Code : 1P2B35

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)
MCA III Semester Regular Examinations, April 2014
Design & Analysis of Algorithms

Time: 3 hours   Max Marks: 60

Answer any FIVE of the following
All questions carry equal marks (12 Marks each)

* * * * *

1. a) Define an algorithm? Explain the Pseudo code for expressing algorithms?   6M

    b) Explain about different Asymptotic notations?   6M

2. a) Construct a binary tree from the following data

    in order :D,B,A,G,E,C,F

    pre order :A,B,D,C,E,G,F   6M

    b) Write and explain an algorithm for binary search with an example?   6M

3. a) Define AVL tree? Explain different types of rotations when imbalance occurred while

    insertion with example?   6M

    b) Write an algorithm for insertion sort and find time complexity?   6M

4. a) What is the difference between greedy method and dynamic programming method?   6M

    b) Explain how dynamic programming can be used to solve the following.
    Traveling sales person problem

$$\begin{bmatrix} 0 & 20 & 30 & 10 & 11 \\ 15 & 0 & 16 & 4 & 2 \\ 3 & 5 & 0 & 2 & 4 \\ 19 & 6 & 18 & 0 & 3 \\ 16 & 4 & 7 & 16 & 0 \end{bmatrix}$$

                                                                                             6M

5. a) Write PRIM's algorithm and construct a minimal spanning tree for a graph.   6M

    b) Find the lengths of all shortest paths from vertex S to all the remining vertices from
    the following graph
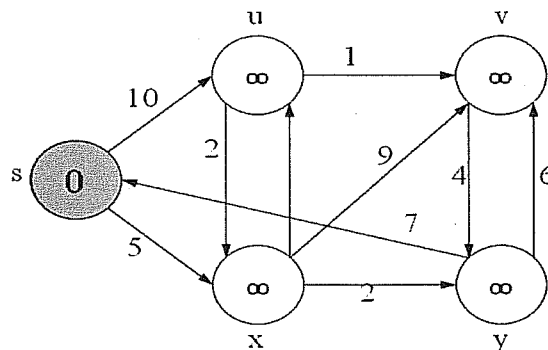
                                                                                             6M

6. a) Describe the 8-queen problem using backtracking?   6M

    b) Explain graph coloring problem with an algorithm.   6M

7.   Draw the portion of state space tree generated by FIFOBB by the following knapsack
        problem n=5,M=12, (p1,p2,p3,p4,p5)= (10,15,6,8,4) and

        (w1,w2,w3,w4,w5)= (4,6,3,4,2)   12M

8. a) Explain about COOKS theorem.   6M

    b) Discuss about NP complete with example   6M

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ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

MCA III SEMESTER REGULAR EXAMINATIONS APRIL, 2014

Java Programming

Max. Marks: 60   Time: 03 Hours

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Answer *any five* questions
All Questions carry equal marks (12 Marks each)

1. a. What is Constructor? How can you overload the constructors?   6M

    b. Describe this keyword with suitable example?   6M

2. a. What is Inheritance? Explain the various forms of Inheritance?   6M

    b. Explain about Super keyword in Inheritance?   6M

3. a. Explain in detail the process of defining, creating, importing and accessing a package   6M
       with an example?

    b. Discuss briefly on the java.util package?   6M

4. a. What is Exception? Explain try-catch blocks with suitable example?   6M

    b. How Synchronization is done in Threads?   6M

5. a. Explain Border layout and Grid layout with suitable example?   6M

    b. Explain CheckBox Class with suitable example?   6M

6. a. Distinguish String and StringBuffer with suitable example?   6M

    b. How Random Access File operations implemented in java?   6M

7. a. Differentiate Swing components and AWT components?   6M

    b. Explain JRadioButton Class with an example?   6M

8. a. Explain URL, URLConnection classes with an example?   6M

    b. Write a simple socket based client server program by using UDP protocol?   6M

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R11

MCA III Semester Regular Examinations, April 2014
Network Programming
Time: 3 hours   Max Marks: 60

Answer any FIVE of the following
All questions carry equal marks (12 Marks each)

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1.   Explain the following commands with syntax, options and examples

     i.   Grep

     ii. Sort

     iii. Cut

     iv. Chmod

     v.   Head

     vi. telnet   12M

2. a)   Briefly discuss about various control structures in shell programming with suitable examples?   8M

  b)   Write a shell script to find out factorial value using command line arguments?   4M

3. a)   What is buffering? What are the different kinds of buffers?   4M

  b)   Write C programs to read last 10 bytes of data using low level IO and Standard IO?   8M

