, James,C., Pearson ,2009.
3. **Financial Accounting**, Tulsian, S Chand, 2009.
4. **Financial Statement Analysis**, Khan and Jain, PHI, 2009
5. **Financial Management**, I.M.Pandey, Vikas Publications
6. **Financial Management**, Bhat Sundhindra, Excel: 2009
7. **Financial Management**, Prasanna Chandra, T.M.H, 2009.

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MCA Semester-I **T**
4

(9F00104) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

UNIT-I

Mathematical Logic: Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Quantifiers, universal quantifiers

UNIT-II

Predicates: Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

UNIT-III

Relations: Properties of Binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Lattices, Hasse diagram. Functions: Inverse Function, Composition of functions, recursive Functions, Lattice and its Properties,

UNIT-IV

Algebraic structures: Algebraic systems examples and general properties, Semi groups and monads, groups, sub groups homomorphism, Isomorphism.

UNIT-V

Elementary Combinatorics: Basis of counting, Enumerating Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion. Pigeon hole principles and its application

UNIT-VI

Recurrence Relation: Generating Functions & Sequences , Calculating Coefficient of generating function, Recurrence relations, Solving Recurrence relation by substitution and Generating functions. Characteristic roots, solution of Inhomogeneous Recurrence Relation.

UNIT-VII

Graph Theory: Representation of Graph, DFS, BFS, Spanning Trees, planar Graphs

UNIT-VIII

Graph Theory Applications: Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers

REFERENCE:

1. **Elements of Discrete Mathematics- A Computer Oriented Approach**,C.L.Liu, D.P. Mohapatra, 3/e,TMH.
2. **Discrete Mathematics for Computer Scientists & Mathematicians**, 2/e, J.L.Mott, A. Kandel, T.P. Baker, PHI
3. **Discrete Mathematical Structures with Application to Computer Science**, Tremblay, Manohar McGraw Hill Publication
4. **Discrete and Combinatorial Mathematics- An Applied Introduction**,Ralph. P.Grimaldi, 5/e,Pearson Education.
5. **Discrete Mathematics and its applications**, 6th edition, K.H.Rosen, TMH.
6. **Discrete Mathematical Structures**, Mallik and Sen, Cengage Learning.
7. **Discrete Mathematical Structures**, Bernand Kolman, Robert C. Busby, Sharon Cutler Ross, PHI/ Pearson Education.
8. **Discrete Mathematics with Applications**,Thomas Koshy,Elsevier.
9. **Discrete Mathematics**, Lovasz, Springer.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR.

MCA Semester-I **Th**
4

(9F00105) DATA STRUCTURES

UNIT – I- Overview of C, Functions, Arrays, Pointers, Strings, Derived types, Input and Output, Concepts and Classification of Data Structures.

UNIT – II-Linked list: Definition, Single linked lists, Doubly linked lists, Circular linked lists, Circular Double linked lists, Applications of Linked list: Sparse Matrix Manipulation, Polynomial Representation

UNIT – III-Stacks: Introduction, Definition, Representation of Stacks- Arrays and Linked lists, Operations on stacks, Applications of stacks-Evaluation of Arithmetic Expression, Implementation of Recursion, Factorial Calculations, Towers of Hanoi.

UNIT – IV-Queues: Introduction, Definition, Representation of Queues- Arrays and Linked lists, Various Queue structures, Operations on Queues, Applications, Priority queues.

UNIT - V -Sorting: Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, Radix Sort and Quick Sort

UNIT – VI-Searching : Linear Search, Binary Search, and Fibonacci Search.
Tables: Rectangular, Inverted Tables, Hashing Techniques.

UNIT – VII-Tress: Binary Tree, Binary Search Tree (BST), Representation and operations on BST, Recursive and Non- Recursive Tree Traversal Techniques: In order, post order, pre order and applications.

UNIT – VIII-Special Binary Trees: Height Balanced Trees, Heaps, Heap Sort, B-Trees, Threaded Binary Trees, Advantages of Special Trees

REFERENCES :

1. **Programming in C and Data Structure**s, J.R. Hanly, Ashok N. Kamthane, A. Ananda Rao, Pearson Education.
2. **C Programming & Data Structures**, B.A.Forouzan and R.F. Gilberg, 3/e, Cengage Learning.
3. **An Introduction to Data Structures With Applications**, Trembley, Sorenson, 2/e, TMH.
4. **Programming in C** – Stephen G. Kochan, III Edition, Pearson Eductaion.
5. ”**Classic Data Structures**”, Samanta,1/e, 2001, PHI.
6. **C Programming with problem solving**, J.A. Jones & K. Harrow, Dreamtech Press
7. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, 8/e, Pearson Education / PHI,.

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MCA Semester I **Lab 3**

(9F00106) DATA STRUCTURES THROUGH C- LAB

Objectives:

- To make the student learn a programming language.
- To teach the student to write programs in C to solve typical problems.
- To introduce the student to simple linear data structures such as lists, stacks, queues.

Recommended Systems/Software Requirements:

- Intel based desktop PC with ANSI C Compiler and Supporting Editors

Exercise l.

a) Write a C program to find the sum of individual digits of a positive integer.

b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

c) Write a C program to generate all the prime numbers between 1 and n, where value of n is supplied.

Exercise 2.

a) Write a C program to calculate the following Sum:

Sum=1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10!

b) Write a C program to find the roots of a quadratic equation.

c) Write C program that uses both recursive and non-recursive functions

i) To find the factorial of a given integer.

ii) To find the GCD (greatest common divisor) of two given integers.

iii) To solve Towers of Hanoi problem.

Exercise 3

a) Write a C program to find both the largest and smallest number in a list of integers.

b) Write a C program that uses functions to perform the following:

i) Addition of Two Matrices ii) Multiplication of Two Matrices

c) Write a C program that uses functions to perform the following operations:

i) To insert a sub-string in to a given main string from a given position.

ii) To delete n Characters from a given position in a given string.

d) Write a C program to determine if the given string is a palindrome or not

Exercise 4

a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn’t contain T.

b) Write a C program to count the lines, words and characters in a given text.
c) Write a C program to generate Pascal's triangle.
d) Write a C program to construct a pyramid of numbers.

Exercise 5
a) Write a C program which copies one file to another.
b) Write a C program to reverse the first n characters in a file.
(Note: The file name and n are specified on the command line.)
c) Write a C programme to display the contents of a file.
d) Write a C programme to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

Exercise 6
Write a C program that uses functions to perform the following operations.:
i) Creation ii) Insertion iii) Deletion iv) Traversal
on
a) singly linked list **b)** doubly linked list **c)** circular linked list

Exercise 7
a)Write C programs that implement stack (its operations) using
i) Arrays ii) Pointers
b)Write C programs that implement Queue (its operations) using
i) Arrays ii) Pointers

Exercise 8
Write a C program that uses Stack operations to perform the following:
i) Converting infix expression into postfix expression
ii) Evaluating the postfix expression

Exercise 9
Write a C program that implements the following sorting methods to sort a given list of integers in ascending order
i) Bubble sort
ii) Selection sort

Exercise 10
Write C program that implements the following sorting method to sort a given list of integers in ascending order:
i)Quick sort
ii)Merge sort

Exercise 11

Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers :

i) Linear search ii) Binary search

Exercise 12

Write C programs to implement the Lagrange interpolation and Newton- Gregory forward interpolation.

Write C programs to implement the linear regression and polynomial regression algorithms.

Exercise 13

Write C programs to create BST and perform operations on it.

Write C programs to implement recursive and non recursive Tree traversal techniques.

Exercise 14

Write C programs to implement Trapezoidal and Simpson methods.

Write C programs to implement Heap Sort.

REFERENCES:

1. **The Spirit of C, an introduction to modern programming**, M.Cooper, Jaico Publishing House.
2. **Mastering** C, K.R. Venugopal and S.R. Prasad, TMH Publications.
3. **Computer Basics and C Programming,** V. Rajaraman, PHI Publications

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR.

MCA Semester-I **Lab 3**

(9F00107) IT WORKSHOP

Objectives:
The IT Workshop for engineers is a training lab course spread over 40 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, Power Point.

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows , Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. **The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.**
Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets and power point presentations. (**Recommended to use Microsoft office 2007 in place of MS Office 2003)**

PC Hardware
Exercise 1 – Task 1 : Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Exercise 2 – Task 2 : Every student should disassemble and **assemble the PC back to working condition.** Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Exercise 3 – Task 3 : Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Exercise 4 – Task 4 : Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Exercise 5 – Task 5 : Hardware Troubleshooting : Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

Exercise 6 – Task 6 : Software Troubleshooting : Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Internet & World Wide Web

Exercise 7 - Task 1 : **Orientation & Connectivity Boot Camp :** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Exercise 8 - Task 3 : **Search Engines & Netiquette :** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

MS Word

Exercise 9&10: The mentor needs to give an overview of Microsoft (MS) word 2007: Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word. Give a task covering to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Inserting table, using Drawing toolbar in word.

MS Excel

Exercise 11&12: The mentor needs to tell the importance of MS office 2007 Excel as a Spreadsheet tool covering Accessing, overview of toolbars, saving excel files, Using help and resources., Also give a task that is covering the features like Gridlines, Format Cells, Summation, auto fill, Formatting Text.

MS Power Point

Exercise 13&14: Students will be working on MS power point that helps them create basic power point presentation. Topics covered during this Exercise include :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in Power point. Students shall be given a model power point presentation which needs to be replicated (exactly how it’s asked).

REFERENCES :

1. **Comdex Information Technology course tool kit Vikas Gupta**, WILEY Dream tech
2. **The Complete Computer upgrade and repair book**,3rd edition Cheryl A Schmidt, WILEY Dreamtech
3. **Introduction to Information Technology**, ITL Education Solutions limited, Pearson Education.
4. **PC Hardware and A+Handbook** – Kate J. Chase PHI (Microsoft)
5. **LaTeX Companion – Leslie Lamport**, PHI/Pearson.
6. **IT Essentials PC Hardware and Software Companion Guide** Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
7. **IT Essentials PC Hardware and Software Labs and Study Guide** Third Edition by Patrick Regan – CISCO Press, Pearson Education.
8. **Troubleshooting,Maintaining and Repairing** PCs,S.J.Bigelow,5th edition,TMH.

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MCA Semester-I **Lab 3**

(9FBS108) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

Objectives:

The **Language Lab** focuses on the recognising and production practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

To expose the students to a variety of self-instructional, learner-friendly modes of language learning.

To help the students cultivate the habit of reading passages from the computer monitor, thus equip them with the required facility to face computer-based competitive exams such GRE, TOEFL, GMAT etc.

To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.

To train them to use language effectively to face interviews, group discussions, public speaking.

To expose them to different techniques in resume preparation, report writing, format-making etc.

The following course content is prescribed for the English Language Laboratory Practice

1. Phonetics- Introduction to the Sounds of English – vowels, Diphthongs and consonants
2. Introduction to Stress, Accent, Intonation and Rhythm
3. Interpersonal communications and Situational Dialogues/Role play
4. Oral Presentations/Public speaking
5. Debate
6. Group Discussions
7. Facing interviews
8. Resume preparation

Exercise 1: Phonetics –English pronunciation– basics in phonetics- introduction to sounds of English – vowels – diphthongs – consonants – phonetic transcription

Exercise 2: Techniques to develop effective word accent- various stress patterns– developing voice quality and tone– intonation– rhythm– rhythm in connected speech

Exercise 3: Fundamentals of interpersonal communication– starting a conversation- responding appropriately and relevantly

Exercise 4: Dialogues- Formal and informal– using the right body language– role play in different situations.

Exercise 5: Importance of Oral Presentations- developing and organizing the presentations– verbal and visual support in presentations– delivering the presentation

Exercise 6: Informative, group and special occasion presentations– persuasive presentations

Exercise 7: Formal and Informal debate– theory for debating– art of debating

Exercise 8: Debate on various topics

Exercise 9: Nature of group discussion– characteristics of successful GD's– strategies– techniques for individual contribution- intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.
Exercise 10: Organizing Group Discussions
Exercise 11: Interview Skills– concept and process, pre-interview planning, opening strategies, answering strategies, projecting a positive image, interview through tele and video-conferencing.
Exercise 12: Organizing mock interviews
Exercise 13: Resume design– structure and presentation, planning, defining the career objective, projecting one's strengths and skill-sets, summary.
Exercise 14: Resume styles– job application letters

Minimum Requirements

Computer aided multi media language lab equipped with Computer systems in LAN facility. Conventional Language Lab. with audio and video systems, speakers, headphones and a teacher console so as to accommodate at least 60 students.

PRESCRIBED SOFTWARE: GLOBARENA

Suggested Software:

- Cambridge Advanced Learners' Dictionary with exercises
- The Rosetta Stone English Library
- Clarity Pronunciation Power
- Mastering English in Vocabulary, Grammar, Spellings, Composition
- Dorling Kindersley series of Grammar, Punctuation, Composition etc.
- Oxford Advanced Learner's Compass, 7th Edition
- Language in Use, Foundation Books Pvt Ltd
- Learning to Speak English - 4 CDs
- Microsoft Encarta
- Murphy's English Grammar, Cambridge
- Time series of IQ Test, Brain-teasers, Aptitude Test etc. English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

REFERENCES :

- **Developing Communication Skills** by Krishna Mohan & Meera Benerji (Macmillan)
- **Speaking English Effectively** by Krishna Mohan & NP Singh (Macmillan)
- **Oxford Practice Grammar with Answers,** John Eastwood, Oxford
- **Handbook of English Grammar and Usage**, Mark Lester and Larry Beason, Tata McGraw-Hill
- **A text book of English Phonetics for Indian Students** by T.Balasubramanian (Macmillan)
- **TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE** by CLIFFS)
- **English Skills for Technical Students**, WBSCTE with British Council, OL
- **Everyday Dialogues in English** by Robert J Dixson, Prentice – Hall of India Ltd.
- Professional Communication by Koneru, McGraw Hill.

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MCA Semester-II **Th**
4

(9FHS201) ORGANISATION STRUCTURE AND PERSONNEL MANAGEMENT

UNIT I- Introduction to Management**:** Concepts of Management and organization – nature, importance and functions and theories of management, systems approach to management, leadership styles, social responsibilities of management.

UNIT II- Introduction to Organization**:** Designing Organizational structures: Basic concepts related to Organization – Departmentation and Decentralization, types and evaluation of mechanistic and structures of organization and suitability.

UNIT III- Decision Process Approach**:** Parts of organization system, development of corporate strategy, dynamics of decision, role of system. Types of models: mathematical planning models, deterministic and probabilistic models.

UNIT IV- Personnel Management**:** Evolution, objectives, personnel policies. Personnel management vs HRM, position of the personnel department in the organization, Role of personnel manager as line manager and staff manager.

UNIT V- Man Power Planning: Need-strategies and limitations, manpower inventory, manpower forecasting, job description, recruitment, job specification and selection, interviewing techniques, transfers and promotion policies.

UNIT VI- Training and Development: Objectives and policies planning, organizing the training department, training manager and his job, on and off the job training techniques, career planning, objectives of performance appraisal.

UNIT VII- Understanding Human Behavior**:** Personality – Johari Window – Transactional Analysis. Perception: Perceptual process, Development of Attitudes and Values, Understanding Group Dynamics, Team Effectiveness, Strategies to deal with conflicts and stress.

UNIT VIII- Contemporary Strategies: Total Quality Management (TQM), six sigma, people capability maturity model (PCMM) levels, performance management, business process outsourcing (BPO), business process re-engineering, bench marking and balanced score card.

REFERENCES:

1. **Organisational Behaviour**, Robbins:Pearson,2008.
2. **Management and Organizational Behavior**, P.Subbarao HPH, 2009.
3. **Industrial Business Management**, Martand T Telsang, S.Chand.
4. **Human resources Management**, Dr L.M.Prasad, S.Chand.
5. **Dynamic personnel Administration**, Rudrabasavaraj MN, Himalaya.
6. **Personnel Management**, Mamoria & Gankar, HPH, 2009.
7. **Essentials of Management**, Koontz & Weihrich, TMH, 2009.
8. **Understanding Organisational Behaviour**, Udai Pareek, P.H.I,2009.

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MCA Semester-II **Th**
4

(9F00202) OBJECT ORIENTED PROGRAMMING

UNIT I - Different paradigms for problem solving, need for OOP paradigm, classes and instances, fundamental characteristics of OOP (Alan key), differences between OOP and Procedure Oriented Programming.

UNIT II- C++ Basics: Structure of a C++ program, Data types, Declaration of variables, Expressions, Operators, Operator Precedence, Evaluation of expressions, Type conversions, Pointers, Arrays, Pointers and Arrays, Strings, Structures, References. Flow control statements- if, switch, while, for, do, break, continue, goto statements.

