ADIKAVI NANNAYA UNIVERSITY

RAJAHMAHENDRAVARAM

UNIVERSITY COLLEGE OF ENGINEERING

Course Structure &Syllabus

Department of Computer Science and Engineering

I MCA, I & II Semesters

(From the admitted batch of 2019 – 2020)

ADIKAVI NANNAYA UNIVERSITY

RAJAHMAHENDRAVARAM

UNIVERSITY COLLEGE OF ENGINEERING

Masters in Computer Applications (2019-20)
I MCA I & II Semester Course Structure and Syllabus

INDEX

Adikavi Nannaya University

Branch/Course: Master of Computer Applications

Semester I (First Year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week		Credits
		External	Internal		Theory	Practical	
MCA-19101	Discrete Mathematical Structures	75	25	100	4	-	4
MCA-19102	Management Accountancy	75	25	100	4	-	4
MCA-19103	C Programming & Data Structures	75	25	100	4	-	4
MCA-19104	Computer Organization	75	25	100	4	-	4
MCA-19105	Operating Systems	75	25	100	4	-	4
MCA-19106	C Programming & Data Structures Lab	50	50	100	-	3	2
MCA-19107	Operating Systems Lab	50	50	100	-	3	2
	Total Credits						24

MCA-19101 DISCRETE MATHEMATICAL STRUCTURES

Instruction: 4 Periods/week	**Time: 3 Hours**	**Credits: 4**
Internal: 25 Marks	**External: 75 Marks**	**Total: 100 Marks**

UNIT I

Introduction: Logic-Prepositional Equivalences-Truth tables-Totalogies-Predicates and Quantifiers-Sets-Operations on sets-Sequences and Summations -Growth functions - relations and their properties- n-ary relations and their applications - Representation of relations-Closures of relations-Equivalence relations-Partial Orderings.

UNIT II

Counting Techniques: Basics of Counting- Pigeonhole Principle- Combinations and Permutations-Generalized Permutations and Combinations

Recurrence relations: Solving Recurrence Relations-Divide and Conquer relations-Inclusion and Exclusion-Applications of Inclusion-Exclusion.

UNIT III

Graphs: Introduction to Graphs-Terminology-Relations and Directed Graphs Representations of Graphs- Isomorphism-Connectivity- Euler and Hamiltonian Paths- Shortest Path problems-Planar Graphs- Graph Coloring.

Trees: Introduction to trees- Applications of trees- Traversals-Trees and sorting Spanning Trees-Minimum Spanning Trees.

UNIT IV

Boolean Algebra and Models of Computation: Boolean Functions- Representing Boolean Functions -Logic Gates-Minimizations of Circuits-Languages and Grammars- Finite State Machines with and with no output.

Text Book:

Discrete mathematics and its applications, Keneth. H. Rosen, Tata McGraw-Hill Publishing Company, New Delhi

Reference Books:

1) Discrete Mathematics for computer scientists & Mathematicians, Joe L.Mott, Abraham Kandel & T. P. Baker,Prentice Hall of India Ltd, New Delhi

2) Discrete mathematics, Richard Johnsonbaug, Pearson Education, New Delhi

MCA-19102 MANAGEMENT ACCOUNTANCY

Instruction: 4 Periods/week	**Time: 3 Hours**	**Credits: 4**
Internal: 25 Marks	**External: 75 Marks**	**Total: 100 Marks**

UNIT I

Principles Of Accounting: Nature And Scope Of Accounting,Double Entry SystemOf accounting introduction To Basic Books Of Accounts Of Sole Proprietary Concern, closing of books of accounts and Preparation Of Trial Balance.

FinalAccounts: Trading,Profit And Loss Accounts And Balance Sheet Of Sole Proprietary Concern with Normal Closing Entries.(With numerical problems)

UNIT II

Ratio Analysis:Meaning, Advantages, Limitations, Types of Ratio and Their Usefulness. (Theory only)Fund Flow Statement: Meaning Of The Term Fund, Flow Of Fund, Working Capital Cycle, Preparation and Inter-preparation Of Statement.

UNIT III

Costing:Nature, Importance And Basic Principles. Budget and Budgetary Control: Nature And Scope, Importance, Method Of Finalization And Master Budget, Functional Budgets.

Marginal Costing:Nature,Scope, Importance,Construction Of Break Even Chart, Limitations And Uses Of Break Even Chart, Practical Applications Of Marginal Costing.(with numerical problems)

UNIT IV

Introduction To Computerized Accounting System: Coding Logic And Codes Required,Master Files, Transaction Files,Introduction To DocumentsUsed ForData Collection, Processing Of Different Files And Outputs Obtained.

TEXTBOOKS:

1.Introduction to Accountancy.T.S. Grewal.

2.Management Accountancy, S.P.Jain.

REFERENCE BOOK:

Introduction To Accounting,G.Agarwal.

MCA-19103: C PROGRAMMING AND DATA STRUCTURES

Theory : 4 Hrs **Credits : 4**

Int Marks : 25 **Ext Marks : 75**

UNIT-I

Introduction to Computers, Algorithm, flowchart, program development steps, Structure of C program, A Simple C program, identifiers, basic data types and sizes, Constants, variables, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit-wise operators, assignment operators, expressions, type conversions, conditional expressions, precedence and order of evaluation. Control structures such as if, go to, labels, and switch statements. Loops- while, do-while and for statements, break, continue.

UNIT-II

Arrays - declaration, definition, accessing elements, storing elements, Strings and string manipulations, 1- D arrays, 2-D arrays – 2-D and character arrays – Multidimensional arrays. **Functions:** basics, parameter passing, storage classes- scope rules, user defined functions, standard library functions, recursive functions, header files, C pre processor. **Pointers: C**oncepts, initialization of pointer variables, pointers and Function arguments, passing by address –dangling memory, Character pointer s and functions, pointer s to pointer s, pointer s and multidimensional arrays, dynamic memory managements functions, command line arguments.

UNIT-III

Derived types: structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typed of, bit-fields, Input and output – concept of a file, text files and binary files, Formatted I/o, file I/o operations.

Data Structures: Introduction to Data Structures – Time Complexity –Space Complexity – Pattern matching – naive method – Robin Karp Algorithm .

