

Prof. G. Ram Reddy Centre for Distance Education
Osmania University
MCA – II Year 2014 ASSIGNMENTS

DATA COMMUNICATIONS AND COMPUTER NETWORKS
ASSIGNMENT – I

1. (a) Write about
(i) CSMA/CD (ii) Transmission Media
(b) Explain Token Ring (or) IEEE 802.5.
2. (a) Write about
(i) LAN Architecture (ii) ISDN
(b) Write about IEEE 802.4 (or) Token Bus.
3. (a) Distinguish between Datagram Subnet and Virtual Circuit Subnet.
(b) Write about Optimality Principle and Shortest Path Routing.
4. (a) Write about
(i) Flow based Routing (ii) Flooding
(b) Write about
(i) Loading Shedding (iv) Traffic Shaping
5. (a) Write about Transport Service Primitives.
(b) Write about Connection Establishment.
6. (a) Write about Crash Recovery.
(b) Write about Flow Control and Buffering.
7. (a) Distinguish between Connection Oriented and Connectionless Service.
(b) Write about Socket Address Structures.
8. (a) Explain Elementary Socket System Calls.
(b) Write about Socket Options.
9. (a) Write about
(i) DES (ii) IDEA
(b) Write about Authentication using Kerberos.
10. (a) Write about SNMP.
(b) Write about RSA.

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DATA COMMUNICATIONS AND COMPUTER NETWORKS
ASSIGNMENT – II

1. (a) Write about
 - (i) Different topologies of network.
 - (ii) Stop-and-Wait Flow Control(b) Explain HDLC

2. (a) For the given bit string $M = 1010001101$ and $P = 110101$ Construct Shift Register Circuit and Find the CRC.
(b) Write about
 - (i) Go – Back n ARQ
 - (ii) Selective reject ARQ
 - (iii) Sliding window Flow Control.

3. (a) Write about Distance vector Routing
(b) Write about
 - (i) Tunneling
 - (ii) Fire Walls
 - (iii) Fragmentation

4. (a) Write about
 - (i) Link State Routing
 - (ii) Hierarchical Routing
 - (iii) Choke Packets(b) Write about IP Protocol.

5. (a) Write about TCP Segment Header
(b) Write about
 - (i) Multiplexing
 - (ii) TCP Connection Establishment

6. (a) Write about
 - (i) TCP Timer Management
 - (ii) TCP Connection Release(b) Write about TCP Congestion Control.

7. (a) Explain Advanced Socket System Calls.
(b) Write about Asynchronous I/O with Program.

8. (a) Explain Internet Super Server
(b) Write about
 - (i) Input – Output Multiplexing
 - (ii) Out-of-Band Data

9. (a) Write about
 - (i) Substitution Cipher
 - (ii) Transposition Cipher
 - (iii) PGP(b) Write about Authentication using KDC.

10. (a) Write about DNS.
(b) Write about E-mail Architecture and Services.

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Database Management System

Assignment – I

1. Construct an E-R diagram for a University registrar's office. The office maintains data about each class, including the instructor, the enrollment and the time & place of class meetings. For each student-class pair, a grade is recorded. Document all assumptions that you make about mapping constraints. Transform the resultant E-R model to relations.
2. (a) With the help of an example, explain aggregate functions in relational algebra
(b) An E-R diagram can be viewed as a graph. What do the following mean in terms of the structure of an enterprise schema? (i) Graph is disconnected
(ii) Graph is acyclic
3. (a) Differentiate between TRC & DRC
(b) Explain referential integrity with the help of an example
4. Consider the SQL query
Select p.a1 from p, r1, r2 where p.a1=r1.a1 or p.a1=r2.a1.
Under what conditions does the preceding query select values of p.a1 that are neither in r1 nor in r2? Examine carefully the cases where one of r1 or r2 may be empty
5. (a) What is an Index? Explain the properties of indices
(b) Explain extendible hashing with the help of an example
6. Compute the closure of the following set F of functional dependencies for relation schema R= (A, B, C, D, E) such that $A \rightarrow BC$, $CD \rightarrow E$, $B \rightarrow D$, $E \rightarrow A$. List the candidate keys of R
7. Explain Conflict equivalent & Conflict Serializability with the help of an example
8. Describe cost based query optimization & heuristic based optimization
9. Explain (i) Time-stamp based protocols (ii) Validation based protocols
10. Explain three phase commit protocol. Discuss the cases of failure of coordinator & participating sites.