UNIT III- C++ Functions-Scope of variables, Parameter passing methods, Default arguments, inline functions, Recursive functions, Pointers to functions.
C++ Classes And Data Abstraction: Class definition, Class objects, Class scope, this pointer, Friends to a class, Static class members, Constant member functions, Constructors and Destructors, Data abstraction, ADT and information hiding.

UNIT IV- Dynamic memory allocation and deallocation operators-new and delete, Dynamic creation and destruction of objects, Preprocessor directives, name spaces.
Polymorphism: Function overloading, Operator overloading, Generic programming-necessity of templates, Function templates and class templates.

UNIT V- Inheritance: Defining a class hierarchy, Different forms of inheritance, Defining the Base and Derived classes, Access to the base class members, Base and Derived class construction, Destructors, Virtual base class.

UNIT VI- Virtual Functions and Run Time Polymorphism: Overriding, Static and Dynamic bindings, Base and Derived class virtual functions, Dynamic binding through virtual functions, Virtual function call mechanism, Pure virtual functions, Abstract classes.
UNIT VII- C++ I/O: I/O using C functions, C++ Stream classes hierarchy, Stream I/O, File streams and String streams, File Operations, Overloading << and >> operators, Error handling during file operations, Formatted I/O.

UNIT VIII- Exception Handling: Benefits of exception handling, Throwing an exception, The try block, Catching an exception, Exception objects, Exception specifications, Stack unwinding, Rethrowing an exception, Catching all exceptions.

REFERENCES:

1. **C++, The Complete Reference**, 4th Edition, Herbert Schildt, TMH.
2. **Object Oriented Programming in C++**, 4th Edition, R.Lafore, SAMS, Pearson Education

3. **An Introduction to OOP**, 3rd Edition, T. Budd, Pearson Education,2008.
4. **Programming Principles and Practice Using C++**, B.Stroutstrup, Addison- Wesley, Pearson Education.
5. **Problem solving with C++,** 6th Edition, Walter Savitch, Pearson Education,2007..
6. **The Art, Philosophy and Science of OOP with C++,** R.Miller,SPD.
7. **OOP in C++, 3rd Edition**, T.Gaddis, J.Walters and G.Muganda, Wiley DreamTech Press.
8. **An Introduction to OOP in C++ with applications in Computer Graphics**, 2nd Edition, G.M.Seed, Springer.

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MCA Semester-II **Th**
4

(9F00203) COMPUTER ORGANIZATION

UNIT I- NUMBER SYSTEMS AND COMPUTER ARITHMETIC- Signed and unsigned numbers, Addition and subtraction, multiplication, division, Floating point representation, logical operation, Gray code, BCD codes, Error detecting codes, Boolean algebra, Simplification of Boolean expressions, K-Maps. COMBINATIONAL AND SEQUENTIAL CIRCUITS- decoders, Encoders, Multiplexers, Half and Full adders, Shift registers, Sequential circuits- flip-flops.

UNIT II- MEMORY ORGANIZATION-Memory hierarchy, Main memory-RAM, ROM chips, Memory address map, memory contention to CPU, Associative Memory-Hardware logic, match, read and write logic, Cache Memory-Associative mapping, Direct mapping, Set-associative mapping, hit and miss ratio.

UNIT III- MICRO PROGRAMMED CONTROL **:** Control memory, Address sequencing, microprogram example, design of control unit, Hard wired control, Microprogrammed control

UNIT IV- BASIC CPU ORGANIZATION-Introduction to CPU, Instruction formats-INTEL-8086 CPU architecture-Addressing modes - generation of physical address- code segment registers, Zero, one, two, and three address instructions.

UNIT V- INTEL 8086 ASSEMBLY LANGUAGE INSTRUCTIONS-Data transfer instructions-input- output instructions, address transfer, Flag transfer, arithmetic, logical, shift, and rotate instructions. Conditional and unconditional transfer, iteration control, interrupts and process control instructions, assembler directives, Programming with assembly language instructions.

UNIT VI- INPUT -OUTPUT ORGANIZATION-Peripheral devices, input-output interface-I/O Bus and interface modules, I/O versus Memory bus, isolated versus memory mapped I/O, Modes of transfer-Programmed I/O, Interrupt-initiated I/O, priority interrupts-Daisy chaining, parallel priority, interrupt cycle, DMA- DMA control, DMA transfer, Input output processor-CPU-IOP communication.

UNIT VII- PIPELINE AND VECTOR PROCESSING **:** Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

UNIT VIII- MULTI PROCESSORS **:** Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration. InterProcessor Communication and Synchronization, Cache Coherance, Shared Memory Multiprocessors.

REFERENCES:

1. **Computer System Architecture**, M. Morris Mano , 3rd Edition, PHI/Pearson Education,2008.
2. **Microprocessors and Interfacing**, Douglas Hall, Tata McGraw-Hill.

3. **Computer Organization**, Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Vth Edition, McGraw Hill.
4. **Fundamentals of Computer Organization and Design**, Sivarama P.Dandamudi, Springer Int. Edition.
5. **Computer Organization and Architecture**, William Stallings, 7th Edition, Pearson/PHI,2007.
6. **Digital Design** , M. Morris Mano, PHI/Pearson Education .

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MCA Semester-II **Th**
4

(9F00204) OPERATING SYSTEMS

UNIT I- Operating System Introduction: Operating Systems objectives and functions, Computer System Architecture, OS Structure, OS Operations, Evolution of Operating Systems - Simple Batch, Multi programmed, time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, Special -Purpose Systems, Operating System services, User OS Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, OS Structure, Virtual Machines.

UNIT II- Process and CPU Scheduling - Process concepts-The Process, Process State, Process Control Block, Threads, Process Scheduling-Scheduling Queues, Schedulers, Context Switch, Preemptive Scheduling, Dispatcher, Scheduling Criteria, Scheduling algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Thread scheduling, Case studies: Linux, Windows.

UNIT III- Process Coordination – Process Synchronization, The Critical Section Problem, Peterson’s solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Case Studies: Linux, Windows.

UNIT IV- Memory Management and Virtual Memory - Logical & Physical Address Space, Swapping, Contiguous Allocation, Paging, Structure of Page Table, Segmentation, Segmentation with Paging, Virtual Memory, Demand Paging, Performance of Demanding Paging, Page Replacement Page Replacement Algorithms, Allocation of Frames, Thrashing, Case Studies: Linux, Windows.

UNIT V- File System Interface - The Concept of a File, Access methods, Directory Structure, File System Mounting, File Sharing, Protection. File System Implementation - File System Structure, File System Implementation, Allocation methods, Free-space Management, Directory Implementation, Efficiency and Performance, Case Studies: Linux, Windows.

UNIT VI- Mass Storage Structure – Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, Swap space Management, RAID structure, stable-storage implementation, Tertiary storage structure.

UNIT VII- Deadlocks - System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

UNIT VIII- Protection – System Protection, Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, Capability-Based Systems, Language-Based Protection.
Security**-** The Security problem, Program threats, System and network threats, Cryptography as a security tool, User authentication, Implementing security defenses, Firewalling to protect systems and networks, Computer –security classifications, Case Studies: Linux, Windows.

REFERENCES:

1. **Operating System Principles** , Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 8th Edition, Wiley Student Edition
2. **Operating Systems – Internals and Design Principles**, W. Stallings, 6th Edition, Pearson Education.
3. **Modern Operating Systems**, Andrew S Tanenbaum, 3rd Edition, Pearson/PHI
4. **Operating Systems A concept-based Approach**, 2nd Edition, D.M.Dhamdhere, TMH.
5. **Principles of Operating Systems** , B.L.Stuart, Cengage learning, India Edition.
6. **Operating Systems**, A.S.Godbole,2nd Edition, TMH
7. **An Introduction to Operating Systems**, P.C.P. Bhatt, PHI.
8. **Operating Systems**, R.Elmasri, A,G.Carrick and D.Levine, Mc Graw Hill.

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MCA Semester-II **Th 4**

(9F00205) OPERATIONS RESEARCH

UNIT I- Introduction to Operations Research: Basics definition, scope, objectives, phases, models and limitations of Operations Research, Linear Programming Problem – Formulation of LPP, Graphical solution of LPP, Simplex Method, Artificial variables, big-M method, two-phase method, degeneracy and unbound solutions.

UNIT II- Revised simplex method- Formulation of LP Problems , Computational Procedure, Dualality in LP-Introduction, Comparison of solutions of the dual and its primal, Dual simple method.

UNIT III- Transportation Problem- Formulation, solution, unbalanced Transportation problem. Finding basic feasible solutions – Northwest corner rule, least cost method and Vogel's approximation method, Optimality test- the stepping stone method and MODI method.

Assignment model- Formulation, Hungarian method for optimal solution, Solving unbalanced problem, Traveling salesman problem as assignment problem.

UNIT IV- Sequencing models, Solution of Sequencing Problem – Processing n Jobs through 2 Machines – Processing n Jobs through 3 Machines – Processing 2 Jobs through m machines – Processing n Jobs through m Machines.

UNIT V- Replacement Models, Replacement of Items that Deteriorate whose maintenance costs increase with time without change in the money value, Replacement of items that fail suddenly: individual replacement policy, group replacement policy.

UNIT VI- Dynamic programming, Characteristics of dynamic programming, Dynamic programming approach for Priority Management employment smoothening, capital budgeting, Stage Coach/Shortest Path, cargo loading and Reliability problems.

UNIT VII- Games Theory, Competitive games, rectangular game, saddle point, minimax (maximin) method of optimal strategies, value of the game, Solution of games with saddle points, dominance principle, Rectangular games without saddle point – mixed strategy for 2 X 2 games.

UNIT VIII- Inventory models, Inventory costs, Models with deterministic demand – model (a) demand rate uniform and production rate infinite, model (b) demand rate non-uniform and production rate infinite, model (c) demand rate uniform and production rate finite.

REFERENCES:

1. **Operations Research**, A.M. Natarajan, P. Balasubramani, A. Tamilarasi,Pearson Education, 2005.
2. **Operations Research**, P Sankara Iyer,Tata McGraw-Hill, 2008.
3. **Operations Research**, R. Panneerselvam, 2/e, PHI 2008.
4. **Operations Research,** P. K. Gupta and D. S. Hira, S. Chand & co., 2007.
5. **Operations Research** – Theory & Applications J K Sharma, 3/e, Macmillan India Ltd, 2007.
6. **Operations Research**, Col. D. S. Cheema, Laxmi Publications Ltd., 2005.
7. **Introductory Operations Research – Theory and applications**, H.S. Kansa & K.D. Kumar, Springer, 2005.
8. **Operations Research ,** A.B.Rao, Jaico Publishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR.

MCA Semester-II **Lab 3**

(9F00206) PROGRAMMING IN C^{++} -LAB

List of Sample Problems/Experiments:

1. Write a **C^{++}** program to find the sum of individual digits of a positive integer.
2. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.Write a C++ program to generate the first n terms of the sequence.
3. Write a **C^{++}** program to generate all the prime numbers between 1 and n , where n is a value supplied by the user.
4. Write **C^{++}** programs that use both recursive and non-recursive functions
   a. To find the factorial of a given integer.
   b. To find the GCD of two given integers.
   c. To find the nth Fibonacci number.
5. Write a **C^{++}** program that uses a recursive function for solving Towers of Hanoi problem.
6. Write a **C^{++}** program that uses functions
   a. To swap two integers.
   b. To swap two characters.
   c. To swap two reals. Note: Use overloaded functions.
7. Write a **C^{++}** program to find both the largest and smallest number in a list of integers.
8. Write a **C^{++}** program to sort a list of numbers in ascending order.
9. Write a **C^{++}** program that uses function templates to solve problems-7&8.
10. Write a **C^{++}** program to sort a list of names in ascending order.
11. Write a **C^{++}** program to implement the matrix ADT using a class. The operations supported by this ADT are: a) Reading a matrix. b) Printing a matrix.
    c) Addition of matrices. d) Subtraction of matrices. e)Multiplication of matrices.
12. Implement the matrix ADT presented in the problem-11 using overloaded operators (<<, >>, +, -, *) and templates.
13. Implement the complex number ADT in C++ using a class. The complex ADT is used to represent complex numbers of the form c=a+ib, where a and b are real numbers. The operations supported by this ADT are:
    a) Reading a complex number. d) Subtraction of complex numbers.
    b) Writing a complex number. e) Multiplication of complex numbers.
    c) Addition of Complex numbers. f) Division of complex numbers.
14. Write a C^{++} program that overloads the + operator and relational operators (suitable) to perform the following operations:
    a) Concatenation of two strings.
    b) Comparison of two strings.

15. Implement the complex number ADT in $\mathbf{C}^{++}$ using a class. The complex ADT is used to represent complex numbers of the form c=a+ib, where a and b are real numbers. The operations supported by this ADT are:
    a) Reading a complex number.
    b) Writing a complex number.
    c) Addition of Complex numbers.
    d) Subtraction of complex numbers.
    e) Multiplication of complex numbers.
    f) Division of complex numbers.

    Note: 1. overload << and >> operators in part a and part b.
    2. overload +, **-** , * , / operators in parts c, d, e and f.
16. Write a template based $\mathbf{C}^{++}$ program that determines if a particular value occurs in an array of values.
17. Write a $\mathbf{C}^{++}$ program that uses functions to perform the following operations:
    a. Insert a sub-string into the given main string from a given position.
    b. Delete n characters from a given position in a given string.
18. Write a $\mathbf{C}^{++}$ program that uses a function to reverse the given character string in place, without any duplication of characters.
19. Write a $\mathbf{C}^{++}$ program to make the frequency count of letters in a given text.
20. Write a $\mathbf{C}^{++}$ program to count the lines, words and characters in a given text.
21. Write a $\mathbf{C}^{++}$ program to determine if the given string is a palindrome or not.
22. Write a $\mathbf{C}^{++}$ program to make frequency count of words in a given text.
23. Write a $\mathbf{C}^{++}$ program that displays the position or index in the string S where the string t begins, or –1 if S doesn't contain t.
24. 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C++ program to find the 2's complement of a binary number.
25. Write a $\mathbf{C}^{++}$ program that counts the number of 1 bit in a given integer.
26. Write a $\mathbf{C}^{++}$ program to generate Pascal's triangle.
27. Write a $\mathbf{C}^{++}$ program to construct of pyramid of numbers.
28. Write a $\mathbf{C}^{++}$ program to compute the Sine series.
29. Write a $\mathbf{C}^{++}$ program that converts Roman numeral into an Arabic integer.
30. Write a C++ program which converts a positive Arabic integer into its corresponding Roman Numeral.
31. Write a $\mathbf{C}^{++}$ program to display the contents of a text file.
32. Write a $\mathbf{C}^{++}$ program which copies one file to another.
33. Write a $\mathbf{C}^{++}$ program that counts the characters, lines and words in the text file.
34. Write a $\mathbf{C}^{++}$ program to change a specific character in a file.

    Note: Filename, number of the byte in the file to be changed and the new character are specified on the command line.
35. Write a $\mathbf{C}^{++}$ program to reverse the first n characters in a file.
36. Write a $\mathbf{C}^{++}$ program that uses a function to delete all duplicate characters in the given string.
37. Write a $\mathbf{C}^{++}$ program that uses a function to convert a number to a character string.
38. Write a $\mathbf{C}^{++}$ program that uses a recursive function to find the binary equivalent of a given non-negative integer n.
39. Write a $\mathbf{C}^{++}$ program to generate prime numbers up to n using Sieve of Eratosthenes method.

40. Write a **C**$^{++}$ program
    a) To write an object to a file.
    b) To read an object from the file.
41. Write **C**$^{++}$ programs that illustrate how the following forms of inheritance are supported:
    a) Single inheritance b) Multiple inheritance
    c) Multi level inheritance d) Hierarchical inheritance
42. Write a **C**$^{++}$ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.
43. Write a **C**$^{++}$ program that illustrates how run time polymorphism is achieved using virtual functions.
44. Write a **C**$^{++}$ program that illustrates the role of virtual base class in building class hierarchy.
45. Write a **C**$^{++}$ program that illustrates the role of abstract class in building class hierarchy.

REFERENCES:

1. **Mastering C**$^{++}$**,** K.R.Venu Gopal, Raj Kumar and T.Ravi Shankar, TMH.
2. C^{++} Programming, D.S.Malik, Cengage Learning.
3. **Practical C**$^{++}$ **Programming**, S.Qualline,SPD.
4. **Object Oriented Programming with C**$^{++}$**,** E.Balaguruswamy, 4th Edition, TMH,2008.
5. **OOP with C**$^{++}$, S.Sahay,Oxford Higher Education.
6. C^{++} and OOP Paradigm,D.Jana,2nd Edition, PHI
7. **Fundamentals of C**$^{++}$ **Programming**,S.Subramanian,Jaico Publishing House.
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MCA Semester-II **Lab 3**

(9F00207) COMPUTER ORGANIZATION LAB

List of Sample Problems/Experiments:

Write assembly language programs for the following using MASAM.