UNIT-IV

Searching – Linear and binary search methods, sorting –Bubble sort, selection sort, Insertion sort, Quick sort, merge sort. Single linked lists, doubly linked lists, circular list, representing stacks and queues in C using arrays and linked lists, infix to post fix conversion, postfix expression evaluation. Trees- Binary tress, terminology, representation, traversals, Graphs - terminology, representation, graph versals (dfs & bfs) –Warshalls – Dijkstra – Kruskal – Prims Algorithms.

TEXT BOOKS:

1.C and Data Structures: A snapshot oriented treatise using live engineering examples, N B Venkateswarlu, E. V Prasad, S Chand & Co.

2.Let Us C ,YashwantKanetkar, BPB Publications, 5th Edition.

3.Computer science, A structured programming approach using C, B.A. Forouzan and R.F.Gilberg, Third edition, Thomson.

REFERENCE BOOKS:

1. Fundamentals of Data Structures in C , Horowitz, Sahni, Anderson-Freed, 2nd ed, 2008.

2. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/ Pearson.

MCA-19104 COMPUTER ORGANIZATION

Instruction: 4 Periods/week **Time: 3 Hours** **Credits: 4**
Internal: 25 Marks **External: 75 Marks** **Total: 100 Marks**

UNIT-I

Digital Logic Circuits:

Digital Computers, Logic Gates, Boolean Algebra, Map Simplification, Combinational Circuit, Flip-flops Sequential Circuits.

Digital Components:

Integrated Circuits, Decoders, Multiplexes, Registers, Shift Registers, counters, Memory Unit.

UNIT-II

Data Representation:

Data Types, Complements, Fixed-point Representation, Floating point Representation.

Register Transfer and Micro Operations:

Register Transfer Language, Register Transfer, Bus and Memory Transfer, Arithmetic Micro Operations, Assembly language Instructions, 8085 Microprocessor Instruction Set Architecture.

UNIT-III

Basic Computer Organization and Design:

Instruction Codes, Computer Register, Computer Instructions, Timing and Control, Instruction Cycle memory reference Instructions, Input-Output, Interrupt.

Central Processing Unit:

Introduction, General Register Organization, Stack Organization, Instruction formats, addressing modes.

UNIT-IV

Input /Output Organization:

Peripherals Devices, I/O Interface, Asynchronous Data Transfer, Mode of Transfer, Priority Interrupt, Direct memory access, Input – Output Processor(IOP).

Memory Organization:

Memory Hierarchy, Main memory, Auxiliary Memory, Associate Memory, Cache Memory and Virtual Memory.

Text Books:

1.Computer System Architecture, M.Morris Mano, Prentice Hall of India Pvt.ltd. Third Edition, Sept. 2008.

Reference Books:

1.Computer Architecture and Organization, William Stallings, PHI Pvt. Ltd. Eastern Economy Edition, Sixth Edition, 2003.
2.Computer System Architecture John P. Hayes.
3.Computer Architecture A Quantitative approach 3rd Edition John L. Hennessy & David A. Patterson Morgan Kufmann (An Imprint of Elseveir)

MCA-19105 OPERATING SYSTEMS

Instruction: 4 Periods/week **Time: 3 Hours** **Credits: 4**
Internal: 25 Marks **External: 75 Marks** **Total: 100 Marks**

UNIT I

Introduction: Definition of Operating System, Types Of Operating Systems, Operating System Structures, Operating-System Services, System Calls, Virtual Machines, Operating System Design and Implementation.

Process Management: Process Concepts, Operations on Processes, Cooperating Processes, Threads, Inter Process Communication, Process Scheduling, Scheduling Algorithms, Multiple - Processor Scheduling. Thread Scheduling.

UNIT II

Process Synchronization: The Critical Section Problem, Semaphores, And Classical Problems of Synchronization, Critical Regions, Monitors, Synchronization examples.

Deadlocks: Principles of Deadlocks, System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Avoidance, Detection & Recovery from Deadlocks.

UNIT III

Memory Management: Logical Versus Physical Address, Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation, Virtual Memory, Demand Paging, Page Replacement Algorithms, Thrashing

File System Implementation: Concept of a file, Access Methods, Directory Structure, File System Structure, Allocation Methods, Free Space Management, Directory Management, Device Drivers.

Mass-storage structure: overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management.

UNIT IV

Protection: Goals and Principles of Protection, Access matrix implementation, Access control, Revocation of access rights.

Case study: LINUX, Windows Operating Systems.

Text Book:

1. Operating System Principles by Abraham Silberschatz, Peter Galvin, Greg Gagne. Seventh Edition, Wiley Publication

Reference Books:

1. Operating Systems, William Stallings 5th Edition - PHI
2. Modern Operating Systems, Andrew S.Tanenbaum, , 2nd edition, 1995, PHI.
3. Operating Systems - A concept based approach, Dhamdhere, 2nd Edition, TMH, 2006.
4. Understanding the Linux Kernel, Daniel P Bovet and Marco Cesati, 3rd Edition,' Reilly, 2005.

MCA-19106: C PROGRAMMING AND DATA STRUCTURES LAB

Lab: 3 Hrs. **Credits : 2**

Int Marks :50 **Ext Marks: 50**

1. Write a C program to read x, y coordinates of 3 points and then calculate the area of a triangle formed by them and print the coordinates of the three points and the area of the triangle. What will be the output from your program if the three given points are in a straight line.
2. Write a C program which generates 100 random numbers in the range of 1 to 100. Store them in an array and then print the array. Write 3 versions of the program using different loop constructs (eg. for, while and do-while).
3. Write a program which determines the largest and the smallest number that can be stored in different data types like short, int, long, float and double. What happens when you add 1 to the largest possible integer number that can be stored?
4. Write a C program which generates 100 random real numbers in the range of 10.0 to 20.0 and sort them in descending order.
5. Write a C function for transporting a square matrix in place (in place means that you are not allowed to have full temporary matrix).
6. Write a C function which will invert a matrix.
7. Write a set of string manipulation functions eg. for getting a sub-string from a given position, copying one string to another, reversing a string and adding one string to another.
8. Write a C program for sorting a list using Bubble sort and then apply binary search.
9. Write a C program to implement the operations on stacks.
10. Write a C program to implement the operations on circular queues.
11. Write a C program for the representation of polynomials using circular linked list and for the addition of two such polynomials.
12. Write a C program for quick sort.
13. Write a C program for Merge sort.
14. Write a C program to create a binary search tree and for implementing the in order, preorder, Post order traversal using recursion.
15. Write a C program for finding the Depth First Search of a graph.
16. Write a C program for finding the Breadth First Search of a graph.