4. a)   What are the various ways of process termination and explain each of them?   6M

  b)   What is process and process states and draw the memory layout of a process?   6M

5. a)   Write about race conditions with an example and how can you eliminate the race conditions?   6M

  b)   What are the various properties that are inherited by a child process from its parent and what are the dissimilarities between parent and child process when a process forks?   6M

6. a)   What is a signal? What are the various kinds of signal handling mechanisms and also write about Signal function?   8M

  b)   What do you mean by a terminal signal and write a C program to handle a terminal Signal?   4M

7.   Write a C program to give solution to reader's and writer's problem using named pipes?   12M

8 a)   What is a socket? What are the different kinds of sockets?   6M

  b)   Discuss the process of IPC in connection less network with the help of a diagram?   6M

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ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)
MCA III Semester Regular Examinations, April 2014
Operating Systems

Time: 3 hours   Max Marks: 60

Answer any FIVE of the following
All questions carry equal marks (12 Marks each)

* * * * *

1.   Write the OS functions. Describe the essential properties of Multi Programmed and Time shared OS.   12M

2. a) Write about PCB?   4M

   b) Explain with an example about FCFS, SJF and Round robin scheduling algorithms.   8M

3. a) What is critical section problem? Give two solutions for critical section problem?   6M

   b) Give a solution for readers-writers problem using conditional critical regions.   6M

4. a) Explain about contiguous memory allocation.   6M

   b) Consider the following page reference and reference time strings for a program:
      Page reference string: 5,4,3,2,1,4,3,5,4,3,2,1,5,.....
      Show how pages will be allocated using the FIFO page replacement policy. Also calculate the total number of page faults when allocated page blocks are 3 and 4 respectively.   6M

5. a) Explain in detail about directory management?   6M

   b) Explain in detail about any two memory allocation methods.   6M

6.   Explain the various disk scheduling algorithms.   12M

7. a) Define deadlock? Explain the necessary conditions for deadlock to occur.   5M

   b) Write an algorithm for deadlock detection.   7M

8.   Differentiate between protection and security. Explain the techniques used for protection of user files.   7M

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R11

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)
MCA V SEMESTER SUPPLEMENTARY EXAMINATIONS APRIL, 2014

UML and Design Patterns

Time: 3 hours   **Max Marks: 60**

Answer any FIVE of the following
All questions carry equal marks (12 Marks each)

* * * * *

1.	a)	Explain the Structural things of UML	6M
	b)	Discuss the common Mechanisms in UML	6M
2.	a)	Discuss about Interaction Diagrams and its role	6M
	b)	Write short notes on Use Case Diagrams	6M
3.		Discuss about	
	i.	State chart Diagram	6M
	ii.	Time and Space	6M
4.	a)	Explain the role of Component Diagrams in OOAD	6M
	b)	Write short notes on Deployment Diagrams	6M
5.	a)	How to select and use a Design Pattern, Explain?	6M
	b)	How to organize the catalog of a Design Pattern, Explain?	6M
6.		Discuss the following	
	a)	Motivation for Factory Method	6M
	b)	Applicability and Structure of Prototype Creational Pattern	6M
7.	a)	Explain the Motivation and Application of Bridge Pattern	6M
	b)	Discuss the Motivation and Application of Decorator Pattern	6M
8.		Write short notes on	
	a)	Observer Pattern	6M
	b)	Template Method	6M

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Code : 1P2B5D

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

MCA V SEMESTER SUPPLEMENTARY EXAMINATIONS APRIL, 2014

Cloud Computing

Time: 3 hours   Max Marks: 60

Answer any FIVE of the following
All questions carry equal marks (12 Marks each)

* * * * *

1. a) What is the origin of term Cloud Computing and List the key characteristics of cloud computing which are leading for "popularity and Growth" of its nature?   8M

   b) Describe about the feature "Device and Location Independence "of cloud computing.   4M

2. a) State and define the cloud computing paradigm "Applications can be easily migrated from one physical server to another".   6M

   b) What makes cloud computing is a systematic approach to the high level of concerns like commercialization and standardization in various diverse areas.   6M

3. a) How to develop and deploy cloud applications in the open public environment and solely private organizations, draw the supportive architectures for both.   8M

   b) What is the key role of cloud collaboration for new advances in globalised world?   4M