1. Write assembly language programs to evaluate the expressions:

   i) a = b + c –d * e

   ii) z = x * y + w – v +u / k

   a. Considering 8-bit, 16 bit and 32 bit binary numbers as b, c, d, e.

   b. Considering 2 digit, 4digit and 8 digit BCD numbers.

   Take the input in consecutive memory locations and results also. Display the results by using “int xx” of 8086. Validate program for the boundary conditions.

2. Write an ALP of 8086 to add two exponential numbers which are in IEEE 754 notation. Display the results by using “int xx” of 8086. Validate program for the boundary conditions.

3. Write an ALP of 8086 to take N numbers as input. And do the following operations on them.

   a) Arrange in ascending and Descending order.

   b) Find max and minimum

   c) Find average Considering 8-bit, 6 bit binary numbers and 2 digit, 4digit and 8 digit BCD numbers. Display the results by using “int xx” of 8086. Validate program for the boundary conditions.

4. Write an ALP of 8086 to take a string of as input (in ‘C’ format)and do the following Operations on it.

   a) Find the length b) Find it is Palindrome or not

   c) Find whether given string substring or not.

   d) Reverse a string e) Concatenate by taking another sting

   Display the results by using “int xx” of 8086.

5. Write the ALP to implement the above operations as procedures and call from the main procedure.

6. Write an ALP of 8086 to find the factorial of a given number as a Procedure and call from the main program which display the result.

7. Write an assembly language program to encrypt digits as shown below:

   Input digit : 0 1 2 3 4 5 6 7 8 9

   Encrypted digit : 4 6 9 5 0 3 1 8 7 2

The program should accept a string consisting of digits. The encrypted string should be displayed using “int xx” of 8086.

8. Write a procedure to locate a character in a given string. The procedure receives a pointer to a string and character to be located. When the first occurrence of the character is located , its position is returned to main. If no match is found, a negative value is returned. The main procedure requests a character string and a character to be located and displays the result.

9. Write an assembly language program to read a string of characters from the user and that prints the vowel count . Display the results by using “int xx” of 8086.
ex. Input : Advanced Programming in UNIX
Out put:

Vowel	count
a or A	3
e or E	1
i or I	3
o or O	1
u or U	1

10. A computer uses RAM chips of 1024 X 1 capacity.
   a) How many chips are needed, and how should their address lines be connected to provide a memory capacity of 1024 bytes?
   b) How many chips are needed to provide a memory capacity of 16K bytes?

11. A computer employs RAM chips of 256X8 and ROM chips of 1024 X 8. The computer needs 2K bytes of RAM, 4K bytes of ROM, and four interface units, each with four registers. A memory-mapped I/O configuration is used. The two highest-order bits of the address bus are assigned 00 for RAM, 01 for ROM, 10 for interface registers.
   a. How many RAM and ROM chips are needed?
   b. Draw a memory-address map for the system.
   c. Give the address range in hexadecimal for RAM, ROM and interface.

12. Obtain the complement function for the match logic of one word in an associative memory. Draw the logic diagram for it and compare with the actual match logic diagram.

13. A two-way set associative cache memory uses blocks of four words. The cache can accommodate a total of 2048 words from main memory. The main memory size is 128K X 32.
   a. Formulate all pertinent information required to construct the cache memory.
   b. What is the size of the cache memory?

14. A digital computer has a memory unit of 64K X 16 and a cache memory of 1K words. The cache uses direct mapping with a block size of four words.
   a. How many bits are there in each word of cache, and how are they divided into functions? Include a valid bit.

b. How many bits are there in the tag, index, block, and word fields of the address format?
c. How many blocks can the cache accommodate?

15. An address space is specified by 24 bits and the corresponding memory space by 16 bits.
a. How many words are there in the address space?
b. How many words are there in the memory space?
c. If a page consists of 2K words, how many pages and blocks are there in the system.

16. A virtual memory has a page size of 1K words. There are eight pages and four blocks. The associative memory page table contains the following entries. Make a list of all virtual addresses(in decimal) that will cause a page fault.

Page	Block
0	3
1	1
4	2
6	0

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1. **IBM PC Assembly Language and Programming**, P. Abel, 5th Edition, PHI/Pearson Education.
2. **Introduction To Assembly Language Programming**, Sivarama P.Dandamudi, Springer Int. Edition,2003.
3. **The 8088 and 8086 Microprocessors: Programming** , Interfacing,Software,Hardware and Application,4th edition,W.A.Triebel,A.Singh,N.K.Srinath,Pearson Education

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MCA Semester-II **Lab 3**

(9F00208) OPERATING SYSTEMS LAB

List of Sample Problems/Experiments:

1. Simulate the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority

2. Simulate all file allocation strategies
   a) Sequentialb) Indexed c) Linked

3. Simulate MVT and MFT

4. Simulate all File Organization Techniques
   a) Single level directory b) Two level c) Hierarchical d) DAG

5. Simulate Bankers Algorithm for Dead Lock Avoidance

6. Write a C program to create a child process and allow the parent to display “Hello” and the child to display “Welcome” on the screen.

7. Simulate all page replacement algorithms such as
   a) FIFO b) LRU c) LFU

8. Simulate Paging Technique of memory management.
9. Write C programs that make a copy of a file using i) standard I/O and
   ii) system calls.

10. Write C programs that count the number of blanks in a text file using
    i) standard I/O and ii) system calls.

REFERENCES:

1. **Operating Systems**, P.P. Choudhury, PHI Learning Private Ltd.
2. **Operating Systems**, R.Chopra, S.Chand and Company Ltd

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MCA II-I Sem **Th**
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(9F00301) DATABASE MANAGEMENT SYSTEMS

UNIT I

Database Systems: Data vs Information-Introducing the Database and the DBMS-Why Database Design is Important-Files and File Systems-Problems with File System Data Management-Database Systems.

Data Models: Data Modeling and Data Models-The Importance of Data Models-Data Model Basic Building Blocks-Business Rules-The Evolution of Data Models-Degree of Data Abstraction.

UNIT II

Entity Relationship Modeling: The Entity Relationship Model (ERM)-Developing an ER Diagram-Database Design Challenges:Conflicting Goals-The Extended Entity Relationship Model-Entity Clustering- Entity Integrity: Selecting Primary Keys-Learning Flexible Database Design-Data Modeling Checklist.

UNIT III

The Relational Database Model: A Logical View of Data-Keys-Integrity Rules-Relational Set Operators-The Data Dictionary and the System Catalog-Relationships within the Relational Database-Data Redundancy Revisited-Indexes-Codd’s Relational Database Rules.

UNIT IV

Structured Query Language (SQL): Introduction to SQL-Data Definition Commands-Data Manipulation Commands-SELECT Queries- Advanced Data Definition Commands-Advanced SELECT Queries-Virtual Tables: Creating a View-Joining Database Tables.

Advanced SQL: Relational Set Operators-SQL Join Operators-Subqueries and Correlated Queries-SQL Functions-Oracle Sequences-Updatable Views-Procedural SQL-Embedded SQL.

UNIT V

Normalization of Database Tables: Database Tables and Normalization-The Need for Normalization-The Normalization Process- Improving the Design-Surrogate Key Considerations-Higher-Level Normal Forms-Normalization and Database Design-Denormalization.

UNIT VI

Transaction Management and Concurrency Control: What is a Transaction?-Transaction State-Implementation of atomicity and durability-Concurrency Control-Serializability-Testing for Serializability-Concurrency Control with Locking Methods-Concurrency Control with Time Stamping Methods-Concurrency Control with Optimistic Methods-Database Recovery Management-Validation Based Protocols-Multiple Granularity.

UNIT VII

Recovery System: Recovery and Atomicity-Log-Based Recovery-Recovery with Concurrent Transactions-Buffer Management-Failure with loss of nonvolatile storage-Advance Recovery Techniques-Remote Backup Systems.

UNIT VIII

File Structure and Indexing: Overview of Physical Storage Media-Magnetic Disks-RAID-Tertiary Storage-Storage Access- File Organization-Organization of Records in Files-Data-Dictionary Storage-Basic Concepts of Indexing-Ordered Indices-B^+-Tree Index Files-B-Tree Index Files-Multiple Key Access- Static Hashing-Dynamic Hashing-Comparison of Ordered Indexing and Hashing-Bitmap Indices-Indexed Sequential Access Methods (ISAM).

REFERENCES:

1. Database Management Systems, Peter Rob, A.Ananda Rao and Carlos Coronel, Cengage Learning.
2. Fundamentals of Database Systems, Elmasri, Navate, Pearson Education.
3. Introduction to Database Systems, C. J. Date Pearson Education.
4. Oracle for Professionals, The X Team, S. Shah and V. Shah, SPD.
5. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition.
6. Database System Concepts, Silberschatz, Korth, McGraw hill, V edition.
7. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
8. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

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MCA II-I Sem **Th 4**

(9F00302) COMPUTER NETWORKS

UNIT I

Network hardware, Reference models, Transmission media, Narrow band and Broadband ISDN, ATM.

UNIT II

The Data Link layer, Design issues, Error detection and correction, Elementary Data link protocols, Sliding window protocols, Data link layer in HDLC, Internet and ATM.

UNIT III

Channel allocation methods, TDM, FDM, ALOHA, Carrier sense Multiple access protocols, Collision free protocols, IEEE standard 802 for LANs-Ethernet, Token Bus, Token ring-Bridges.

UNIT IV

NETWORK LAYER-Routing Algorithms, Shortest path, Flooding, Flow based, Distance vector, Link state, Hierarchical, Broadcast Routing. Congestion control algorithms-General principals of congestion control, Congestion prevention polices, choke packets and Load shedding.

UNIT V

INTERNETWORKING, Tunneling, internetworking, Fragmentation, Network layer in the Internet-IP protocols, IP address, Subnets, Internet control protocols, OSPF, BGP, Internet multicasting, Mobile IP, Network layer in the ATM networks-cell formats, connection setup routing & switching, service categories, and quality of service, ATM LANS.

UNIT VI

The Transport Layer – Elements of transport protocols-addressing, establishing a connection, releasing connection, flow control & buffering & crash recovery, END TO END PROTOCOL-UDP-reliable byte streams(TCP)-end to end format, segment format connection establishment & termination, sliding window revisited, adaptive retransmission.

UNIT VII

Application layer, Network Security- Cryptographic Algorithms, DES, RSA, security mechanisms, Authentication protocols, Message Integrity protocol, Firewalls-Filter based Firewalls, Proxy based firewalls, limitations.

UNIT VIII

Application layer, Name service(DNS) Domain Hierarchy, Name servers, Name resolutions, Traditional applications, SMTP, MIME, World Wide Web-HTTP, Network Management, SNMP.

REFERENCES:

1. Computer Networks -- Andrew S Tanenbaum, 4th Edition. Pearson Education
2. William Stallings. “Data and Computer Communication”, 7e, 2003, PEA.
3. An Engineering Approach to Computer Networks-S.Keshav,2nd Edition,Pearson Education.
4. .Understanding communications and Networks,3rd Edition, W.A.Shay,Cengage Learning.
5. .Computer and Communication Networks Nader F. Mir, Person Education
6. Computer Networking:A Top-Down Approach Featuring the Internet,James F.Kurose,K.W.Ross,3rd Edition,Pearson Education.

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MCA II-I Sem **Th 4**

(9F00303) LINUX PROGRAMMING

UNIT I

Linux Utilities-File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities, sed – scripts, operation, addresses, commands, applications, awk – execution, fields and records, scripts, operation, patterns, actions, functions, using system commands in awk.

UNIT II

Working with the Bourne again shell(bash): Introduction, shell responsibilities, pipes and input Redirection, output redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts.

UNIT III

Linux Files: File Concept, File System Structure,Inodes, File types, The standard I/O (fopen, fclose, fflush, fseek, fgetc, getc, getchar, fputc, putc, putchar, fgets, gets etc.), formatted I/O, stream errors, kernel support for files, System calls, library functions, file descriptors, low level file access - usage of open, creat, read, write, close, lseek, stat family, umask, dup, dup2, fcntl, file and record locking. file and directory management - chmod, chown, links(soft links & hard links - unlink, link, symlink), mkdir, rmdir, chdir, getcwd, Scanning Directories-opendir, readdir, closedir,rewinddir, seekdir, telldir functions.

UNIT IV

Linux Process – Process concept, Kernel support for process, process attributes, process hierarchy,process states,process composition, process control - process creation, waiting for a process, process termination, zombie process,orphan process, system call interface for process management-fork, vfork, exit, wait, waitpid, exec family, system.

UNIT V

Linux Signals – Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise , alarm, pause, abort, sleep functions.

UNIT VI

Interprocess Communication : Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems,pipes, FIFOs, Introduction to three types of IPC(Linux)-message queues, semaphores and shared memory.

Message Queues- Kernel support for messages, Linux APIs for messages, client/server example.

Semaphores-Kernel support for semaphores, Linux APIs for semaphores, file locking with semaphores.

Shared Memory- Kernel support for shared memory, Linux APIs for shared memory, semaphore and shared memory example.

UNIT VII

Multithreaded Programming – Differences between threads and processes,Thread structure and uses,Threads and Lightweight Processes,POSIX Thread APIs, Creating Threads,Thread Attributes,Thread Synchronization with semaphores and with Mutexes,Example programs.

UNIT VIII

Sockets: Introduction to Linux Sockets, Socket system calls for connection oriented protocol and connectionless protocol, example-client/server programs.

REFERENCES:

1. Unix System Programming using C++, T.Chan, PHI.
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH,2006.
3. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones,Wrox, Wiley India Edition,rp-2008.
4. Linux System Programming, Robert Love, O’Reilly, SPD, rp-2007.
5. Unix Network Programming ,W.R.Stevens,PHI.
6. Unix for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson Education, 2003.
7. Advanced Programming in the Unix environment, 2nd Edition, W.R.Stevens, Pearson Education.
8. System Programming with C and Unix,A.Hoover,Pearson.
9. Unix Programming, Kumar Saurabh, 1st Edition, Wiley India pvt Ltd.
10. Unix and Shell programming, B.A.Forouzan and R.F.Gilberg, Cengage Learning.

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MCA II-I Sem **Th**
4

(9F00304) SOFTWARE ENGINEERING

UNIT I

Software, Software Engineering, and Process: The nature of Software, The unique nature of WebApps, Software engineering- A layered technology, The essence and principles of software engineering practice, Generic process model (framework), Process patterns, Process assessment and improvement, CMMI, Software myths.

UNIT II

Process Models: Prescriptive process models: The waterfall model, Incremental process models, Evolutionary process models.
The Unified process, Aspect oriented software development, Agile development: Agile process, Extreme programming.

UNIT III

Software Requirements : Introduction to functional and non-functional requirements, Requirements engineering activities, Eliciting requirements, *Requirements modeling*, Requirements validation, Software requirements specification(SRS), Requirements management. ***Requirements modeling*****:** Structured view: Data modeling (ERD), Flow-Oriented modeling(DFD), Behavioral modeling, Object models, Structured methods. **Software Project Estimation:** Empirical estimation models.

UNIT IV

Design Concepts: Software design quality guidelines and attributes, Design concepts, Design model.
Software Architecture: Architecture and its importance, Architectural Styles, Data design, Architectural design.
Design : Structured view (Traditional view): Architectural mapping using data flow (Call and return architecture), Interface design, Function based component design.
Object oriented view: OO Architecture, Class hierarchies, Message design, Class based component design.

UNIT V

Performing User Interface Design: Golden rules, User interface analysis and design, interface analysis, interface design steps.

Pattern Based Design: Design patterns, Pattern based software design, Architectural patterns, Component level design patterns, User interface design patterns.

UNIT VI

Testing : Software testing strategies: A strategic approach to software testing, Test strategies (Unit testing and integration testing) for conventional and object oriented software, Validation testing, System testing, The art of debugging.

UNIT VII

Testing Conventional Applications: Software testing fundamentals, White-Box testing: Basis path testing, condition (predicate) testing, data flow testing, loop testing, Black box testing: Equivalence partitioning, Boundary value analysis, Graph based testing methods.

Testing Object Oriented Applications: OO testing methods, Testing methods applicable at class level, Interclass test case design.

UNIT VIII

Umbrella Activities :

Risk management, Software quality assurance, Software configuration management, Measurement and metrics: Size oriented metrics, Function oriented metrics, Metrics for software quality, Product metrics: Metrics for the requirements model, Metrics for the design model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Software Reengineering: A software reengineering process model, Software reengineering activities.