REFERENCE BOOKS:

1. Let Us C ,YashwantKanetkar, BPB Publications, 5th Edition.
2. Computer Science, A structured programming approach using C", B.A.Forouzan and R.F.Gilberg, " 3rd Edition, Thomson, 2007.
3. The C –Programming Language' B.W. Kernighan, Dennis M. Ritchie, PHI
4. Data Structures and Algorithms, 2008,G.A.V.Pai, TMH
5. Classic Data Structures, 2/e, Debasis ,Samanta,PHI,2009
6. Fundamentals of Data Structure in C, 2/e, Horowitz,Sahni, Anderson Freed,University

MCA-19107 OPERATING SYSTEMS LAB

Practical: 3 Periods /week **Time: 3 Hours** **Credits: 2**
Internal: 50 Marks **External: 50 Marks** **Total: 100 Marks**

List of Experiments:

1. Basic UNIX commands

Implement the following using Shell Programming

2. Input number even or odd
3. Count the number of lines in the input text
4. Print the pattern

```
*
***
*****
```

5. File encryption

Implement the following using C/C++/JAVA

6. FCFS CPU scheduling algorithm
7. SJF CPU scheduling algorithm
8. Round Robin CPU scheduling algorithm
9. Priority CPU scheduling algorithm
10. Implement Semaphores
11. Sequential file allocation strategy
12. Indexed file allocation strategy
13. Bankers Algorithm for Dead Lock Avoidance
14. Algorithm for Dead Lock Detection
15. FIFO Page Replacement Algorithm
16. LRU Page Replacement Algorithm
17. LFU Page Replacement Algorithm

REFERENCE BOOKS:

1. Operating System Principles by Abraham Silberschatz, Peter Galvin, Greg Gagne. Seventh Edition, Wiley Publication
2. Understanding the Linux Kernel, Daniel P Bovet and Marco Cesati, 3rd Edition, Reilly, 2005.
3. Unix programming, Stevens, Pearson Education.
4. Shell programming, Yashwanth Kanetkar.

Adikavi Nannaya University

Branch/Course: Master of Computer Applications

Semester II (First Year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week		Credits
		External	Internal		Theory	Practical	
MCA-19201	Probability Statistics and Queuing Theory	75	25	100	4	-	4
MCA-19202	Information Systems and Organizational Behavior	75	25	100	4	-	4
MCA-19203	Object Oriented Programming through JAVA	75	25	100	4	-	4
MCA-19204	Formal Languages and Automata Theory	75	25	100	4	-	4
MCA-19205	Web Technologies	75	25	100	4	-	4
MCA-19206	Object Oriented Programming through JAVA Lab	50	50	100	-	3	2
MCA-19207	Web Technologies Lab	50	50	100	-	3	2
	Total Credits						24

MCA-19201 PROBABILITY, STATISTICS & QUEUING THEORY

Instruction: 4 Periods/week **Time: 3 Hours** **Credits: 4**
Internal: 25 Marks **External: 75 Marks** **Total: 100 Marks**

UNIT I:

Probability: Definitions of probability, Addition theorem, Conditional probability, Multiplication theorem, Bayes' Theorem of Probability.

Random variables and their properties: Discrete Random Variable, Continuous Random Variable, Probability Distribution, Joint Probability Distributions their Properties, Transformation Variables, Mathematical Expectations, Probability Generating Functions.

UNIT II:

Probability Distributions: Discrete Distributions**:** Binomial, Poisson and Their Properties; Continuous Distributions**:** Uniform, Normal, Exponential Distributions and Their Properties. **Multivariate Analysis**: Correlation, Correlation Coefficient, Rank Correlation, Regression Analysis, Attributes, Coefficient of Association, Chisquare – Test For Goodness Of Fit, Test For Independence.

UNIT III:

Estimation: Sample, Populations, Statistic, Parameter, Sampling Distribution, Standard Error, Un-biasedness, Efficiency, Maximum Likelihood Estimator, Notion & Interval Estimation. **Testing of Hypothesis**: Formulation of Null hypothesis, critic al region, level of significance, power of the test;

UNIT IV:

Sample Tests: Small Sample Tests: Testing equality of means, testing equality of variances, Large Sample tests : Tests based on normal distribution

Queuing Theory: Queue description, characteristics of a queuing model, study state solutions of M/M/1:∞ Model, M/M/1 : N Model,

TEXT BOOKS :

1. Probability & Statistics for Engineers and Scientists,Walpole, Myers, Myers, Ye. Pearson Education.
2. Probability, Statistics and Random Processes T.Veerarajan Tata McGraw – Hill

REFERENCE BOOK:

1. Probability & Statistics with Reliability, Queuing and Computer Applications, Kishor S. Triv edi, Prentice Hall of India ,1999

MCA-19202 INFORMATION SYSTEMS & ORGANIZATIONAL BEHAVIOUR

Instruction: 3 Periods/week **Time: 3 Hours** **Credits: 4**
Internal: 25 Marks **External: 75 Marks** **Total: 100 Marks**

UNIT I

Organization Structure: Features of Good Organization Structures, Designing of Organization Structure, Types of Organization Structures- Functional, Product, Geographic and Matrix Organization Structures

UNIT II

Motivation: Nature and importance of motivation, Theories of motivation – Maslow's, Herzberg's and Mc Gregor's X and Y Theories of Motivation. Leadership: Meaning and definition, Importance of Leadership, Leadership styles, Communication: Process of Communication, Importance, Forms of Communication and Barriers in Communication.

UNIT III

Group Dynamics: Types of Groups, Stages of Group Development, Group Behavior and Group Performance Factors. Organizational Conflicts: Reasons for Conflicts, Consequences of Conflicts in Organizations, Types of Conflict, Strategies for Managing Conflicts, Organizational Climate and Culture.