4. a) What is the primary electronic cloud collaboration tool for corporation? How it makes team of people to achieve mapping schedulesam for mapping the project task.   7M

   b) Explain the cloud computing collaboration for community.   5M

5. a) List some of the application areas in which cloud collaboration is more helpful to achieve concurrency.   4M

   b) Explain the cloud collaboration on event management.   8M

6. a) How to evaluate the instant messages through the direct IP without the servers from peer to peer clients in the cloud environment.   6M

   b) Evaluate the cloud based online web conferences.   6M

7. List some online groupware tools. How to Create and Evaluate social networks for collaboration of the groupware.   12M

8. a) How cloud become more popular for high storage capacity consumer end devices.   5M

   b) Explain cloud online file storage mechanism which supports the re-provision of infrastructure, platform, and software resources.   7M

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Code : 1P2B32

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)
MCA III Semester Regular Examinations, April 2014
Computer Communications

Time: 3 hours

Max Marks: 60

Answer any FIVE of the following
All questions carry equal marks (12 Marks each)

* * * * *

1.	a)	Define Distributed System? How Computer Networks will be useful in Business and Social Issues?	5M
	b)	Draw and Explain about TCP/IP Reference model?	7M
2.		Define Multiplexing? Discuss in Detail about Frequency Divison Multiplexing and Time Divison Multiplexing?	12M
3.	a)	Discuss the Techniques of Bit Stuffing and Character Stuffing with Examples?	7M
	b)	Explain about Simplex Stop and Wait Protocol?	5M
4.	a)	What is Channel Allocation Problem? Explain?	5M
	b)	With a Neat Sketch explain about various ALOHA Protocols?	7M
5.	a)	Define Congestion? List out the general Principles of Congestion Control?	5M
	b)	Discuss about Link state Routing Technique with a Clear Example?	7M
6.	a)	Write Short notes on Tunneling and Internetworking?	6M
	b)	Draw the Header format of IPV4? Explain about its contents?	6M
7.	a)	What are various Transport Services?	4M
	b)	What is TCP Service Model? How Connection Establishment and Release will be done in TCP?	8M
8.	a)	Define Cryptography? Explain the process of Cryptography?	5M
	b)	Explain in detail about DES algorithm with an Example?	7M

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Code : 1P2B21

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)
MCA II SEMESTER SUPPLEMENTARY EXAMINATIONS APRIL, 2014

COMPUTER ORGANIZATION

Time: 3 hours   **Max Marks: 60**

Answer any FIVE of the following
All questions carry equal marks

* * * * *

1. a) Perform the arithmetic operations (+42) + (-13) and (-42)-(-13) in binary using signed- 4M
        2's complement representation for negative numbers.

    b) Simplify the Boolean function F together with the don't care conditions d in   8M
        i) Sum-of-Products form and   ii) Product-of-Sums forms.
            $F (w, x, y, z)= \Sigma(0,1,2,3,7,8,10)$
            $d (w, x, y, z)= \Sigma(5,6,11,15)$

2. a) What is a multiplexer? Why is it called as a data selector? Draw the block a 6M
        diagram of 4-to -1 line multiplexer and explain its operation by means of function
        table?

    b) Explain the operation of a JK flip-flop using its block diagram and truth table.   6M

3. a) Discuss the memory hierarchy in a computer system with regard to speed, size and 4M
        cost.

    b) With the help of a neat diagram explain the match logic for one word of associative 8M
        memory.

4. a) Discuss various addressing modes of 8086 with suitable examples.   6M

    b) With a neat sketch explain the life cycle of an instruction execution.   6M

5. a) Explain the following data transfer instructions with an example.   8M
            i) MOV   ii) IN   iii)XCHG   iv) XLAT

    b) List and explain the logical instructions in 8086 microprocessor.   4M

6. a) Discuss different types of 8086 unconditional jump instructions with an example for 6M
        each type.

    b) Write an ALP to sort a given set of N numbers in ascending order using bubble sort 6M
        algorithm.

7. a) Draw a block diagram of a micro-programmed control unit. Explain the function of 6M
        each block in the diagram.

    b) Describe the process for developing a micro programmed control unit.   6M

8. a) With the help of a flow chart explain programmed I/O? What are its limitations?   6M

    b) Explain the operation of DMA controller with a neat block diagram.   6M

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Code : 1P2B23

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)
MCA II SEMESTER SUPPLEMENTARY EXAMINATIONS APRIL, 2014

COMPUTER ORIENTED NUMERICAL METHODS

Time: 3 hours   **Max Marks: 60**

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Answer *any five* questions
All Questions carry equal marks (12 Marks each)