REFERENCES:

1. Software Engineering, A practitioner’s Approach- Roger S. Pressman, 7th edition. McGrawHill International Edition.
2. Software Engineering- Sommerville , 8th edition, Pearson education.

3. . Software Engineering- K.K. Agarwal & Yogesh Singh,New Age International Publishers

4. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiely.

5. Systems Analysis and Design- Shely Cashman Rosenblatt,Thomson Publications.

6. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.

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MCA II-I Sem **Th 4**

(9F00305) JAVA PROGRAMMING

UNIT I

Java Basics - History of Java, Java buzzwords, comments, data types, variables, constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow-block scope, conditional statements, loops, break and continue statements, simple java program, arrays, input and output, formatting output, Review of OOP concepts, encapsulation, inheritance, polymorphism, classes, objects, constructors, methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection, building strings, exploring string class, Enumerations, autoboxing and unboxing, Generics.

UNIT II

Inheritance – Inheritance concept, benefits of inheritance ,Super classes and Sub classes, Member access rules, Inheritance hierarchies, super uses, preventing inheritance: final classes and methods, casting, polymorphism- dynamic binding, method overriding, abstract classes and methods, the Object class and its methods.

Interfaces – Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interface.

UNIT III

Inner classes – Uses of inner classes, local inner classes, anonymous inner classes, static inner classes, examples.

Packages-Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

UNIT IV

Data structures creation and manipulation in java – Introduction to Java Collections, Overview of Java Collection frame work, Commonly used Collection classes – ArrayList, LinkedList, HashSet, HashMap, TreeMap, Collection Interfaces – Collection, Set, List, Map, Legacy Collection classes – Vector, Hashtable, Stack, Dictionary(abstract), Enumeration interface, Iteration over Collections – Iterator interface, ListIterator interface. Other Utility classes – StringTokenizer, Formatter, Random, Scanner, Observable, Using java.util.

UNIT V

Files – streams- byte streams, character streams, text Input/output, binary input/output, random access file operations, File management using File class, Using java.io.

Networking in Java – Introduction, Manipulating URLs, Ex. Client/Server Interaction with Stream Socket Connections, Connectionless Client/Server Interaction with Datagrams, Using java.net.

UNIT VI

Exception handling – Dealing with errors, benefits of exception handling, the classification of exceptions- exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, rethrowing exceptions, exception specification, built in exceptions, creating own exception sub classes, Guide lines for proper use of exceptions.

Multithreading - Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, interthread communication, thread groups, daemon threads.

UNIT VII :

GUI Programming with Java - The AWT class hierarchy, Introduction to Swing, Swing vs. AWT,MVC architecture, Hierarchy for Swing components, Containers – Top-level containers – JFrame, JApplet, JWindow, JDialog, Light weight containers – JPanel, A simple swing application, Overview of several swing components- Jbutton, JToggleButton, JCheckBox, JRadioButton, JLabel, JTextField, JTextArea, JList, JComboBox, JMenu, Java's Graphics capabilities – Introduction, Graphics contexts and Graphics objects, color control, Font control, Drawing lines, rectangles and ovals, Drawing arcs, Layout management - Layout manager types – border, grid, flow, box.

UNIT VIII

Event Handling - Events, Event sources, Event classes, Event Listeners, Relationship between Event sources and Listeners, Delegation event model, Semantic and Low-level events, Examples: handling a button click, handling mouse and keyboard events, Adapter classes.

Applets – Inheritance hierarchy for applets, differences between applets and applications, life cycle of an applet - Four methods of an applet, Developing applets and testing, passing parameters to applets, applet security issues..

REFERENCES :

1. Java: the complete reference, 7th editon, Herbert Schildt, TMH.
2. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education / Java: How to Program P.J.Deitel and H.M.Deitel ,8th edition, PHI.
3. Core Java, Volume 1-Fundamentals, eighth edition, Cay S.Horstmann and Gary Cornell, Pearson eduction.
4. Java Programming, D.S.Malik, Cengage Learning.
5. Object Oriented Programming with Java, B.Eswara Reddy, T.V.Suresh Kumar, P.Raghavan, Pearson-Sanguine.
6. An introduction to Java programming and object oriented application development, R.A. Johnson- Cengage Learning.
7. Advanced Programming in Java2, K.Somasundaram, Jaico Publishing House.
8. Starting out with Java, T.Gaddis, dreamtech India Pvt. Ltd.
9. Object Oriented Programming with Java, R.Buyya, S.T.Selvi, X.Chu, TMH.
10. Object Oriented Programming through Java, P.Radha Krishna, Universities Press.
11. An introduction to programming and OO design using Java, J.Nino, F.A.Hosch, John Wiley&Sons.
12. Java and Object Orientation, an introduction, John Hunt, second edition, Springer.
13. Maurach's Beginning Java2,D.Lowe, J.Murach, A. Steelman, SPD.
14. Programming with Java, M.P.Bhave, S.A.Patekar, Pearson Education

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MCA II-I Sem **Lab 3**

(9F00306) DATA BASE MANAGEMENT SYSTEMS LAB

Recommended Systems/Software Requirements:

- Intel based desktop PC
- Mysql /Oracle latest version Recommended

List of Sample Problems/Experiments

1) Creation, altering and droping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
2) Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.
   Example:- Select the roll number and name of the student who secured fourth rank in the class.
3) Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
4) Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)
5) i)Creation of simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found)
   ii)Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.
6) Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.
7) Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE-APPLICATION ERROR.
8) Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.
9) Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.
10) Program development using creation of package specification, package bodies, private objects, package variables and cursors and calling stored packages.

11) Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.
12) Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers

REFERENCES :

1. Database Management Systems, Peter Rob, A.Ananda Rao and Carlos Coronel, Cengage Learning.
2. ORACLE PL/SQL by example. Benjamin Rosenzweig, Elena Silvestrova, Pearson
   Education 3rd Edition
3. SQL & PL/SQL for Oracle 10g, Black Book, Dr.P.S. Deshpande.
4. Introduction to SQL, Rick F.Vander Lans, Pearson Education.
5. Oracle PL/SQL Programming,Steven Feuerstein,SPD.
6. The Database Book, N.Gehani, Universities Press.
7. Database Systems using Oracle: A Simplified Guide to SQL and PL/SQL, Shah, PHI.

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MCA II-I Sem **Lab**
3

(9F00307) JAVA AND LINUX PROGRAMMING LAB.

List of Sample Problems/Experiments

I) JAVA PROGRAMS:

1. a) Write a Java program that prints all real solutions to the quadratic equation ax2 + bx + c = 0. Read in a, b, c and use the quadratic formula. If the discriminant b2 -4ac is negative, display a message stating that there are no real solutions.
   b) The Fibonacci sequence is defined by the following rule:
   The fist two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it. Write a Java program that uses both recursive and non recursive functions to print the nth value in the Fibonacci sequence.

2. a) Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.
   b) Write a Java program to multiply two given matrices.
   c) Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use StringTokenizer class of java.util)

11. Write a Java program to find both the largest and smallest number in a list of integers.

4. Write a Java program to illustrate method overloading.
5. Write a Java program that implements the Sieve of Eratosthenes to find prime numbers.
6. Write a Java program to sort a list of names in ascending order.
7. Write a Java program to implement the matrix ADT using a class. The operations supported by this ADT are:
   a) Reading a matrix. c) Addition of matrices.
   b) Printing a matrix. d) Subtraction of matrices.
   e) Multiplication of matrices.

8. Write a Java Program to solve Tower's of Hanoi problem .
9. Write a Java Program that uses a recursive function to compute ncr. (Note: n and r values are given.)
10. Write a Java program to perform the following operations:

a) Concatenation of two strings.
b) Comparison of two strings.

11. Implement the complex number ADT in Java using a class. The complex ADT is used to represent complex numbers of the form c=a+ib, where a and b are real numbers. The operations supported by this ADT are:
    a) Reading a complex number. d) Subtraction of complex numbers.
    b) Writing a complex number. e) Multiplication of complex numbers.
    c) Addition of Complex numbers.f) Division of complex numbers.

12. Write a Java program that makes frequency count of letters in a given text.

13. Write a Java program that uses functions to perform the following operations :
    a) Inserting a sub-string in to the given main string from a given position.
    b) Deleting n characters from a given position in a given string.

14. a) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.
    b) Write a Java program to make frequency count of words in a given text.

15 .a) Write a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
    b) Write a Java program that reads a file and displays the file on the screen, with a line number before each line.
    c) Write a Java program that displays the number of characters, lines and words in a text file.
    d) Write a Java program to change a specific character in a file.
    Note: Filename , number of the byte in the file to be changed and the new character are specified on the command line.

16. Write a Java program that:
    i) Implements stack ADT.
    ii) Converts infix expression into Postfix form
    iii) Evaluates the postfix expression.

17. a) Develop an applet in Java that displays a simple message.
    b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named “Compute” is clicked.

18. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result.

19. Write a Java program for handling mouse events.

20. a) Write a Java program that creates three threads. First thread displays "Good Morning" every one second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds.

b) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.

21. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

22 . Write a Java program that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result, and then sends the result back to the client. The client displays the result on the console. For ex: The data sent from the client is the radius of a circle, and the result produced by the server is the area of the circle. (Use java.net)

23. a) Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on at a time No light is on when the program starts.

b) Write a Java program that allows the user to draw lines, rectangles and ovals.

24 . a) Write a Java program to create an abstract class named Shape that contains an empty method named numberOfSides ( ).Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes contains only the method numberOfSides ( ) that shows the number of sides in the given geometrical figures.

b) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Jtable component.

25. Write a Java program that illustrates the following
    a) Creation of simple package. b) Accessing a package.
    c) Implementing interfaces.

26. Write Java programs that illustrates the following
    a) Handling predefined exceptions
    b) Handling user defined exceptions

27. Write Java programs that use both recursive and non-recursive functions for implementing the following searching methods:
    a) Linear search b) Binary search

28. Write Java programs to implement the following using arrays and linked lists
    a) List ADT

29. Write Java program to implement the following using an array.
    a) Queue ADT

30. Write a Java program for handling Key events.

31. Write a Java program that uses both stack and queue to test whether the given string is a palindrome.

32. Write Java programs to implement the following using a singly linked list.
    a) Stack ADT b) Queue ADT

33. Write Java programs for implementing the following sorting methods:
    a) Bubble sort d) Quick sort
    b) Selection sort
    c) Insertion sort

II) LINUX PROGRAMMING:

Note: Use Bash for Shell scripts.

1. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
2. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
3. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
4. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
5. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
6. Write a shell script to list all of the directory files in a directory.

1. Write a shell script to find factorial of a given integer.

8. Write an awk script to count the number of lines in a file that do not contain vowels.

9. Write an awk script to find the number of characters, words and lines in a file.

10. Write a c program that makes a copy of a file using standard I/O and system calls.

11. Implement in C the following Unix commands using System calls
    A . cat B. ls C. mv

12. Write a program that takes one or more file/directory names as command line input and reports the following information on the file.
    A. File type. B. Number of links.
    C. Time of last access. D. Read, Write and Execute permissions.

13. Write a C program to emulate the Unix ls –l command.

14. Write a C program to list for every file in a directory, its inode number and file name.

15. Write a C program that demonstrates redirection of standard output to a file.Ex: ls > f1.

16. Write a C program to create a child process and allow the parent to display “parent” and the child to display “child” on the screen.

17. Write a C program to create a Zombie process.

18. Write a C program that illustrates how an orphan is created.

19. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex:- ls –l | sort

20. Write C programs that illustrate communication between two unrelated processes using named pipe.

21. Write a C program (sender.c) to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.

22. Write a C program (receiver.c) that receives the messages (from the above message queue as specified in (21)) and displays them.

Note: You may use packages like java.io, java.util, java.net, java.awt etc in solving the above Java problems.

REFERENCES :

1. Core Java 2, Vol I, Fundamentals, 7th Edition, C.Horstman, Gary Cornel, Pearson Education.
2. Core Java 2, Vol 2, Fundamentals, 7th Edition, C.Horstman, Gary Cornel, Pearson Education.
3. Introduction to Java programming, Sixth edition, Y.Daniel Liang, Pearson Education
4. Data structures and algorithms in Java, 2nd Edition, R.Lafore, Pearson Education.
5. Data Structures using Java, D.S.Malik and P.S. Nair, Cengage Learning.
6. Advanced Unix Programming, N.B.Venkateswarulu, BS Publications.
7. Unix and Shell programming, B.A.Forouzan and R.F.Gilberg, Cengage Learning.
8. Unix and Shell Programming, M.G. Venkatesh Murthy, Pearson Education, 2005.
9. Unix Shells by Example, 4th Edition, Elllie Quigley, Pearson Education.
10. Sed and Awk, O.Dougherty&A.Robbins,2nd edition,SPD.
11. Java Programming,J.Wigglesworth and P.McMillan,Cengage Learning.

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MCA II-II Sem **Th**
4

(9F00401) MANAGEMENT INFORMATION SYSTEMS

UNIT I

Information Systems in Global Business: Information Systems in Global Business today, Information Systems, Organizations, and Strategy: Organizations and Information Systems, How Information Systems Impact Organizations and Business Firms, Economic Impact, Organizational and Behavioral Impact, The Internet and Organizations, Implications for the Design and Understanding of Information Systems, Using Information Systems to Achieve Competitive Advantage, Porter's Competitive Forces Model, Using Systems for Competitive Advantage.

UNIT II

Conceptual system design: Define the problems, set system objectives, establish system constraints, determine information needs, determine information sources, develop alternative conceptual designs and select one, document the system concept, prepare the conceptual design report. Organising data and information: Datawarehouses, Datamart and datamining

UNIT III

Detailed system design I: Inform and involve the organization, aim of detailed design, project management of MIS detailed design, identify dominant and trade off criteria, define the subsystems, sketch the detailed operating subsystems and information flows

UNIT IV

Detailed system design II: determine the degree of automation of each operation, inform and involve the organization again, inputs, outputs, and processing, early system testing, software, hardware and tools, propose an organization to operate the system, document the detailed design, revisit the manager-user.

UNIT V

Implementation, evaluation and maintenance of the MIS: Plan the implementation, acquire floor space and plan space layouts, organize for implementation, develop procedures for implementation, train the operating personnel, computer related acquisitions, develop forms for data collection and information dissemination, develop the files, test the system, cutover, document the system, evaluate the MIS, control and maintain the system.

UNIT VI

Pitfalls in MIS development: Fundamental weaknesses, soft spots, in planning, design problems, implementation : the TAR PIT. Introduction to E-Commerce and E-commerce challenges, An overview of ERP, Applications of information systems to business. Security and ethical issues of information systems.

UNIT VII

Key System Applications for the Digital Age: Enterprise Systems, Supply Chain Management Systems, Customer Relationship Management Systems, Enterprise Applications: New Opportunities and Challenges.

UNIT VIII

Enhancing Decision Making: Decision Making and Information Systems, Systems for Decision Support, Executive Support Systems (ESS) and the Balanced Scorecard Framework. The Growth of International Information Systems, Organizing International Information Systems, Managing Global Systems, Technology Issues and Opportunities for Global Value Chains,

REFERENCES:

1. Information systems for modern management, 3rd Edition by R.G Murdick, J.E Ross and J. R clagget, PHI-1994.
2. Management Information Systems, Managing the Digitial Firm Edition by Kenneth C. Laudon, Jane P. Laudon, Pearson Education, 10th Edition.
3. Management information Systems, 4th edition by Robert Schultheis, Mary Sumner,PHI-Seventeenth Reprint 2007.
4. Principles of Information systems, Sixth edition by Ralph M.Stair, George W.Reynolds, Cengage learning.
5. Management Information Systems,J.A.O’brien,G.M.Marakas,R.Behl,9th Edition,TMH.
6. Management Information Systems,Effy Oz,Cengage Learning.
7. Managing and Using Information Systems,K.E.Pearlson,C.S.Saunders,Wiley India.
8. Management information Systems,M.Jaiswal&M.Mital,Oxford Univ.Press

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MCA II-II Sem **Th**
4

(9F00402) WEB TECHNOLOGIES

UNIT I
HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets

UNIT II
Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script

UNIT III
XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX

UNITIV
Java Beans: Introduction to Java Beans, Advantages of Java Beans, BDK
Introspection, Using Bound properties, Bean Info Interface, Constrained properties
Persistence, Customizes, Java Beans API, Introduction to EJB's

UNIT V
Web Servers and Servlets: Tomcat web server, Introduction to Servelets: Lifecycle of a Serverlet, JSDK, The Servelet API, The javax.servelet Package, Reading Servelet parameters, Reading Initialization parameters. The javax.servelet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues,

UNIT VI
Introduction to JSP: The Problem with Servelet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat

UNIT VII
JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations

UNIT VIII

Database Access : Database Programming using JDBC, Studying Javax.sql.* package,Accessing a Database from a JSP Page, Application – Specific Database Actions,Deploying JAVA Beans in a JSP Page, Introduction to struts framework..