UNIT IV

Management Information System: Nature and Scope, Characteristics and Functions. Classification of MIS - Transaction Processing System, Management Information System, Decision Support System, Executive Support System, Office Automation System and Business Expert System.

TEXT BOOKS:

1. Elements of Organizational Behavior, Robbins, 7th Edition, Pearson Education
2. Management Information Systems – D.P.Goyal, Macmillan Publishers India Ltd.

REFERENCE BOOKS:

1. Organizational Behaviour – L.M.Prasad, Sultan Chand and sons
2. Management Information Systems - L.M.Prasad, Usha Prasad , Sultan Chand and sons
3. Management Information Systems – Kanter Jerma , PHI

MCA-19203 Object Oriented Programming through JAVA

Instruction: 4 Periods/week **Time: 3 Hours** **Credits: 4**
Internal: 25 Marks **External: 75 Marks** **Total:100 Marks**

UNIT I

Introduction to OOP :Introduction, Principles of Object Oriented Languages, Applications of OOP, Programming Constructs: Variables, Primitive Datatypes, Identifiers- Naming Coventions, Keywords, Literals, Operators-Binary, Unary and ternary, Expressions, Precedence rules and Associativity, Primitive TypeConversion and Casting, Flow of control- Branching, Conditional, loops. Classes and Objects- classes, Objects, Creating Objects, Methods, constructors-Constructor overloading, cleaning up unused objects-Garbage collector, Class variable and Methods-Static keyword, this keyword, Arrays, Command line arguments.

Inheritance: Types of Inheritance, Deriving classes using extends keyword, Method overloading, super keyword, final keyword, Abstract class.

UNIT II

Interfaces, Packages and Enumeration: Interface-Extending interface, Interface Vs Abstract classes, Packages-Creating packages, using Packages, Access protection, java.lang package. **Exceptions & Assertions** – Introduction, Exception handling techniques- try… catch, throw, throws, finally block, user defined exception, Exception Encapsulation and Enrichment, Assertions.

UNIT III

MultiThreading: java.lang.Thread, The main Thread, Creation of new threads, Thread priority, Multithreading- Using isAlive () and join (), Syncronization, suspending and Resuming threads, Communication between Threads Input/Output: reading and writing data, java.io package, **Applets**– Applet class, Applet structure, An Example Applet Program, Applet : Life Cycle, paint(), update() and repaint(),

UNIT IV

Event Handling -Introduction, Event Delegation Model, java.awt.event Description, Sources of Events, Event Listeners, Adapter classes, Inner classes.

Abstract Window Toolkit :Why AWT?, java.awt package, Components and Containers, Button, Label, Checkbox, Radio buttons, List boxes, Choice boxes, Text field and Text area, container classes, Layouts, Menu, Scroll bar, **Swing**: Introduction, JFrame, JApplet, JPanel, Components in swings, Layout Managers, JList and JScroll Pane, Split Pane, JTabbedPane, Dialog Box Pluggable Look and Feel.

Text Books:

1. The Complete Refernce Java, 8ed, Herbert Schildt, TMH
2. Programming in JAVA, Sachin Malhotra, Saurabh choudhary, Oxford.

References:

1. JAVA for Beginners, 4e, Joyce Farrell, Ankit R. Bhavsar, Cengage Learning.\
2. Introduction to Java rogramming, 7th ed, Y Daniel Liang, Pearson.

MCA-19204 FORMAL LANGUAGES & AUTOMATA THEORY

Instruction: 4 Periods/week **Time: 3 Hours** **Credits: 4**
Internal: 25 Marks **External: 75 Marks** **Total: 100 Marks**

UNIT-I

Finite Automata and Regular Expressions: Basic Concepts of Finite State Systems, Chomsky Hierarchy of Languages, Deterministic and Non-Deterministic Finite Automata, Finite Automata with ϵ-moves, Regular Expressions.

Regular sets &Regular Grammars: Basic Definitions of Formal Languages and Grammars, Regular Sets and Regular Grammars, Closure Properties of Regular Sets, Pumping Lemma for Regular Sets, Decision Algorithm for Regular Sets, Minimization of Finite Automata.

UNIT-II

Context Free Grammars and Languages: Context Free Grammars and Languages, Derivation Trees, simplification of Context Free Grammars, Normal Forms, Pumping Lemma for CFL, Closure properties of CFL's.

Push down Automata: Informal Description, Definitions, Push-Down Automata and Context free Languages, Parsing and Push-Down Automata.

UNIT-III

Turing Machines: The Definition of Turing Machine, Design and Techniques for Construction of Turing Machines, Combining Turing Machines.

Universal Turing Machines and Undecidability: Universal Turing Machines. The Halting Problem, Decidable & Undecidable Problems - Post Correspondence Problem.

UNIT-IV

The Propositional calculus: The Prepositional Calculus : Introduction – Syntax of the Prepositional Calculus – Truth-Assignments – Validity and Satisfiability – Equivalence and Normal Forms – resolution in Prepositional Calculus.

The Predicate calculus: Syntax of the Predicate Calculate Calculus – Structures and Satisfiability – Equivalence – Un-solvability and NP-Completeness.

TEXT BOOKS:

1. Introduction to Automata Theory, Languages and Computations – J.E. Hopcroft, & J.D. Ullman , Pearson Education Asia.

2. Elements of The Theory Of Computation, Harry R Lewis, Cristos h. Papadimitriou, Pearson Education / Prentice-Hall of India Private Limited.