1. a) Convert $(0.7)_{10}$ to the corresponding binary fraction.   6M

   b) Explain about errors.   6M

2. a) Find a positive real root of the equation $\cos x - xe^x = 0$ using the bisection method.   6M

   b) Find the smallest positive root of the equation $x^3 - 5x + 1 = 0$ using the Newton-Raphson method.   6M

3. a) Solve the equations $10x_1 - x_2 + 2x_3 = 4;\ x_1 + 10x_2 - x_3 = 3;\ 2x_1 + 3x_2 + 20x_3 = 7$ using the Gauss elimination method.   6M

   b) Solve the system of equations $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 8 & 22 \\ 3 & 22 & 82 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 5 \\ 6 \\ -10 \end{bmatrix}$ using the Cholesky method.   6M

4. a) Solve the equations $4x_1 + x_2 + x_3 = 2;\ x_1 + 5x_2 + 2x_3 = -6;\ x_1 + 2x_2 + 3x_3 = -4$ using the Jacobi iteration method.   6M

   b) Find all the Eigen values and the corresponding Eigen vectors of $A = \begin{bmatrix} 3 & 2 & 2 \\ 2 & 5 & 2 \\ 2 & 2 & 3 \end{bmatrix}$.   6M

   Also prove that $S^{-1}AS$ is a diagonal matrix, where S is the matrix of the Eigen vectors.

5. a) The following data represents the function $f(x) = e^x$.   6M

x	1	1.5	2.0	2.5
$f(x)$	2.7183	4.4817	7.3891	12.1825

   Estimate the value of $f(2.25)$ using the Newton's backward difference interpolation. Compare with the exact value.

   b) Construct the divided difference table for the data   6M

x	0.5	1.5	3.0	5.0	6.5	8.0
$f(x)$	1.625	5.875	31.0	131.0	282.125	521.0

   Hence, find the interpolating polynomial and an approximation to the value of $f(7)$.

6. a) Obtain the piecewise linear interpolating polynomials for the function $f(x)$ defined by the data   6M

x	1	2	4	8
$f(x)$	3	7	21	73

   Hence, estimate the values of $f(3)$ and $f(7)$

   b) Fit the following four points by the cubic splines   6M

x	1	2	3	4
$f(x)$	1	5	11	8

   Use the end conditions $f''(1) = 0 = f''(4)$. Hence, compute $f(1.5)$ and $f'(2.5)$

7. a) The following data for the function $f(x) = x^4$ is given.   6M

x	0.4	0.6	0.8
$f(x)$	0.0256	0.1296	0.4096

Find $f'(0.8)$ and $f''(0.8)$ using quadratic interpolation. Compare with the exact solution. Obtain the bound on the truncation errors.

b) Find the approximate value of the integral $I = \int_0^1 \dfrac{dx}{1+x}$ using Simpson's three-eighth rule.   6M

Also, find a bound on the error.

8. a) Use the Euler method to solve numerically the initial value problem   6M
$u' = -2tu^2$, $u(0) = 1$ with $h = 0.2$ on the interval $[0, 1]$.

b) Use Runge-Kutta method of fourth order to find the numerical solution at $x = 0.8$ for   6M
$\dfrac{dy}{dx} = \sqrt{x+y}$, $y(0.4) = 0.41$. Assume the step length $h = 0.2$.

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ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)
MCA III Semester Regular Examinations, April 2014
Database Management Systems

Time: 3 hours   Max Marks: 60

Answer any FIVE of the following
All questions carry equal marks (12 Marks each)

* * * * *

1. a) Discuss about Database Languages   6M

    b) What are the functions of Database Administrator, explain.   6M

2. a) What is Aggregation? Give two examples where it is useful   6M

    b) Explain the distinction between

        i) Disjoint and Overlapping Constraints

        ii) Total and Partial Constraints.   6M

3. a) Discuss the following fundamental Relational Algebra operations with example.

        a) Rename   b) Union   6M

    b) Explain the tuple and domain relational calculus with safety expressions   6M

4. a) Define "View" in SQL, explain with an example.   6M

    b) What is Nested Queries, explain with an example.

5. a) Write a details notes on 4NF and 4NF Decomposition   6M

    b) Write short notes on BCNF and Dependency Preservation.   6M

6. a) What are the various levels of RAID? Explain.   6M

    b) What is File organization? Discuss the Fixed and Variable length records.   6M

7. a) Explain the states of a Transaction using a neat diagram.   6M

    b) Write a short notes on Serializability   6M

8.   Write short notes on

        a) Log- Based Recovery.   6M

        b) ARIES Recovery Technique.   6M

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