REFERENCES:

1. Web Programming, building internet applications, Chris Bates 2nd edition,
WILEY Dreamtech
2. The complete Reference Java Seventh Edition by Herbert Schildt. TMH.
3. Java Server Pages –Hans Bergsten, SPD O'Reilly

4. Programming world wide web-Sebesta,Pearson
5.Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES By Marty Hall and Larry Brown Pearson
6.Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education Asia.
7. Jakarta Struts Cookbook , Bill Siggelkow, S P D O'Reilly for chap 8.
8.Murach's beginning JAVA JDK 5, Murach, SPD
9.An Introduction to web Design and Programming –Wang-Thomson
10.Web Applications Technologies Concepts-Knuckles,John Wiley
11.Java Script,D.Flanagan,O'Reilly,SPD.
12.Struts 2,Black Book, 2nd Edition,deamtech Press.
13.Web Warrior Guide to Web Programmming-Bai/Ekedaw-Cengage Learning.
14.Beginning Web Programming-Jon Duckett, WROX.
15.Java Server Pages, Pekowsky, Pearson.

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MCA II-II Sem **Th**
4

(9F00403) DATA WAREHOUSING AND MINING

UNIT I

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Major issues in Data Mining.

Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT II

Data Warehouse and OLAP Technology for Data Mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining

UNIT III

Data Cube Computation and Data Generalization: Efficient Methods for Data Cube Computation, Further Development of Data Cube and OLAP Technology, Attribute-Oriented Induction.

UNIT IV

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Efficient and Scalable Frequent Itemset Mining Methods, Mining various kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining

UNIT V

Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Backpropagation, Support Vector Machines, Associative Classification, Lazy Learners, Other Classification Methods, Prediction, Accuracy and Error measures, Evaluating the accuracy of a Classifier or a Predictor, Ensemble Methods

UNIT VI

Cluster Analysis Introduction : Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Clustering High-Dimensional Data, Constraint-Based Cluster Analysis, Outlier Analysis

Mining Streams, Time Series and Sequence Data: Mining Data Streams, Mining Time-Series Data, Mining Sequence Patterns in Transactional Databases, Mining Sequence Patterns in Biological Data, Graph Mining, Social Network Analysis and Multirelational Data Mining

UNIT VII

Mining Object, Spatial, Multimedia, Text and Web Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web.

UNIT VIII

Applications and Trends in Data Mining: Data Mining Applications, Data Mining System Products and Research Prototypes, Additional Themes on Data Mining and Social Impacts of Data Mining.

REFERENCES:

1. Data Mining – Concepts and Techniques - Jiawei Han & Micheline Kamber, Morgan Kaufmann Publishers, 2nd Edition, 2006.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson education.

3. Data Warehousing in the Real World – Sam Aanhory & Dennis Murray Pearson Edn Asia.
4.Insight into Data Mining,K.P.Soman,S.Diwakar, V.Ajay,PHI,2008.
5.Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley student Edition
6.The Data Warehouse Life cycle Tool kit – Ralph Kimball Wiley student edition
7.Building the Data Warehouse By William H Inmon, John Wiley & Sons Inc, 2005.
8.Data Mining Introductory and advanced topics –Margaret H Dunham, Pearson education
9.Data Mining Techniques – Arun K Pujari,2nd edition, Universities Press.
10. Data Mining,V.Pudi and P.Radha Krishna, Oxford University Press.

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MCA II-II Sem **Th 4**

(9F00404a) INFORMATION SECURITY

(ELECTIVE-I)

UNIT I

Security Goals, Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security.Internet Standards and RFCs.

UNIT II

Conventional Encryption Principles & Algorithms(DES, AES, RC4), Block Cipher Modes of Operation, Location of Encryption Devices, Key Distribution.

UNIT III

Public key cryptography principles, public key cryptography algorithms(RSA, RABIN, ELGAMAL, Diffie-Hellman, ECC), Key Distribution.Approaches of Message Authentication. Secure Hash Functions(SHA-512, WHIRLPOOL) and HMAC Digital Signatures. Comparison, Process- Need for Keys, Signing the Digest, Services, Attacks on Digital Signatures, Kerberos, X.509 Directory Authentication Service.

UNIT IV

Email Security: Pretty Good Privacy (PGP) and S/MIME.

UNIT V

IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management

UNIT VI

Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT VII

Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3. Intruders, Viruses and related threats, Virus Counter measures.

UNIT VIII

Firewall Design principles, Trusted Systems, Intrusion Detection Systems

REFERENCES:

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education, 2008.
2. Cryptography & Network Security by Behrouz A. Forouzan, TMH 2007.
3. Cryptography and Network Security by William Stallings, Fourth Edition,Pearson Education 2007.
4. Information Security by Mark Stamp, Wiley – INDIA, 2006.
5. Fundamentals of Computer Security, Springer.
6. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
7. Computer Security Basics by Rick Lehtinen, Deborah Russell & G.T.Gangemi Sr., SPD O'REILLY 2006.
8. Modern Cryptography by Wenbo Mao, Pearson Education 2007.
9. Principles of Information Security, Whitman, Thomson.
10. Information Systems Security,Godbole,Wiley Student Edition.
11. Cryptography and Information Security,V.K.Pachghare,PHI.
12. Network Security and Cryptography,B.Menezes,Cengage Learning.

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MCA II-II Sem **Th**
4

(9F00404b) NET TECHNOLOGIES

(ELECTIVE I)

UNIT I

INTRODUCTION TO .NET FRAMEWORK: .NET Overview - Behind Microsoft .NET- The .NET Platform - .NET Framework Design Goals -.NET Framework. - The Common Language Runtime - CLR Environment and Executables – Metadata - JIT Compilation - Automatic Memory Management -Assemblies and Manifests - Intermediate Language (IL) - The CTS and CLS - CLR Execution.

UNIT II

Introduction to C#.Net Programming: A Demonstration of Visual C# - Common Elements in Visual C# - C# Core Language Features – Types – Classes – Structures – Enumeration - Inheritance - Interfaces Polymorphism - Arrays and Collections - Generics - Operator Overloading - Delegates and Events – Introduction to LINQ Programming - Exception Handling - MSIL Programming.

UNIT III

INTRODUCTION TO VISUALBASIC.NET : Introduction to Visual Basic .NET- Modules-variables- error handling- Arrays, lists - collections – Files- directories- streams - Object serialization - Regular expressions – Threading - Assemblies and AppDomains - Reflection - Windows Forms applications and GDI+ - Windows Forms custom control creation - Windows services.

UNIT IV

APPLICATION DEVELOPMENT USING ADO .NET: Features of ADO.NET. Architecture of ADO.NET – ADO.NET providers –Accessing Data bases Using ADO.NET- Connection opening and closing– Command object – Data Adapter – Dataset – DataTables - Controlling table views with DataViews and DataRelation Objects- Data-binding in Windows Forms and web forms.

UNIT V

INTRODUCTION to ASP.NET: Introduction - Working in ASP.NET - ASP.NET Controls - Session & Cookies – Caching - Authentication & Authorization - Web User Controls - Working with Web Config file - Implementing Security - Crystal Reports - Creating Setup and Deployment.

UNIT VI

XML: Introduction to .NET and XML - Reading and Writing XML - Reading and Writing XML Data Using XmlReader and XmlWriter - Manipulating XML with DOM - XML Data Validation - XML DOM Object Model - Transforming XML Data with XSLT - XML and ADO.NET

UNIT VII

WEB SERVICES:XML Serialization in the .NET Framework -SOAP Fundamentals- Using SOAP with the .NET Framework.- Web Services protocol and standards – WSDL- Documents - Overview of UDDI - Calling a Web Service from a Browser - Calling a Web -Service by Using a Proxy - Creating a simple web service - Developing a WCF Web Service - Creating and Consuming AJAX-Enabled Web Services - Introducing REST and JSON

UNIT VII

.NET Mobile: **.**NET Mobile Introduction - Mobile Example – Emulators – Forms – Events – Input – Validation – Lists – Selection – Images – Utilities

REFERENCES:

1. .NET Framework Essentials, Third Edition , Thuan L. Thai, Hoang Lam Publisher: O'Reilly.
   2003
2. Programming Microsoft® Visual C#® 2008: The Language , Donis Marshall Microsoft Press,2008.
3. Programming Microsoft® Visual Basic® .NET (Core Reference) , Francesco Balena, Microsoft Press, 2006.
4. Microsoft® ADO.NET Step by Step ,Rebecca M. Riordan, Microsoft Press, 2002
5. Professional ASP.NET 2.0 XML, Thiru Thangarathinam ,Wiley Publishing, Inc. 2006
6. Building Microsoft® ASP.NET Applications for Mobile Devices, Second EditionAndy Wigley, Peter Roxburgh , Microsoft Press, 2003

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MCA II-II Sem **Th 4**

(9F00404c) COMPUTER GRAPHICS

(ELECTIVE-I)

UNIT I

Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

UNIT II

Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

UNIT III

2-D Geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

UNIT IV

2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Liang -Barsky line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.

UNIT V

3-D Object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces. Basic illumination models, polygon rendering methods.

UNIT VI

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations, 3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

UNIT VII

Visible surface detection methods: Classification, back-face detection, depth-buffer, A buffer method, scan-line, depth sorting, BSP-tree methods, area sub-division and Octree Methods, Ray-casting Method, Curved Surfaces, Curved- Surface Representations, Surface Contour Plots, Wireframe Methods, Visibilty- Detection Functions.

UNIT VIII

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

REFERENCES:

1. “Computer Graphics C version”, Donald Hearn and M. Pauline Baker, Pearson education.
2. “Computer Graphics Principles & practice”, second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.
3. “Computer Graphics Second edition”, Zhigand xiang, Roy Plastock, Schaum’s outlines, Tata Mc Graw hill edition.
4. “Procedural elements for Computer Graphics”, David F Rogers, Tata Mc Graw hill, 2nd edition.
5. “Principles of Interactive Computer Graphics”, Neuman and Sproul, TMH.
6. “Principles of Computer Graphics”, Shalini, Govil-Pai, Springer.
7. “Computer Graphics”, Steven Harrington, TMH
8. Computer Graphics,F.S.Hill,S.M.Kelley,PHI.
9. Computer Graphics,P.Shirley,Steve Marschner&Others,Cengage Learning.
10. Computer Graphics & Animation,M.C.Trivedi,Jaico Publishing House.

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MCA II-II Sem **Th**
4

(9F00405a) DISTRIBUTED SYSTEMS

(ELECTIVE II**)**

UNIT I

Characterization of Distributed Systems, Networking and Internetworking – Types of network, Network principles, Internet protocols, Case studies.

UNIT II

Inter Process Communication – The API for Internet protocols, External data representation and marshalling, Client-Server Communication, Group Communication, IPC in UNIX.

UNIT III

Distributed Objects and Remote Invocation – Communication between distributed objects, Remote Procedure Call, Events and notifications, Case study – Java RMI.

UNIT IV

Operating System Support – The operating system layer, Protection, Process and threads, Communication and invocation, Operating system architecture.

UNIT V

Distributed File Systems – File service architecture, Sun Network File System, The Andrew File System.

UNIT VI

Name Services - Name services and the Domain Name System, Directory services, Synchronizing physical clocks, Logical time and logical clocks, Distributed debugging. Replication System model and group communication, Coordination and Agreement – Distributed mutual exclusion, Elections, Multicast communication.

Transactions, Nested Transactions - Concurrency control in distributed transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

UNIT VII

Distributed Transactions - Flat and nested distributed transactions, Atomic commit protocols, Concurrency control in distributed transactions, distributed Deadlocks, Transactions with replicated data, Transaction recovery, Fault-tolerant services, Hierarchical and group masking of faults.

Cryptography, Authentication and key distribution, Logics of Authentication, Digital signatures.

UNIT VIII

Distributed shared memory, Design and Implementation issues, Sequential consistency and ivy, Release consistency and Munin, Overview of Distributed Operating systems Mach, Chorus.

REFERENCES:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education.
2. Distributed Operating Systems,Pradeep K.Sinha,PHI.
3. Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, Tata McGraw-Hill Edition.
4. Distributed Systems,S.Ghosh,Chapman&Hall/CRC,Taylor&Francis Group,2010.
5. Distributed Systems – Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, PearsonEducation.
6. Distributed Algorithms,N.A.Lynch,Elsevier.

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MCA II-II Sem **Th**
4

(9F00405b) SOCIAL NETWORKS AND SEMANTIC WEB
(ELECTIVE-II)

UNIT I
Web Intelligence
Thinking and Intelligent Web Applications, The Information Age, The World Wide Web, Limitations of Todays Web, The Next Generation Web, Machine Intelligence, Artifical Intelligence, Ontology,Inference engines, Software Agents, Berners-Lee www, Semantic Web Road Map, Logic on the semantic Web.

UNIT II
Knowledge Representation for the Semantic Web
Ontologies and their role in the semantic web,Ontologies Languages for the Semantic Web – Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL),UML,XML/XML Schema.

UNIT III
Ontology Engineering
Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic,Rule and Inference Engines.

UNIT IV
Semantic Web Applications, Services and Technology
Semantic Web applications and services, Semantic Search,e-learning,Semantic Bioinformatics,Knowledge Base ,XML Based Web Services,Creating an OWL-S Ontology for Web Services,Semantic Search Technology.

UNIT V
Social Network Analysis
What is networks analysis?, Development of Social Networks Analysis, Key concepts and measures in network analysis – The global structure of networks, The macro-structure of social networks, Personal networks.

UNIT VI
Electronic Sources for Network Analysis
Electronic Discussion networks, Blogs and Online Communities, Web-based networks.
Modelling and aggregating social network data

State-of-art in network data representation, Ontological representation of social individuals, Ontological representation of social relationships, Aggregating and reasoning with social network data.

UNIT VII

Developing social-semantic applications

Building Semantic Web Applications with social network features, Flink: the social networks of the Semantic Web community, Evaluation of web-based social network extraction.

UNIT VIII

Semantic-based Social Network Analysis in the sciences

Methodology – Data acquisition, Representation, storage and reasoning, Visualization and Analysis, Results – Descriptive analysis, Structural and cognitive effects on scientific performance.

REFERENCES:

1. Thinking on the Web - Berners Lee,Godel and Turing,Wiley interscience,2008.
2. Social Networks and the Semantic Web ,Peter Mika,Springer,2007.
3. Semantic Web Technologies ,Trends and Research in Ontology Based Systems, J.Davies,Rudi Studer,Paul Warren,JohnWiley&Sons.
4. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers,(Taylor & Francis Group)
5. Information Sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.
6. Programming the Semantic Web,T.Segaran,C.Evans,J.Taylor,O’Reilly,SPD.

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MCA II-II Sem **Th 4**

(9F00405c) ARTIFICIAL INTELLIGENCE

(ELECTIVE-II)

UNIT I

Introduction: AI-Acting and Thinking humanly, rationally, Searching: Searching for solutions, Uniformed Search Strategies, Informed Search Strategies, Heuristic Functions.

UNIT II

Local Search Algorithms and Optimization Problems: Hill-climbing, Simulated annealing, Local beam, Genetic algorithms, Constraint Satisfaction Problems, Backtracking Search for CSPs.

UNIT III

Adversial Search: Games, Optimal Decision in Games, Alpha-Beta Pruning, Evaluation Functions, Cutting off search, Games that include an Element of chance, Game programs. Knowledge and reasoning-I: Logical Agents.

UNIT IV

Knowledge and reasoning-II: First-Order Logic: Syntax and Semantics, Using First Order Logic, Knowledge Engineering, Inference in First-Order Logic: Propositional vs. First-Order Inference, Unification and Lifting, Resolution, Forward and Backward Chaining.

UNIT V

Planning: Classical planning problem, Language of planning problems, Expressiveness and extension, planning with state-space search, Partial-Order planning, Planning Graphs, Planning with Propositional Logic.

UNIT VI

Learning: Forms of learning, Introduction learning, Learning Decision Tree, Statistical learning methods, learning with complete data, learning with hidden variables-EM Algorithms, Instance based learning, Neural networks.

UNIT VII

Expert Systems: Introduction, Advantages, Characteristics, General concepts, Applications and Domains, Languages, Shells and Tools, Elements, Production Systems, Procedural and Nonprocedural Paradigms, Artificial Neural Systems, Connectionist Expert Systems and Inductive Learning.

UNIT VIII

Design of Expert Systems: Selecting the Appropriate Problem, Stages in the Development of an Expert System, The Expert System Life Cycle.

Detailed life cycle model, Expert system design examples-Certainty factors, Decision trees, backward chaining.