REFERENCE BOOKS:

1. Introduction to languages and theory of computation – John C. Martin (MGH)

2. Theory of Computation, KLP Mishra and N. Chandra Sekhar, IV th Edition, PHI

3. Introduction to Theory of Computation – Michael Sipser (Thomson Nrools/Cole)

MCA-19205 WEB TECHNOLOGIES

Instruction: 4 Periods/week **Time: 3 Hours** **Credits: 4**
Internal: 25 Marks **External: 75 Marks** **Total: 100 Marks**

UNIT I

Networking Protocols and OSI Model: Protocols in Computer Communications, the OSI Model, OSI Layer Functions

Internetworking Concepts, Devices, Basics, History and Architecture: Internetworking, Problems in Internetworking, Dealing with Incompatibility Issues, A Virtual Network, Internetworking Devices, Repeaters, Bridges, Routers, Gateways, A Brief History of the Internet, Growth of the Internet, Internet topology, Internal Architecture of an ISP

TCP/IP Part I (Introduction to TCP/IP, IP, ARP, RARP, ICMP):TCP/IP Basics, Why IP Addresses? Logical Addresses,TCP/IP Example The Concept of IP Address, Address Resolution Protocol (ARP), Reverse ARP, Internet Control Message Protocol (ICMP), Datagram, Fragmentation and Reassembly

UNIT II

TCP/IP Part II (TCP, UDP):Basics of TCP, Features of TCP, Relationship between TCP and IP, Ports and Sockets, Connections-Passive Open and Active Open, TCP connections, What Makes TCP Reliable? TCP Packet Format, Persistent TCP Connections, User Datagram Protocol , UDP Packet, Difference between UDP and TCP

TCP/IP Part III (DNS, Email, FTP, TFTP): Domain Name System (DNS), Electronic Mail (Email), File Transfer Protocol (FTP)**,** Trivial File Transfer Protocol (TFTP)

TCP/IP Part IV (WWW, HTTP, TELNET): A Brief History of WWW, Basics of WWW and Browsing, Locating Information on the Internet, HTML , Web Browser Architecture, Web Pages and Multimedia, Remote Login (TELNET).

An Introduction to Electronic Commerce: Aspects of Electronic Commerce, Types of E Commerce, Approaches for Developing E Commerce Solutions, Electronic Procurement, Phases in a Procurement Process, E-Procurement Models, E-Procurement Solutions, Trading Models, Buyer Side Purchasing, Supply Chain Management (SCM) and Customer Relationship Management (CRM)

UNIT III

Introduction to Web Technology: Features Required for Enabling e-commerce, Web pages-Types and Issues, Tiers, The Concept of a Tier, A Concept of Microsoft and Java Technologies, Web Pages, Static Web Pages, Plug-ins, Introduction to Frames and Forms

Dynamic Web Pages: Need for Dynamic Web Pages,Magic of Dynamic Web Pages, Overview of Dynamic Web Page Technologies, Overview of Dynamic HTML (DHTML), Common Gateway Interface (CGI), Microsoft's Active Server Pages (ASP), Basics of ASP Technology, ASP Example, Modern Trends in ASP, Java and the Concept a Virtual Machine, Java Servlets and Java Sever pages(JSP), Java Servlets, Java Sever pages (JSP).

Active Web pages: Active Web pages is a Better Solution, Java Applets, Why are Active Web Pages Powerful? When not to use Active Web Pages, Lifecycle of Java Applets, Java Beans, Active X Controls.

UNIT IV

Middleware and Component-based E-commerce Architectures:CORBA, Java Remote Method Invocation (RMI), Microsoft's Distributed Component Object Model

Electronic Data Interchange (EDI): An Overview of EDI, the Origins of EDI, Understanding EDI, Data Exchange Standards, EDI Architecture, The Significance of EDI in International Trade, Financial EDI, EDI and the Internet.

Extensible Markup Language (XML): Standard Generalized Markup Language (SGML), Basics of XML, XML parsers, The Need for a Standard.

Wireless Application Protocol (WAP):Limitations of Mobile Devices, The emergence of WAP, WAP Architecture, The WAP Stack, Concerns about WAP and its Future, Alternatives to WAP.

Text Book:

Web Technologies: TCP/IP to Internet Application Architectures-TATA McGraw Hill Publications – Achyut S Godbole, Atul Kahate

MCA-19206 Object Oriented Programming through JAVA Lab

Instruction: 3 Periods/week **Time: 3 Hours** **Credits: 2**
Internal: 50 Marks **External: 50 Marks** **Total:100 Marks**

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1. a) Write A Java Program to print Quadratic roots using command line arguments.

   b) Write a java program to print multiplication table using arrays.

2. Write a java program to find the volume of a Box using method overloading with different number of parameters.

3. 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 is clicked.

4. Write a Java program that creates a user interface to perform integer divisions. If Num1 or Num2 is not an integer, the program would throw a Number Format Exception. If Num2 is Zero, program would throw an Arithmetic Exception. Display the exception in a message dialog box.

5. Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.

6. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with “Stop” or “Ready” or “Go” should appear above the buttons in selected color. Initially, there is no message shown.

7. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

8. Write a java package for book class and then import and display the result.

9. Write a Java program to illustrate the multiple inheritance by using Interfaces.

10. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).

TEXT BOOKS

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education Pvt. Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

MCA-19207 WEB TECHNOLOGIES LAB

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 2**
Internal: 50 Marks	**External: 50 Marks**	**Total: 100 Marks**

List of Experiments:

1. Create web pages for an application demonstrating the working of different features of HTML and DHTML.
2. Demonstrate the use of CSS in organizing the layout of webpages

Implement at least two Java Script programs to demonstrate the working of

3. Conditional statements
4. Looping statements.
5. Arrays
6. Functions.
7. Event handling
8. Validation controls.

Develop simple applications for the following

9. Exercise client server programming using Java Script, Servlets, ASP, JSP
10. Create a web application with database connectivity and work on different queries for data manipulation.

REFERENCES:

1. Web Technologies, Godbole, Kahate, 2nd Ed., TMH
2. Internet & World Wide Web How to program, Dietel & Deitel Fourth Edition, PHI
3. Web Programming, building internet applications, 2nd Ed., Chris Bates, Wiley Dreamtech
4. The complete Reference HTML and DHTML, Thomas A. Powey
5. Core Servlets and Java Server Pages, Marty Hall Larry Brown, Second Edition

ADIKAVI NANNAYA UNIVERSITY, RAJAMAHENDRAVARAM
MCA-19101 I Semester
DISCRETE MATHEMATICAL STRUCTURES
MODEL QUESTION PAPER

Time:3 hrs. **Max.Marks: 75**

SECTION- A (4 X 15 = 60 M)
Answer ALL Questions

1(a) Show that $p \rightarrow q$ and $\neg q \rightarrow \neg p$ are logically equivalent. (7M)

(b) Show that the relation ≤(less than or equal to) defined on the set of positive integers Z, is a partial order relation. (8M)

(or)

(c) S.T $R \wedge (P \vee Q)$ is a valid conclusion from the premises $P \vee Q$, $Q \Rightarrow R$, $P \Rightarrow M$ and $\neg M$. (7M)

(d) If R be a relation in the set of integers z defined by R = {(x,y)/:x∈ z,y ∈ z, (x-y) is divisible by 6}.

(8M)

2(a) Solve the recurrence relation $a_n = a_{n-1} + 2$, $n \geq 2$ subject to initial condition $a_1 = 3$ (7M)

(b) How many ways are there to assign five different jobs to four different employees if every employee is assigned atleast one job? (8M)

(or)

(c) Applying pegion hole principle show that of any 14 integers are selected from the set

S= {1,2,3,.....,25} there are atleast two whose seem is 26.Also write a statement that generalizes this result. (7M)

(d) In a class of 25 students, 12 have taken mathematics. 8 have taken mathematics but not biology. Find the number of students who have taken mathematics and biology and those who have taken biology but not mathematics. (8M)

3(a) If G= (V,E) be a directed graph with e edges , then $\sum_{\forall v} deg^+(V) = \sum_{\forall v} deg^-(V) = e$ (7M)

(b) Show that C_6 is a bipartite graph. (8M)

(or)

(c) Show that the complete graph K_n has a Hamiltonian cycle. (7M)

(d) Prove that a tree with n vertices has n-1 edges. (8M)

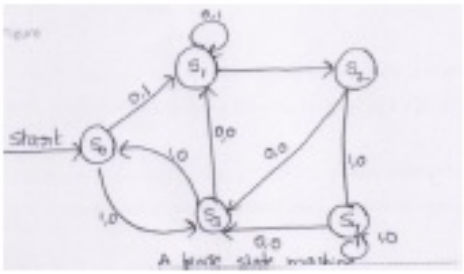
4. (a)Find the sum of products expansion for the function $F(x,y,z)=(x+y)\overline{z}$ (7)

(b) Construct circuits that produce the following outputs (i)$(x+y)\overline{x}$ (ii)$\overline{x}(y+z)$ (8)

(or)

(c) Show that distributive law $x(y+z)=xy+xz$ is valid (7)

(d)Construct the state table for the finite state machine with the state diagram shown in the following Figure (8)



SECTION-B(5*3=15M)

5.**Answer any Five Questions of the following**

a. Construct the truth table for $p\wedge(\neg q\vee q)$

b. Write the following in symbolic form Every person is precious.

c. Compute $\frac{20!}{18!}$

d.Prove $A\cup(B\cap C)=(A\cup B)\cap(A\cup C)$

e.State and prove Hand shaking theorem

f.Define Hamilton circuit Hamiltonian graph

give examples to each

g. Find the duals of $x(y+0)$ and $\overline{x}\cdot 1+(\overline{y}+z)$

h. Let A= {1,00} , find A_n for n= 0,1,2 and 3

ADIKAVI NANNAYA UNIVERSITY, RAJAMAHENDRAVARAM
MCA-19102 I Semester
MANAGEMENTACCOUNTANCY
MODEL QUESTIONPAPER

Time:3Hrs **Max Marks: 75**

SECTION- A(4 X 15 = 60 M)

Answer ALL Questions

1. a) Define Accounting Process? Explain various Branches of Accounting. [15]

(OR)

b) Give detailed proforma for Trading A/C, P&L A/C and Balance Sheet. [15]

2. a) What do you mean by financial statement analysis? Explain the importance ofRatio analysis in analyzing the financial strength ofanorganization? [15]

(OR)

b) Distinguish between Funds flow and cash flow analysis [15]

3. a) Explain the nature and importance of budgets and budgetary control in planningand coordinating the functional activities ofanorganization? [15]

(OR)

b) Calculate P/V ratio, BEP and Margin of Safety from the following data of a manufacturing
Enterprise.

Selling price	10 Rs
Variable Cost	6 Rs
Fixed Cost	40,000 Rs
Actual Sales	16,500 Units

[15]

4. a) What are the various types of documents used for data collection in computerized accountingsystem? [15]

(OR)

b) Explain the importance of coding logics in computerized accounting system? [15]

SECTION – B (5×3=15 Marks)
Answer any five Questions

5. a) Double entry system
   b) Closing entities
   C) Liquidity ratios
   d) Working Capital Cycle
   e) Master Budget
   f) Assumptions of Break even analysis
   g) Transaction files
   h) Flexibility budget

ADIKAVI NANNAYA UNIVERSITY, RAJAMAHENDRAVARAM

MCA-19103 I Semester

C Programming and Data Structures

MODEL QUESTIONPAPER

Time:3 Hrs. **Max Marks:75**

SECTION- A(4 X 15 = 60 M)

Answer ALL Questions

1. a) Explain the structure of a C program with example. [15M]

(Or)

b) List and explain loop control statements in C. [15M]

2. a) Write a C program to find the kth smallest in the given array. [15M]

(Or)

b) Explain in detail about Character pointers and functions [15M]

3. a) Discuss Robin Karp Algorithm [15M]

(Or)

b) Explain about Formatted I/o, file I/o operations [15M]

4. a) Write an algorithm for infix to postfix conversion. [15M]

(Or)

b) Describe operation on a stack with examples [15M]

SECTION – B(5 X 3 = 15 M)

Answer any FIVE of the following

5.

(a) What are the various basic data types in C?
(b) Write the syntax for conditional operator.
(c) Differentiate between putchar( ) and puts ( ).
(d) Describe the steps in writing a function in a C program.
(e) List the four storage classes in C.
(f) How do you declare a two dimensional array? Give its memory representation.
(g) Compare structures and unions.
(h) What are the uses of Pointers?