REFERENCES:

1. Russell, Norvig-"Artificical Intelligence-A Modern Approach",2e, 2004, PEA
2. Giarratano, Riley-"Expert Systems-Principles and Programming", 3e,2003, Thomson

3. George F Luger – "Artificial Intelligence-Structures and strategies for Complex problem Solving", 4e, 2004, PEA.
4. Rich, Knight, Nair – "Artificial Intelligence", 3e, TMH.

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MCA II-II Sem **Lab 3**

(9F00406) WEB TECHNOLOGIES LAB

Objective :

To create a fully functional website with mvc architecture. To Develop an online Book store using we can sell books (Ex amazon .com).

Hardware and Software required :

1. A working computer system with either Windows or Linux
2. A web browser either IE or firefox
3. Tomcat web server and Apache web server
4. XML editor like Altova Xml-spy [www.Altova.com/**XML**Spy – free] , Stylusstudio , etc.,
5. A database either Mysql or Oracle
6. JVM(Java virtual machine) must be installed on your system
7. BDK(Bean development kit) must be also be installed

Week-1:

Design the following static web pages required for an online book store web site.

1) **HOME PAGE:**

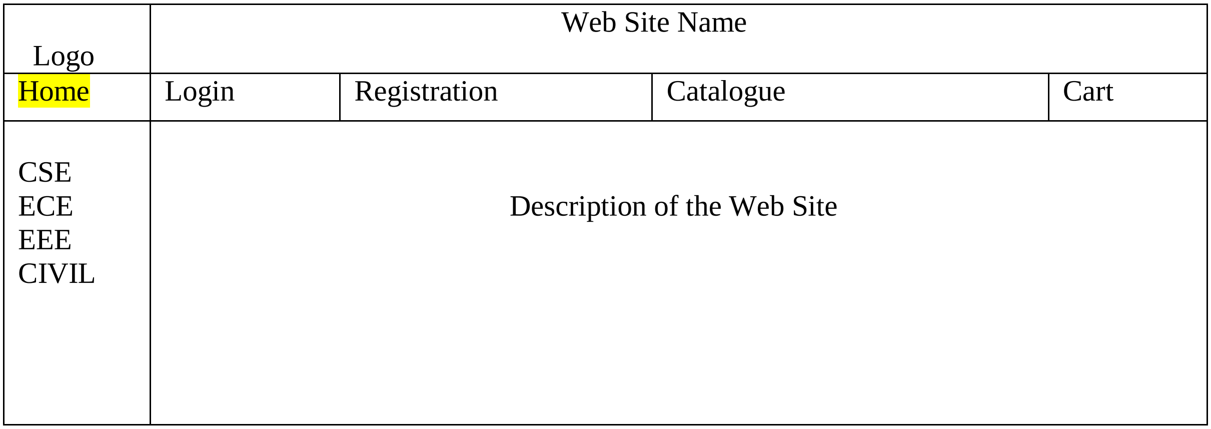
The static home page must contain three **frames**.

Top frame : Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).

Left frame : At least four links for navigation, which will display the catalogue of respective links.

For e.g.: When you click the link **"CSE"** the catalogue for **CSE** Books should be displayed in the Right frame.

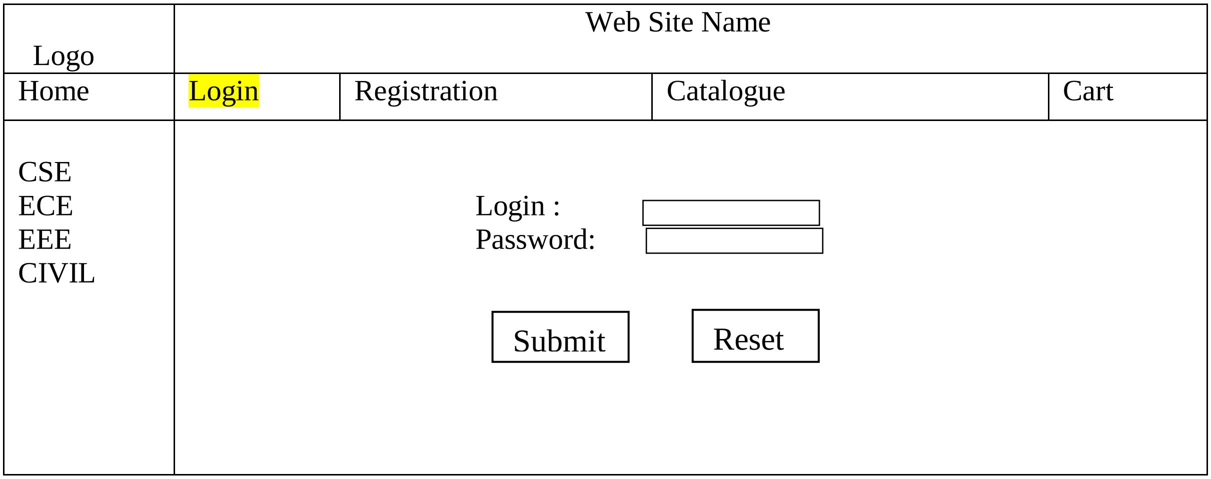
Right frame: The *pages to the links in the left frame must be loaded here*. Initially this page contains description of the web site.



Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Description of the Web Site			

Fig 1.1

2) LOGIN PAGE:



Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Login : ▭ Password: ▭ Submit Reset			

This page looks like below:

3) CATOLOGUE PAGE:
The catalogue page should contain the details of all the books available in the web site in a table. The details should contain the following:

3. Snap shot of Cover Page.
4. Author Name.
5. Publisher.
6. Price.

7. Add to cart button.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL		Book : XML Bible Author : Winston Publication : Wiely	$ 40.5	Add to cart
		Book : AI Author : S.Russel Publication : Princeton hall	$ 63	Add to cart
		Book : Java 2 Author : Watson Publication : BPB publications	$ 35.5	Add to cart
		Book : HTML in 24 hours Author : Sam Peter Publication : Sam publication	$ 50	Add to cart

Note: Week 2 contains the remaining pages and their description.

Week-2:

4) CART PAGE:

The cart page contains the details about the books which are added to the cart.
The cart page should look like this:

<table>
<tr><td>Logo</td><td colspan="4">Web Site Name</td></tr>
<tr><td>Home</td><td>Login</td><td>Registration</td><td>Catalogue</td><td>Cart</td></tr>
<tr><td>CSE
ECE
EEE
CIVI
L</td><td colspan="4"><table>
<tr><th>Book name</th><th>Price</th><th>Quantity</th><th>Amount</th></tr>
<tr><td>Java 2</td><td>$35.5</td><td>2</td><td>$70</td></tr>
<tr><td>XML bible</td><td>$40.5</td><td>1</td><td>$40.5</td></tr>
<tr><td></td><td></td><td><b>Total amount -</b></td><td>$130.5</td></tr>
</table></td></tr>
</table>

5) REGISTRATION PAGE:

Create a "*registration form* "with the following fields

1) Name (Text field)
2) Password (password field)
3) E-mail id (text field)
4) Phone number (text field)
5) Sex (radio button)
6) Date of birth (3 select boxes)
7) Languages known (check boxes – English, Telugu, Hindi, Tamil)
8) Address (text area)

WEEK 3:

VALIDATION:

Write *JavaScript* to validate the following fields of the above registration page.

1. Name (Name should contains alphabets and the length should not be less than 6 characters).
2. Password (Password should not be less than 6 characters length).
3. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)
4. Phone number (Phone number should contain 10 digits only).

Note : validation of the login page can also be done with these parameters.

Week-4:

Design a web page using **CSS (C**ascading **S**tyle **S**heets**)** which includes the following:

1) Use different font, styles:
In the style definition you define how each selector should work (font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles.

For example:

```
<HTML>
<HEAD>
<style type="text/css">
B.headline {color:red; font-size:22px; font-family:arial; text-
decoration:underline}
</style>

</HEAD>

<BODY>
<b>This is normal bold</b><br>
Selector {cursor:value}

For example:

<html>
<head>
<style type="text/css">
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>

<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a>
<br>
<a href="mypage.htm" class="hlink">HELP LINK</a>
</b>
</body>
</html>

<b class="headline">This is headline style bold</b>
```

```
</BODY>

</HTML>
```

2) Set a background image for both the page and single elements on the page. You can define the background image for the page like this:

```
BODY {background-image:url(myimage.gif);}
```

3) Control the repetition of the image with the background-repeat property.

As background-repeat: repeat

Tiles the image until the entire page is filled, just like an ordinary background image in plain HTML.

4) Define styles for links as

A:link
A:visited
A:active
A:hover

Example:

```
<style type="text/css">
A:link {text-decoration: none}
A:visited {text-decoration: none}
A:active {text-decoration: none}
A:hover {text-decoration: underline; color: red;}
</style>
```

5) Work with layers:

For example:

LAYER 1 ON TOP:

```
<div style="position:relative; font-size:50px; z-index:2;">LAYER 1</div>
<div style="position:relative; top:-50; left:5; color:red; font-size:80px; z-
        index:1">LAYER 2</div>
```

LAYER 2 ON TOP:

```
<div style="position:relative; font-size:50px; z-index:3;">LAYER 1</div>
<div style="position:relative; top:-50; left:5; color:red; font-size:80px; z-
        index:4">LAYER 2</div>
```

6) Add a customized cursor:

Selector {cursor:value}

For example:

```
<html>
<head>
<style type="text/css">
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>

<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a>
<br>
<a href="mypage.htm" class="hlink">HELP LINK</a>
</b>
</body>
</html>
```

Week-5:

Write an XML file which will display the Book information which includes the following:

1) Title of the book
2) Author Name
3) ISBN number
4) Publisher name
5) Edition
6) Price

Write a Document Type Definition (DTD) to validate the above XML file.

Display the XML file as follows.

The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns.

Use XML schemas XSL and CSS for the above purpose.

Note: Give at least for 4 books. It should be valid syntactically.

Hint: You can use some xml editors like XML-spy

Week-6:

VISUAL BEANS:

Create a simple visual bean with a area filled with a color.

The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square and it is Circle, if it is false.

The color of the area should be changed dynamically for every mouse click. The color should also be changed if we change the color in the “property window “.

Week-7:

1) Install TOMCAT web server and APACHE.
   While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port.
2) Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root.

Access the pages by using the urls : http://localhost:4040/rama/books.html (for tomcat) http://localhost:8080/books.html (for Apache)

Week-8:

User Authentication :

Assume four users user1,user2,user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a servelet for doing the following.

1. Create a Cookie and add these four user id’s and passwords to this Cookie.
2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.

If he is a valid user(i.e., user-name and password match) you should welcome him by name(user-name) else you should display “ You are not an authenticated user “.

Use init-parameters to do this. Store the user-names and passwords in the webinf.xml and access them in the servlet by using the getInitParameters() method.

Week-9:

Install a database(Mysql or Oracle).

Create a table which should contain at least the following fields: name, password, email-id, phone number(these should hold the data from the registration form).

Practice 'JDBC' connectivity.

Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.

Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).

Week-10:

Write a JSP which does the following job:

Insert the details of the 3 or 4 users who register with the web site (week9) by using registration

form. Authenticate the user when he submits the login form using the user name and password

from the database (similar to week8 instead of cookies).

Week-11:

Create tables in the database which contain the details of items (books in our case like Book name , Price, Quantity, Amount)) of each category. Modify your catalogue page (week 2)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.

Week-12:

HTTP is a stateless protocol. Session is required to maintain the state.

The user may add some items to cart from the catalog page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time(i.e., from different systems in the LAN using the ip-address instead of localhost). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated (by using the method session.invalidate()).

Modify your catalogue and cart JSP pages to achieve the above mentioned functionality using sessions.

REFERENCES:

1. Java Server Programming for Professionals, 2nd Edition, Bayross and others, O’reilly,SPD, 2007.
2. JDBC, Servlets, and JSP ,Black Book, K. Santosh Kumar, dreamtech.
3. Core Web Programming, 2nd Edition, Volume 1, M.Hall and L.Brown, PHPTR.
4. Core Web Programming, 2nd Edition, Volume 2, M.Hall and L.Brown, PHPTR.
5. Core Java, Volume 1, Horstman and Cornell, 8th Edition, Pearson Education, 2008.
6. Core Java, Volume 2, Horstman and Cornell, 8th Edition, Pearson Education, 2008.
7. Java Programming: Advanced Topics, 3rd Edition, J.Wiggles worth and P.McMillan,Thomson, 2007.
8. Struts 2 for Beginners,S.Shah & V.Shah,The X Team,SPD,2nd edition.

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MCA II-II Sem **Lab 3**

(9F00407) DATA WAREHOUSING AND MINING LAB

List of Sample Problems/Experiments:

i)Data Warehousing and Data Mining:

Task 1: Credit Risk Assessment

Description:

The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient.

To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.
1. Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.
2. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.
3. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

The German Credit Data:
Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data.
In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer !)

A few notes on the German dataset
• DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).
• owns_telephone. German phone rates are much higher than in Canada so fewer people own telephones.

• foreign_worker. There are millions of these in Germany (many from Turrkey). It is very hard to get German citizenship if you were not born of German parents.
• There are 20 attributes used in judging a loan applicant. The goal is the classify the applicant into one of two categories, good or bad.

Subtasks : (Turn in your answers to the following tasks)

1.List all the categorical (or nominal) attributes and the real-valued attributes seperately. (5 marks)

2.What attributes do you think might be crucial in making the credit assessement ? Come up with some simple rules in plain English using your selected attributes. (5 marks)

3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training. (10 marks)

4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly ? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy ? (10 marks)

5. Is testing on the training set as you did above a good idea ? Why orWhy not ? (10 marks)

6. One approach for solving the problem encountered in the previous question is using cross-validation ? Describe what is cross-validation briefly. Train a Decistion Tree again using cross-validation and report your results. Does your accuracy increase/decrease ? Why ? (10 marks)

7. Check to see if the data shows a bias against "foreign workers" (attribute 20),or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss. (10 marks)

8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.) (10 marks)

9. Sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the

misclassifcations equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)? (10 marks)

10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees ? How does the complexity of a Decision Tree relate to the bias of the model ? (10 marks)

11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain ? Also, report your accuracy using the pruned model. Does your accuracy increase ? (10 marks)

12. (Extra Credit): How can you convert a Decision Trees into "if-then-else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules.PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one ! Can you predict what attribute that might be in this dataset ? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR. (10 marks)

Task Resources:

- Mentor lecture on Decision Trees
- Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)
- Decision Trees (Source: Tan, MSU)
- Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)
- Weka resources:
  - Introduction to Weka (html version) (download ppt version)
  - Download Weka
  - Weka Tutorial
  - ARFF format
  - Using Weka from command line

Task 2: Hospital Management System

Data Warehouse consists Dimension Table and Fact Table.

REMEMBER The following

Dimension

The dimension object (Dimension):

_ Name
_ Attributes (Levels) , with one primary key
_ Hierarchies

One time dimension is must.

About Levels and Hierarchies

Dimension objects (dimension) consist of a set of levels and a set of hierarchies defined over those levels. The levels represent levels of aggregation. Hierarchies describe parent-child relationships among a set of levels.

For example, a typical calendar dimension could contain five levels. Two hierarchies can be defined on these levels:

H1: YearL > QuarterL > MonthL > WeekL > DayL
H2: YearL > WeekL > DayL

The hierarchies are described from parent to child, so that Year is the parent of Quarter, Quarter the parent of Month, and so forth.

About Unique Key Constraints

When you create a definition for a hierarchy, Warehouse Builder creates an identifier key for each level of the hierarchy and a unique key constraint on the lowest level (Base Level)

Design a Hospital Management system data warehouse (TARGET) consists of Dimensions Patient, Medicine, Supplier, Time. Where measures are ‘ NO UNITS’, UNIT PRICE.

Assume the Relational database (SOURCE) table schemas as follows

TIME (day, month, year),
PATIENT (patient_name, Age, Address, etc.,)
MEDICINE (Medicine_Brand_name, Drug_name, Supplier, no_units, Uinit_Price, etc.,)
SUPPLIER :(Supplier_name, Medicine_Brand_name, Address, etc.,)

If each Dimension has 6 levels, decide the levels and hierarchies, Assume the level names suitably.

Design the Hospital Management system data warehouse using all schemas. Give the example 4-D cube with assumption names.

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MCA III-I Sem **Th 4**

(9F00501) MOBILE APPLICATION DEVELOPMENT

UNIT I

J2ME Overview -Java 2 Micro Edition and the World of Java, Inside J2ME, J2ME and Wireless Devices

Small Computing Technology: Wireless Technology, Radio Data Networks, Microwave Technology, Mobile Radio Networks, Messaging, Personal Digital Assistants

J2ME Architecture and Development Environment- J2ME Architecture, Small Computing Device Requirements, Run-Time Environment, MIDlet Programming, Java Language for J2ME, J2ME Software Development Kits, Hello World J2ME Style, Multiple MIDlets in a MIDlet Suite, J2ME Wireless Toolkit.