ADIKAVI NANNAYA UNIVERSITY – RAJAMAHENDRAVARAM

MCA-19104 I -Semester

COMPUTERORGANIZATION

MODEL QUESTIONPAPER

Time:3Hrs **Max Marks: 75**

SECTION- A(4 X 15 = 60 M)

Answer ALL Questions

1. a) What is Flip-Flop? Explain various types ofFlip-Flop. 15M

(Or)

b) Write about Decoder and Multiplixers and also Construct 8 to 1 Linemultiplexers 15M

2. a) Explain Data types,Complements and fixed –pointrepresentation. 15M

(Or)

b) Draw and Explain 8085 microprocessor Architecture. 15M

3. a) Describe the mechanism of an instruction cycle and memory referenceinstructions. 15M

(Or)

b) Explain instruction formats and addressing modes 15M

4. a) Write about Asynchronous data transfer methods and Explain DMA transfer with block diagram. 15M

(Or)

b) What is the difference between main memory and Auxiliary memory and Explain the mapping process of Cache memory.

SECTION – B(5 X 3 = 15 M)

Answer any FIVE of the following

5. a) Logic Gates.
b) Registers and memoryunit.
c) Floating point representation.
d) Arithmetic microoperations.
e) Timing andControl.
f) Stackorganization.
g) I/Ointerface.
h) Virtualmemory

ADIKAVI NANNAYA UNIVERSITY – RAJAMAHENDRAVARAM

MCA-19105 I -Semester

OPERATING SYSTEM

MODEL QUESTIONPAPER

Time:3Hrs **Max marks: 75**

SECTION – A (4X15=60 Marks)

Answer ALL Questions

1. Write shortnoteon (5*3=15)
   a) i)MainframeSystems ii) Multiprocessor Systems
   iii)DistributedSystems iv) Real TimeSystems
   v) Functions of OS
   (OR)
   b) i) Write short notes on System calls.
   ii) ExplainSystemStructure. [8+7]
2. a) i) Explain InterprocessCommunications.
   ii) Write short notes on communication inClient-ServerSystems. [9+6]
   (OR)
   b) Compare and Construct preemptive and non-preemtive scheduling algorithms.

3. a) Write a short notes on Demand Paging andSegmentation.
   (OR)
   b) i) Explain various Page Replacement Algorithms.
   ii) Write a short notes on Disk Management andDiskScheduling. [8+7]
4. a) Describe protections concepts and mechanisms provided by an operatingsystem.
   (OR)
   b) Explain OS Concepts with respect to LINUX.

SECTION– B (5X3=15Marks)

Answer any FIVE Questions

5. a)Threads
   b) Dining Philosophers Problem
   c) Paging
   d) File Operations
   e) Process
   f) Methods for Handling Deadlocks
   g) Directory Structure
   h) User Authenticatio

ADIKAVI NANNAYA UNIVERSITY, RAJAMAHENDRAVARAM

MCA-19201 II Semester

PROBABILITY STATISTICS AND QUEUING THEORY

MODEL QUESTION PAPER

Time:3hrs. **Max.Marks: 75**

SECTION- A(4 X 15 = 60 M)

Answer ALL Questions

1. a) Find the moment generating function of therandom variable whose moments are

   $M_r = (r+1)!2^r$

   (Or)

   b) Find the moment of generating function of a normal distribution
2. a) Let X denotes the minimum of the two numbers that appear when a pair of fair dice is thrown once. Determine the (i) Discrete probability distribution (ii)Expectation (iii) Variance

   (Or)

   b) In a Normal distribution, 31% of the items are under 45 and 8% are over 64 find.
3. a)A sample of 100 electric bulbs produced by manufacturer 'A' showed a mean life time of 1190 hrs and an S.D. of 90 hrs A sample of 75 bulbs produced by manufacturer 'B' Showed a mean life time of 1230 hrs with S.D. of 120 hrs. Is there difference between the mean life times of the two brands at a significance level of 0.05.

   (Or)

   b) In an investigation on machine performance the following results are obtained

	No. of units inspected	**No. of defectives**
Machine I	375	17
Machine II	450	22

   Test whether there is any significance performance of two machines at $\alpha = 0.05$.

4. a) The number of defects on 20 items are given below

   Item No. 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20
   No. of defects:2,0,4,1,0,8,0,1,2,0,6,0,2,1,0,3,2,1,0,2

Devise a suitable control scheme for the future.

b) A drilling machine bores holes with a mean diameter of 0.5230 cm and a Standarddeviation of 0.0032 cm. calculate the 2-sigma and 3-sigma upper and lowercontrol limits for means of samples 4, and prepare a control Chart.

SECTION– B (5X3=15Marks)

Answer any FIVE Questions

5.

a) A sample size of 100 is taken from a population whose S.D is 16. Find the standard error and probable error

b) In a random sample of 125 cola drinks , 68 said they prefer thumsup to Pepsi .Test the null hypothesis at P = 0.5 at 5% level of significance

c) Calculate expected value of y when x = 12 if $\bar{X}$=7.6, $\bar{Y}$ =14.8,σ_X=3.6,σ_Y=2.5 & R =0.99

d) Write the procedure to compute R-chart

e) If a Poisson distribution is such that $P(X=1) = 3\,P(X=3)$, find (i) $P(X \geq 1)$ (ii) $P(X \leq 3)$ (iii) $P(2 \leq X \leq 5)$.

f) Measurements on average ($\bar{X}$) and ranges (R) from 20 samples each of size 5 gave the following results: $\bar{X}$ = 99.6, $\bar{R}$ = 7.0. Determine the values of the control limits for drawing mean chart, (given that for n = 5, mean range = 2.32 $\times$ population S.D)

g) The following show the improvement (gain in reading Speed) of eight students in speed reading program and the number of weeks they have been in the program.

No. of weeks	3	5	2	8	6	9	3	4
Speed gain	86	118	49	193	164	232	73	109

Fit a straight line by method of least squares

ADIKAVI NANNAYA UNIVERSITY, RAJAMAHENDRAVARAM

MCA-19202 II Semester

INFORMATION SYSTEM AND ORGANIZATION BEHAVIOUR

MODEL QUESTIONPAPER

Time:3Hrs **Max Marks: 75**

SECTION-A

Answer ALL Questions (4 x 15 = 60)

1. (a) "Organisation Structure refers to the differentiation and integration of activities and authority, roles, and relationships." Explain.

(or)

(b) What are the essential features of a good organisation structure?

2. (a) Critically examine Herzberg's theory of Motivation. Make a comparision between theories of Herzberg and Maslow. Which of these theories do you prefer in Indian contest? Give reasons.

(or)

(b) What are different barriers of communication? What steps can be taken to overcome these barriers?

3. (a) What is meant by Organisation Conflict? Explain its process.

(or)

(b) Explain determinants of OC.

4. (a) What are the characters and functions of MIS?

(or)

(b) What are the different types of computer based information system used in different functional areas of business by organisations?

SECTION-B

Answer any FIVE Questions (5 x 3 = 15)

5. (a) Matrix Organisation Structure
   (b) Organisation Chart
   (c) Management vs Leadership
   (d) Theory Y
   (e) Formal Groups vs Informal Groups
   (f) Conflict Management
   (g) Resources of Information System
   (h) Information System and its contribution to TQM

ADIKAVI NANNAYA UNIVERSITY, RAJAMAHENDRAVARAM
MCA-19203 II Semester
OBJECT ORIENTED PROGRAMMING THROUGH JAVA
MODEL QUESTION PAPER

Time:3 Hrs. **Max Marks:75**

SECTION- A(4 X 15 = 60 M)

Answer ALL Questions

1. a) Explain about Principles of Object Oriented Languages. [15M]

(Or)

b) What is the purpose of constructor in Java programming [15M]

2. a) Define inheritance. What are the benefits of inheritance? What costs are associated withinheritance? How to prevent a class from inheritance? [15M]

(Or)

c) Write a program to demonstrate hierarchical and multiple inheritance using interfaces. [15M]

3. a) Explain in details about Thread. [15M]

(Or)

b) Discuss about Applet Life Cycle. [15M]

4. a) Write a program with nested try statements for handling exception. [15M]

(Or)

b) How to move/drag a component placed in Swing Container? Explain. [15M]

SECTION– B (5X3=15Marks)

Answer any FIVE Questions

5.

a. Differentiate between print() and println() methods in Java.
b. What are symbolic constants? Explain with examples.
c. What are the methods available in the character streams?
d. What is the significance of the CLASSPATH environment variable in creating/using a package?
e. What is the difference between error and an exception?
f. What is synchronization and why is it important?
g. What is the significance of Legacy class? Give example.
h. What is an adapter class? Explain with an example.

ADIKAVI NANNAYA UNIVERSITY – RAJAMAHENDRAVARAM

MCA-19204II -Semester

FORMAL LANGUAGE AND AUTOMATA THEORY

MODEL QUESTIONPAPER

Time:3Hrs **Max Marks: 75**

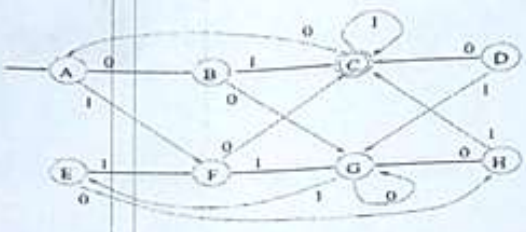
SECTION-A

Answer ALL Questions (4 x 15 = 60)

1. a) Let r be a regular expression. Then there exists some NFA with e-transitions that accepts $L(r)$?

   (OR)

   b) What is the use of Membership algorithm and construct the minimum state automaton equivalent to the transition diagram given below



2. a) State and prove pumping lemma for CFL's? 8M
   b) Explain any five closure properties of Regular sets? 7M

   (OR)

   c) Construct a PDA to accept L={WW^R/ W in $(0+1)^*$} ?

3. a) Copstruct a TM to accept L={$a^n b^n c^n$/ n>=1}?

   (OR)

   b) Briefly discuss combining Turing Machines? 8M
   c) Discuss the halting problem of Turing machine? 7M

4. a) Syntax of predicate calculus? 7M
   b) Explain truth assignment? 8M

   (OR)

   c) Explain validity and Satisfiability?

SECTION-B

Answer any FIVE Questions (5 x 3 = 15)

5. a) What is transition system?
   b) What are the differences between DFA and Non-DFA?
   c) Explain any three closure properties of regular sets?
   d) Briefly discuss simplification of CFL's ?
   e) Define Turing machine?
   f) What is Post Correspondence Problem?
   g) Explain Normal forms?
   h) Discuss NP-completeness

ADIKAVI NANNAYA UNIVERSITY – RAJAMAHENDRAVARAM
MCA-19205 II -Semester
WEB TECHNOLOGIES
MODEL QUESTIONPAPER

Time:3Hrs **Max marks: 75**

SECTION – A (4X15=60 Marks)
Answer ALL Questions

1. a) i) Explain the different layers and their roles in protocols of Computer Communication.
   ii) What are the types of Bridges? ExplainSimple Bridge? [10+5]
   (OR)
   b) Explain the concepts of data fragmentation and reassembly in detail.
2. a) i) How does the three way Handshake technique help in creating a TCP connection?
   ii) Explain the concept of FTP (FileTransferProtocol)? [7+8]
   (OR)
   b) i) Describe the steps involved when a web browser request for and obtains a web page from a Web server?
   ii) What are the three approaches for e-Commerce application Development and Explain Main features of a product such as IBM'sNet.Commerce [7+8]
3. a) i) Describe how static Web pages are madedynamic?
   ii) Create web pages for MOOCs withrelevantfields. [8+7]

   (OR)
   b) i) What are the advantages of Client - side scripting?
   ii)Describe ADO and how it can be used to interactwithDatabases? [7+8]
4. a) i) Describe the typical operation involving a middleware such asCORBA?
   ii) Explain the conceptofEDI? [7+8]
   (OR)
   b) i) Describe the anatomy of an XML Document?
   ii) ExplainWAPArchitecture? [7+8]

SECTION– B (5X3=15Marks)
Answer any FIVE Questions

5. a) What isICMP?
   b) Describe Spooling inbrief?
   c) What isResolver?
   d) What are JavaBeans?
   e) What is the need for XSL? Illustrate this with the help of anexample?
   f) Explain GPRS andUMTS?
   g) Life cycle of JAVAapplet.
   h) JAVA Remote MethodInvocation.