UNIT II

J2ME Best Practices and Patterns*:* The Reality of Working in a J2ME World, Best Practices

Commands, Items, and Event Processing: J2ME User Interfaces, Display Class, The Palm OS Emulator, Command Class, Item Class, Exception Handling

UNIT III

High-Level Display Screens: Screen Class, Alert Class, Form Class, Item Class, List Class, Text Box Class, Ticker Class

UNIT IV

Low-Level Display Canvas: The Canvas, User Interactions, Graphics, Clipping Regions, Animation

UNIT V

Record Management System- Record Storage, Writing and Reading Records, Record Enumeration, Sorting Records, Searching Records, Record Listener.

UNIT VI

JDBC Objects: The Concept of JDBC, JDBC Driver Types, JDBC Packages, Overview of the JDBC Process, Database Connection, statement Objects, Result set, Transaction Processing, Metadata, Data Types, Exceptions.

UNIT VII

JDBC and Embedded SQL: Model Programs, Tables, Indexing, Inserting Data into Tables, Selecting Data from a Table, Metadata, Updating Tables, Deleting Data form a Table, Joining Tables, Calculating Data, Grouping and Ordering Data, Subqueries, VIEWs

UNIT VIII

Generic Connection Framework: The Connection, Hypertext Transfer Protocol, Communication Management Using HTTP Commands, Session Management, Transmit as a Background Process.

REFERENCES:

1. J2ME: The Complete Reference, James Keogh, Tata McGrawHill.
2. Enterprise J2ME: Developing Mobile Java Applications – Michael Juntao Yuan, Pearson Education, 2004
3. Beginning Java ME Platform, Ray Rischpater, Apress, 2009
4. Beginning J2ME: From Novice to Professional, Third Edition, Sing Li, Jonathan B. Knudsen, Apress, 2005
5. Kicking Butt with MIDP and MSA:Creating Great Mobile Applications,1st edition,J.Knudsen,Pearson.

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MCA III-I Sem **Th 4**

(9F00502) SOFTWARE TESTING

UNIT I

Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs.

UNIT II

Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT III

Transaction Flow Testing: transaction flows, transaction flow testing techniques. Dataflow testing:- Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

UNIT IV

Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT V

Paths, Path products and Regular expressions: path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

UNIT VI

Logic Based Testing: overview, decision tables, path expressions, kv charts, specifications.

UNIT VII

State, State Graphs and Transition testing: state graphs, good & bad state graphs, state testing, Testability tips.

UNIT VIII

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like JMeter or Win-runner).

REFERENCES:

1. Software Testing techniques - Baris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.
3. The craft of software testing - Brian Marick, Pearson Education.
4. Software Testing,3rd edition,P.C.Jorgensen,Aurbach Publications(Dist.by SPD).
5. Software Testing in the Real World – Edward Kit, Pearson.
6. Effective methods of Software Testing, Perry, John Wiley, 2nd Edition, 1999.
7. Art of Software Testing – Meyers, John Wiley.
8. Software Testing,N.Chauhan,Oxford University Press.
9. Software Testing,M.G.Limaye,TMH.
10. Software Testing,S.Desikan,G.Ramesh,Pearson.
11. Foundations of Software Testing,D.Graham & Others,Cengage Learning.

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MCA III-I Sem **Th 4**

(9F00503) OBJECT ORIENTED ANALYSIS AND DESIGN(using UML)

UNIT I

Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

UNIT II

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.
Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

UNIT III

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

UNIT IV

Basic Behavioral Modeling-I: Interactions, Interaction diagrams.

UNIT V

Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams.

UNIT VI

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

UNIT VII

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

UNIT VIII

Patterns and Frameworks, Artifact Diagrams.Case Study: The Unified Library application

REFERENCES:

1. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education 2nd Edition
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.
3. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
4. Pascal Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.
5. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
6. Mark Priestley: Practical Object-Oriented Design with UML,TATA McGrawHill.
7. Appling UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
8. Object-Oriented Analysis and Design with the Unified Process By John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.
9. UML and C++,R.C.Lee, and W.M.Tepfenhart,PHI.
10. Object Oriented Analysis,Design and Implementation,B.Dathan,S.Ramnath,Universities Press.
11. OODesign with UML and Java,K.Barclay,J.Savage,Elsevier.

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MCA III-I Sem **Th**
4

(9F00504a) SOFTWARE PROJECT MANAGEMENT

(ELECTIVE-III)

UNIT I
Convetional Software Management
The Waterfall Model, Conventional software Management Performance. Evolution of Software Economics: Software Economics, Pragmatic Software Cost Estimation.

UNIT II
Improving Software Economics
Reducing Software Product Size, Improving software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

UNIT III
Conventional And Modern Software Management
Principles of Conventional Software Engineering, Principles of Modern Software Management, Transitioning to an Iterative Process. Life Cycle Phases: Engineering and Production Stages, Inception. Elaboration, Construction, Transition Phases.

UNIT IV
Artifacts Of The Process
The Artifact Sets. Management Artifacts, Engineering Artifacts, Programmatic Artifacts. Model Based Software Architectures: A Management Perspective and Technical Perspective.

UNIT V
Flows Of The Process
Software Process Workflows. Inter Trans Workflows. Checkpoints of the Process : Major Mile Stones, Minor Milestones, Periodic Status Assessments. Interactive Process Planning: Work Breakdown Structures, Planning Guidelines, Cost and Schedule Estimating. Interaction Planning Process. Pragmatic Planning.

UNIT VI
Project Organizations And Responsibilities
Line-of-Business Organizations, Project Organizations, and Evolution of Organizations. Process Automation: Automation Building Blocks, The Project Environment.

UNIT VII
Project Control And Process Instrumention
Server Care Metrics, Management Indicators, Quality Indicators, Life Cycle Expectations Pragmatic Software Metrics, Metrics Automation. Tailoring the process: Process Discriminates, Example.

UNIT VIII

Future Software Project Management

Modern Project Profiles Next Generation Software economics, Modern Process Transitions. Case Study: The Command Center Processing and Display System –Replacement (CCPDS-R)

REFERENCES:

1. Walker Rayce, “Software Project Management”, 1998, PEA.
2. Henrey, “Software Project Management”’ Pearson.

3. Richard H. Thayer: “Software Engineering Project Management”, 1997, IEEE Computer Society.
4. Shere K. D. : “” Software Engineering and Management”, 1998, PHI.
5. S. A. Kelkar, “ Software Project Management: A Concise Study”, PHI.
6. Hughes Cotterell, “ Software Project Management”, 2e, TMH.
   Kaeron Conway, “ Software Project Management from Concept to Development”, Dream Tech.

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MCA III-I Sem	**Th** **4**

(9F00504b) HUMAN COMPUTER INTERACTION

(ELECTIVE-III)

UNIT I

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design.

UNIT II

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT III

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT IV

Screen Designing:- Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT V

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls.

UNIT VI

Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT VII

Software tools – Specification methods, interface – Building Tools.

UNIT VIII

Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

REFERENCES:

1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia

3. Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson Education
4. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.
5. User Interface Design, Soren Lauesen , Pearson Education.
6. Human –Computer Interaction,D.R.Olsen,Cengage Learning.
7. Human –Computer Interaction,Smith - Atakan,Cengage Learning.

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MCA III-I Sem **Th 4**

(9F00504c) INFORMATION RETRIEVAL SYSTEMS

(ELECTIVE-III)

UNIT I

Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses, **Information Retrieval System Capabilities -** Search, Browse, Miscellaneous.

UNIT II

Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction, **Data Structures:** Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure –

UNIT III

Automatic Indexing: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages

Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters

UNIT IV

User Search Techniques: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, Weighted searches of Boolean systems, Searching the Internet and hypertext **- Information Visualization**: Introduction, Cognition and perception, Information visualization technologies.

UNIT V

Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems.

Information System Evaluation: Introduction, Measures used in system evaluation, Measurement example – TREC results.

UNIT VI

Parallel and Distribute IR - Parallel Computing, Performance Measures, Parallel IR - MIMD and SIMD Architectures, Distributed IR – Collection Partitioning, Source Selection, Query Processing, Web Issues, Trends and Research Issues.

UNIT VII

Multimedia Information Retrieval – Models and Languages – Data Modeling, Query Languages, Indexing and Searching

UNIT VIII

Libraries and Bibliographical Systems – Online IR Systems, OPACs, Digital Libraries.

REFERENCES :

1. Information Storage and Retrieval Systems: Theory and Implementation By Kowalski, Gerald, Mark T Maybury Kluwer Academic Press, 2000.
2. Modern Information Retrival By Ricardo Baeza-Yates, Pearson Education, 2007.
3. Information Retrieval: Algorithms and Heuristics By David A Grossman and Ophir Frieder, 2nd Edition, Springer International Edition, 2004.
4. Information Retrieval Data Structures and Algorithms By William B Frakes, Ricardo Baeza-Yates, Pearson Education, 1992.
5. Information Storage & Retieval By Robert Korfhage – John Wiley & Sons.
6. Introduction to Information Retrieval By Christopher D. Manning and Prabhakar Raghavan, Cambridge University Press, 2008.

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MCA III-I Sem **Th 4**

(9F00505a) WEB SERVICES

(ELECTIVE-IV)

UNIT I

Evolution and Emergence of Web Services - Evolution of distributed computing, Core distributed computing technologies – client/server, CORBA, JAVA RMI, Micro Soft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA).

UNIT II

Introduction to Web Services – The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services

UNIT III

Web Services Architecture – Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication, basic steps of implementing web services, developing web services enabled applications.

UNIT IV

Core fundamentals of SOAP – SOAP Message Structure, SOAP encoding , SOAP message exchange models, SOAP communication and messaging, SOAP security

UNIT V

Developing Web Services using SOAP – Building SOAP Web Services, developing SOAP Web Services using Java, limitations of SOAP.

UNIT VI

Describing Web Services – WSDL – WSDL in the world of Web Services, Web Services life cycle, anatomy of WSDL definition document, WSDL bindings, WSDL Tools, limitations of WSDL

UNIT VII

Discovering Web Services – Service discovery, role of service discovery in a SOA, service discovery mechanisms, UDDI – UDDI Registries, uses of UDDI Registry, Programming with UDDI, UDDI data structures, support for categorization in UDDI Registries, Publishing API, Publishing information to a UDDI Registry, searching information in a UDDI Registry, deleting information in a UDDI Registry, limitations of UDDI.

UNIT VIII

Web Services Interoperability – Means of ensuring Interoperability, Overview of .NET and J2EE. **Web Services Security** – XML security frame work, XML encryption, XML digital signature, XKMS structure, guidelines for signing XML documents.

REFERENCES:

1. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India, rp – 2008.
2. Developing Enterprise Web Services, S. Chatterjee, J. Webber, Pearson Education, 2008.
3. XML, Web Services, and the Data Revolution, F.P.Coyle, Pearson Education.
4. Building Web Services with Java, 2nd Edition, S. Graham and others, Pearson Edn., 2008.
5. Java Web Services, D.A. Chappell & T. Jewell, O’Reilly,SPD.
6. McGovern, et al., “Java Web Services Architecture”, Morgan Kaufmann Publishers,2005.
7. J2EE Web Services, Richard Monson-Haefel, Pearson Education.
8. Web Services, G. Alonso, F. Casati and others, Springer, 2005.
9. Java Web Services Programming,R.Mogha,V.V.Preetham,Wiley India Pvt.Ltd.

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MCA III-I Sem **Th**
4

(9F00505b) MULTIMEDIA AND RICH INTERNET APPLICATIONS

(ELECTIVE-IV)

UNIT I
Introduction to Multimedia: Internet and Multimedia communications, Multimedia Networks, Multimedia Applications, Multimedia Information representation- Digitization Principles, Text, Images, Audio and Video.

UNIT II
Compression Methods: Basic Coding Methods – Run Length coding, Huffman coding, Arithmetic coding, Discrete Cosine Transform, Differential PCM, Motion Compensated Prediction, Video Compression – JPEG, H.261, MPEG-1 Video, MPEG 2 and 3 Video, H.263, Wavelet and Fractal Image Compression, Audio Compression.

UNIT III
Multimedia Applications in Networks: Introduction, Application Level Framing, Audio/Video Conferencing-Session Directories, Audio/Video Conferencing, Adaptive Applications, Receiver Hetrogenity, Real Time Application with Resource Reservation, Video Server.

UNIT IV
Applications Requiring: Reliable Multicast-White Board, Network Text Editor for Shared Text Editing, MultiTalk, Multicast file transfer, Multimedia Applications on the World Wide Web-Multicast Web Page Sharing, Audio/Video Streams in the www, Internet Multiplayer Games.

UNIT V
Web 2.0: What is web 2.0, Search,Content Networks,User Generated Content, Blogging, Social Networking, Social Media, Tagging, Social Marking, Rich Internet Applications, Web Services, Mashups, Location Based Services, XML, RSS, Atom, JSON, and VoIP, Web 2.0 Monetization and Business Models, Future of the Web.

UNIT VI
Rich Internet Applications(RIAs) with Adobe Flash and Flex: Adobe Flash- Introduction, Flash Movie Development, Learning Flash with Hands-on Examples,

Publish your flash movie, Creating special effects with Flash, Creating a website splash screen, action script, web sources.

UNIT VII

Adobe Flex 2- Introduction, Flex Platform Overview, Creating a Simple User Interface, Accessing XML data from your application, Interacting with Server Side Applications, Customizing your User Interface, Creating Charts and Graphs, Connection Independent RIAs on the desktop -Adobe Integrated Runtime(AIR), Flex 3 Beta.

UNIT-VIII

Ajax- Enabled Rich Internet Application: Introduction, Traditional Web Applications vs Ajax Applications, Rich Internet Application with Ajax, History of Ajax, Raw Ajax example using xmlhttprequest object, Using XML, Creating a full scale Ajax Enabled application, Dojo ToolKit.

REFERENCES:

1.Multimedia Communications: Protocols and Applications , Franklin F Kuo, J.Joaquin Garcia , Wolf gang Effelsberg,Prentice Hall Publications.
2.Multimedia Communications : Applications, Networks, Protocols and Standards , Fred Halsall,Addison Wesley Publications.
3.AJAX, Rich Internet Applications, and Web Development for Programmers, Paul J Deitel and Harvey M Deitel,Deitel Developer Series,Pearson education.

4.Professional Adobe Flex 2 , Rich Tretola , Simon barber and Renaun Erickson,Wrox,Wiley India Edition.
5.Multimedia Information Networking , Nalin K Sharda,PHI Learning.
6.Multimedia Computing, Communications & Applications , Ralf Steinmetz and Klara Nahrstedt,Pearson Education.
7.Multimedia Communication Systems: techniques, standards and networks, K.R.Rao,Bojkovic and Milovanovic.,PHI Learning.
8.Programming Flex 3,C.Kazoun and J.Lott,SPD.
9.Dojo,J.E.Harmon,Pearson Education.
10.Adobe Flex 3:Training from the Source,Tapper&others,Pearson Education.
11.Principles of Multimedia,R.Parekh,TMH.
12.Mastering Dojo,R.Gill,C.Riecke and A.Russell,SPD.

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MCA III-I Sem **Th 4**

(9F00505c) DESIGN PATTERNS

(ELECTIVE-IV)

UNIT I

Introduction : What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

UNIT II

A Case Study : Designing a Document Editor : Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary .

UNIT III

Creational Patterns : Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

UNIT IV

Structural Pattern Part-I : Adapter, Bridge, Composite.

UNIT V

Structural Pattern Part-II : Decorator, Facade, Flyweight, Proxy.

UNIT VI

Behavioral Patterns Part-I : Chain of Responsibility, Command, Interpreter, Iterator.

UNIT VII

Behavioral Patterns Part-II : Mediator, Memento, Observer.

UNIT VIII

Behavioral Patterns Part-III (cont'd):State, Strategy, Template Method ,Visitor, Discussion of Behavioral Patterns.

REFERENCES:

1. Design Patterns By Erich Gamma, Pearson Education
2. Pattern’s in JAVA Vol-I By Mark Grand ,Wiley DreamTech.
3. Pattern’s in JAVA Vol-II By Mark Grand ,Wiley DreamTech.
4. JAVA Enterprise Design Patterns Vol-III By Mark Grand ,Wiley DreamTech.
5. Head First Design Patterns By Eric Freeman-Oreilly-spd
6. Design Patterns Explained By Alan Shalloway,Pearson Education.
7. Pattern Oriented Software Architecture,F.Buschmann&others,John Wiley & Sons.

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MCA III-I Sem **Lab 3**

(9F00506) MOBILE APPLICATIONS DEVELOPMENT LAB

Mobile Application Development (Through J2ME) LABORATORY

Objective:

In this lab, a student is expected to design, implement, document and present a mobile client/server system using standard Java and Java 2 Micro Edition (J2ME) platform. Specifically it is required to design and implement a system that consists mainly of a mobile client (MC) and a Proxy Server (PS). MC will be written in J2ME, MIDP 2.0, while PS will be written in standard Java. It is necessary to use a mobile phone emulator to develop and demonstrate the experiments.

It may be necessary to use other components or existing resources (servers) as needed. For instance a database local to PS or a web service available on the Internet that can be invoked by the PS.

Week - 1: Installation of Java Wireless Toolkit (J2ME)

1) If the Java Development Kit (JDK) is not there or only having the Java Runtime Environment (JRE) installed, install the latest JDK from http://java.sun.com/javase/downloads/index.jsp. Current stable release of Java is JDK 6 Update 7 but check the web page in case there are newer non-beta releases available.
2) Next, download the **Java Wireless Toolkit** (formerly called J2ME Wireless Toolkit) from: http://java.sun.com/products/sjwtoolkit/download.html.
3) Run the installer (for example, for Windows it is: sun_java_wireless_toolkit- 2_5_2-windows.exe). The installer checks whether a compatible Java environment has been pre-installed. If not, it is necessary to uninstall old versions of Java and perform Step 1 again.
Once after successful installation of Java and the tool kit compile this program and run the following program in the toolkit.
Steps to run this program in toolkit:

1. Start -> All Programs -> Sun Java Tool Kit -> Wireless Tool Kit
2. Click New Project – Enter Project Name -> Enter Class Name -> Click on Create Project.
3. Choose appropriate API Selection and Configurations.
4. Place Java Source file in WTK2.1 / WTK2.2\apps\projectname\src
5. Build the Project.
6. Run the Project.

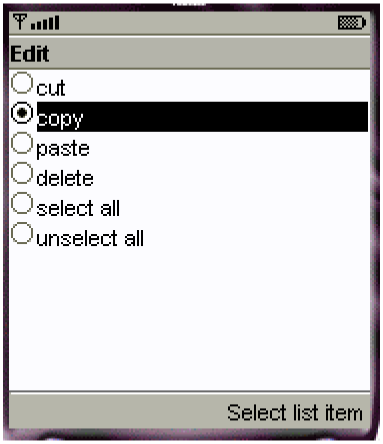
```
import javax.microedition.lcdui.*;
import javax.microedition.midlet.*;

public class HelloWorld extends MIDlet{
  private Form form;
  private Display display;

  public HelloWorld(){
    super();
  }

  public void startApp(){
    form = new Form("Hello World");
    String msg = "Hello World!!!!!!!";
    form.append(msg);
    display = Display.getDisplay(this);
    display.setCurrent(form);
  }

  public void pauseApp(){}

  public void destroyApp(boolean unconditional){
    notifyDestroyed();
  }
}
```

Week - 2 Working with J2ME Features:

Working with J2ME Features: Say, creating a *Hello World* program Experiment with the most basic features and mobile application interaction concepts (lists, text boxes, buttons, radio boxes, soft buttons, graphics, etc)

2.1 Create a program which creates to following kind of menu.

* cut
* copy
* past
* delete
* select all
* unselect all



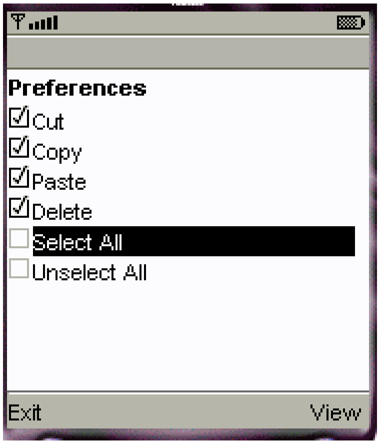
Edit

○ cut
● copy
○ paste
○ delete
○ select all
○ unselect all

2.2 Event Handling.

Create a menu which has the following options:

* cut - can be on/off
* copy - can be on/off
* paste - can be on/off
* delete - can be on/off
* select all - put all 4 options on
* unselect all - put all 4 options off



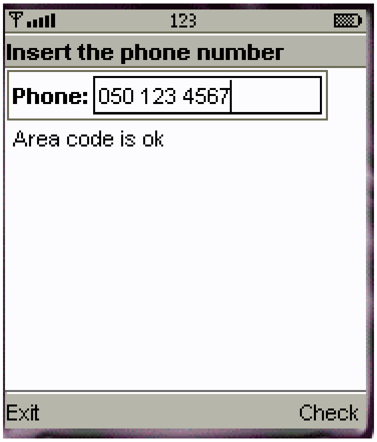
Preferences

☑ Cut
☑ Copy
☑ Paste
☑ Delete
□ Select All
□ Unselect All

2.3. Input checking

Create an MIDP application which examine, that a phone number, which a user has entered is in the given format.

* Area code should be one of the following: 040, 041, 050, 0400, 044
* There should 6-8 numbers in telephone number (+ area code)



123

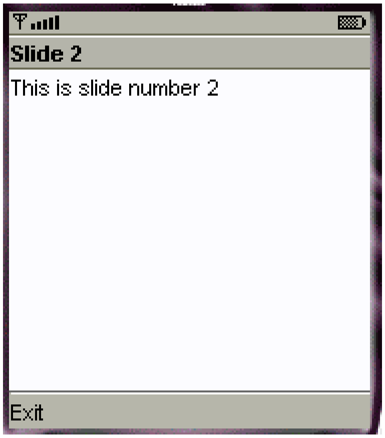
Insert the phone number

Phone: 050 123 4567

Area code is ok

Week - 3 Threads & High Level UI:

3.1. Create a slide show which has three slides, which includes only text. Program should change to the new slide after 5 seconds. After the third slide program returns to the first slide.

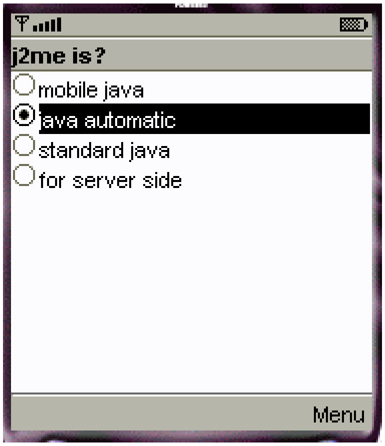


Slide 2

This is slide number 2

3.2 High-level UI

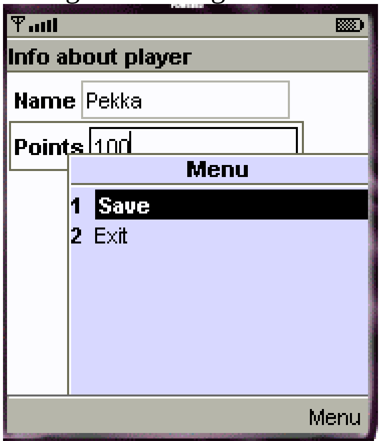
Create a MIDP application, which show to the user 5-10 quiz questions. All questions have 4 possible options and one right option exactly. Application counts and shows to the user how many right answers were right and shows them to user.



j2me is?

○ mobile java
● java automatic
○ standard java
○ for server side

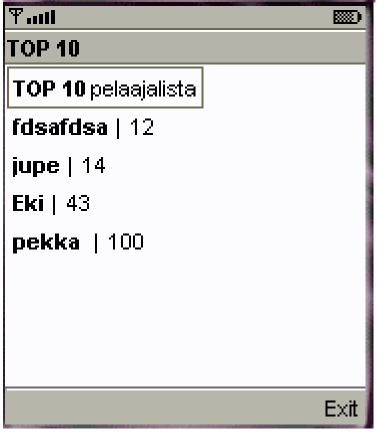
3.3 Create a MIDP application, where the user can enter player name and points. The program saves the information to the record using RMS at MIDP device. Program should also print out the top 10 player list to the end user. You can use this class in your game if you made own class for saving and reading record sets.



Info about player

Name: Pekka

Points: 100



TOP 10

TOP 10 pelaajalista

fdsafdsa | 12

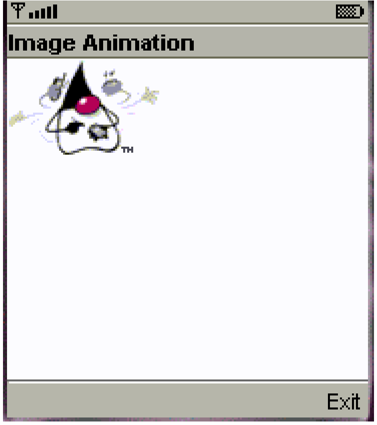
jupe | 14

Eki | 43

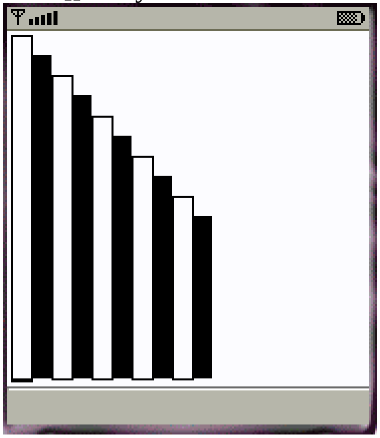
pekka | 100

Week - 4 Working on Drawing and Images

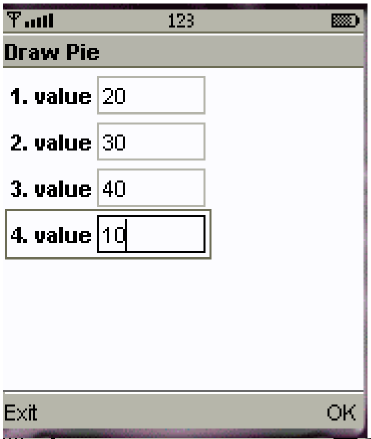
4.1 Create a slide show which has three slides, which includes pictures at PNG format. Program should change to the new slide other 5 seconds.



4.2 Create a MIDP application, which draws a bar graph to the display. Data values can be given at int[] array.



4.3 Create a MIDP application, which draws a bar graph to the display. Data values can be given at int[] array. You can enter four data (integer) values to the input text field.



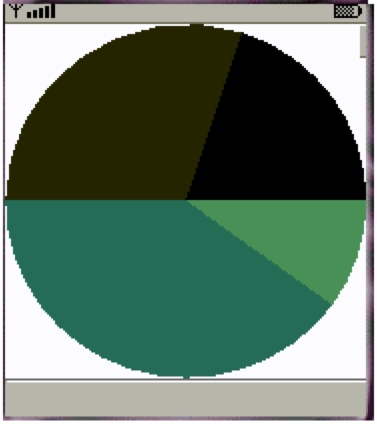
Draw Pie

1. value 20

2. value 30

3. value 40

4. value 10



Week - 5 Developing Networked Applications using the Wireless Toolkit

Creating a Simple Client-Server Application
Create, compile and run a basic UDP-based client-server application.
Creating the Datagram Server project
1) Click on Wireless Toolkit 2.5.2 under the group: **All Programs→Sun Java (TM) Wireless Toolkit 2.5.2**.
2) Click on '**New Project...**' button.
3) Enter project name as '**DatagramServer**'. Enter MIDlet name as '**DatagramServer**'. Note that the Midlet name is the same as the name of the class in the source code, which extends the MIDlet class, otherwise the application won’t run.
4) Another window pops up where it is required to select a target platform. Select '**MIDP 1.0**' from the drop down list.
5) After clicking OK, the project is created; and the Wireless Toolkit tells that the name of the folder where source code files are created. The path of the source code folder is displayed in the debug output window.

Creating and Compiling the DatagramServer source files

The Wireless Toolkit does not come with an IDE by default so Use any IDE or a text editor like *Notepad*.
1) Create a new text file called **DatagramServer.java** in the source folder of the project. The exact path of this folder is displayed in the Wireless Toolkit window.
2) Paste contents **DatagramServer.java** from into the source file.

Running your Server application on the Phone simulator

1) After compiling the project successfully, click on the Run button in the Wireless Toolkit window.
2) A graphical window depicting a phone handset will appear with the name of your application highlighted on its screen as shown below.
3) To start the application, click on the right soft-key (marked with a dot) below the '**Launch'** command.
4) The phone simulator might ask if it is OK to run the network application. Select '**Yes**' by clicking on the appropriate soft-key. The server is now up and running.
5) Keep the server running during the creation, compilation and running of the Datagram Client application.

Creating the DatagramClient project

1) Use the same instance of the Wireless Toolkit that is used for creating and compiling the Datagram Server project.
2) Click on '**New Project...**' button.
3) A new window pops up. Enter project name as '**DatagramClient**'. Enter MIDlet name as '**DatagramClient**'. Note that the Midlet name is the same as the name of the class in the source code, which extends the MIDlet class.
4) Another window pops up where one has to select a target platform. Select '**MIDP 1.0**' from the drop down list.
5) After clicking OK, the project is created and the Wireless Toolkit tells where to place the source code files. The path of the source code folder is displayed in the debug output window as explained before.

Creating and Compiling the DatagramClient source files

1) Create a new text file called **DatagramClient.java** in the source folder of the project.
2) Paste contents **DatagramClient.java** into the source file.
3) Then click on the Build button in the Wireless Toolkit window. If the compilation is OK, it will say Build Complete in the window's debug output window, otherwise it will show the errors. Note: In the source code, use the System.out.println() statement to output debug information to this window.

Running your Client application on the Phone simulator

1) After compiling the project successfully, click on the Run button in the Wireless Toolkit window.
2) A graphical window depicting a phone handset will appear with the name of the application highlighted on its screen.
3) To start the application, click on the right soft-key (marked with a dot) below the '**Launch**' command.
4) The phone simulator might ask if it is OK to run the network application. Select '**Yes**' by clicking on the appropriate soft-key. The client is now up and running.
5) When the client executes on the phone simulator, one should see a text box with the caption 'Message'. Enter any message and press the right soft-key (corresponding to Send). If the client-server application is working properly, the screen of the server phone will display the message sent by the client and the client screen will now display a message sent by the server in response. The response message from the server is the original client message in reverse.
6) Try various features of the phone simulator including the different look-and feel options.

Week - 6 Authentication with a Web Server

6.1 Write a sample program to show how to make a SOCKET Connection from j2me phone.

This J2ME sample program shows how to how to make a SOCKET Connection from a J2ME Phone. Many a times there is a need to connect backend HTTP server from the J2ME application. shows how to make a SOCKET connection from the phone to port 80.

6.2 Login to HTTP Server from a J2ME Program

This J2ME sample program shows how to display a simple LOGIN SCREEN on the J2ME phone and how to authenticate to a HTTP server.

Many J2ME applications for security reasons require the authentication of the user. This free J2ME sample program, shows how a J2ME application can do authentication to the backend server.

Note: Use Apache Tomcat Server as Web Server and Mysql as Database Server.

Week - 7 & 8 Web Application using J2ME

The following should be carried out with respect to the given set of application domains: (Assume that the Server is connected to the well-maintained database of the given domain. Mobile Client is to be connected to the Server and fetch the required data value/information)

- Students Marks Enquiry
- Town/City Movie Enquiry

- Railway/Road/Air (For example PNR) Enquiry/Status
- Sports (say, Cricket) Update
- Town/City Weather Update
- Public Exams (say Intermediate or SSC)/ Entrance (Say EAMCET) Results Enquiry

Divide Student into Batches and suggest them to design database according to their domains and render information according the requests.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR.

MCA III-I Sem **Lab 3**

(9F00507) SOFTWARE TESTING LAB AND UML LAB

List of Sample Problems/Experiments:

i)Software Testing Methodologies :

Objectives:

1.To learn to use the testing tools to carry out the functional testing,load/stress testing.

2.To learn to use the following(or Similar) automated testing tools to automate testing:

a) Win Runner/QTP for functional testing.
b) LoadRunner for Load/Stress testing.
c) Test Director for test management.

ii)UML:

1. The student should take up the case study of Unified Library application which is mentioned in the theory, and Model it in different views i.e Use case view, logical view, component view, Deployment view, Database design, forward and Reverse Engineering, and Generation of documentation of the project.

2. Student has to take up another case study of his/her own interest and do the same what ever mentioned in first problem. Some of the ideas regarding case studies are given in reference books which were mentioned in theory syllabus can be referred for some idea.

REFERENCES:

1. Software Testing Concepts and Tools, P.Nageswara Rao, dreamtech press.
2. Software Testing Tools, Dr.K.V.K.K.Prasad, dreamtech Press.
3. Software Testing with Visual Studio Team System 2008, S.Subashini, N.Satheesh kumar, SPD.