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Database Management System

Assignment - II

1. (a) Differentiate between Physical & logical data independence
(b) Describe the functions of Database Administrator
2. What is a join? Explain different types of joins with one example each
3. Let $R = (A, B, C)$ & let r_1 & r_2 both be relations on schema R . Give an expression in DRC & TRC equivalent to each of the following:
(a) $\prod_A (r_1)$ (b) $\sigma_{B=16} (r_1)$ (c) $r_1 \cup r_2$ (d) $\prod_{A,B} (r_1) \times \prod_{B,C} (r_2)$
4. (a) What is Authorization graph? Explain
(b) Write the syntax of Grant & Revoke statement and explain
5. Suppose that we decompose the scheme $R = (A, B, C, D, E)$ into (A, B, C) & (A, B, E) . Show that this decomposition is lossless join decomposition if the following dependencies holds: $A \rightarrow BC$, $CD \rightarrow E$, $B \rightarrow D$, $E \rightarrow A$
6. Construct a B+ tree for the following set of key values (2, 3, 5, 7, 11, 17, 19, 23, 29, 31) where the number of pointers in a node is six. Also insert 9, insert 10, delete 23 & delete 19 from the B+ tree.
7. Explain (i) Two Phase Locking protocol (ii) Phantom problem
8. Describe the log based recovery techniques? Describe the cases of failures
9. What is a distributed database? Explain distributed transactions
- 10 Explain Concurrency Control in distributed databases

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CDE – 203 Operating System assignment -1

- 1 Define Operating System and discuss its various function of operating system in brief
- 2 Explain the structure of a monitor & monitor solution to dining philosopher's problem
3. a) Explain briefly how resource allocation graphs are used in detecting and avoiding deadlock explain.
 b) Compare file allocation methods
- 4 Explain process management and explain about inter process communications
- 5 What is distributed systems. Explain the goals and challenges of distributed
- 6 What is memory management and discuss various memory allocations schemes Systems
7. a) Explain general architecture of windows 2000.
 b) Explain briefly about Windows NT Executive.
8. a) Explain design issues of distributed file system
 b) Discuss mounting mechanism used in Unix systems
9. a) List and explain Unix system calls b) Enumerate different shell variables
10. Explain memory management of Unix operating system.

Operating System assignment -2

1. List out some different types of operating systems. Explain their functionalities of each
2. What is CPU Schedule and Scheduling criteria and differentiate between preemptive and non preemptive scheduling.
3. Distinguish between external and internal fragmentation and give solutions to the problem
4. Explain 1. Critical Section 2. Monitors 3.Semaphores 4. Spin Locks
5. Explain page replacement algorithm and fault handling mechanism.
6. Consider the following snapshot of a system

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D ₀
P ₀	0	0	1	2	0	0	1	2	1	5	2	0
P ₁	1	0	0	0	1	7	5	0				
P ₂	1	3	5	4	2	3	5	6				
P ₃	0	6	3	2	0	6	5	2				
P ₄	0	0	1	4	0	6	5	6				

Answer the following questions using Bankers Avoidance algorithm

- I) is the system in a safe state, if so give the sequence
- II) If a request from process P arrives for (0,4,2,0) can the request be granted immediately.
7. a) Explain the features of UNIX Operating system and explain its architecture.
 b) What is security explain security descriptor.
8. a) Explain DMA Mode of I/O. What are the steps in DMA transfers.
 b) Identify the functions in Client and the Server in Client/Server architecture.
9. Explain RPC. Identify the components of RPC mechanism
10. Explain Distributed shared memory concept.

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**SOFTWARE ENGINEERING & OBJECT ORIENTED SOFTWARE
DEVELOPMENT**

ASSIGNMENT QUESTIONS -I

1. Discuss about **SE Challenges**.
2. Discuss about **Spiral Model**
3. Define **Software Requirement**. Give the IEEE format of SRS?
4. What is **Function Oriented Design**? Explain
5. Explain **COCOMO Effort Estimation Model**
6. Explain **Risk** Management
7. Discuss **about Interaction Diagrams**
8. Explain about **Building blocks** of UML
9. Explain **USDP**
10. Write about **Workers & their Role** in **Design** workflow

ASSIGNMENT QUESTIONS -II

1. What is **CMMI**? Explain
2. Explain about **PDL**
3. Write about design principles
4. Explain about **Formal Technical Reviews**
5. Write about **Software Maintenance**.
6. Define **Re-engineering, Forward Engineering**
7. Draw a **Class diagram** for ATM System
8. Differentiate between **Analysis & Design Classes**
9. What are the **activities** in **Design** workflow?
10. Differentiate between **State-chart** and **Activity** diagrams

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DESIGN AND ANALYSIS OF ALGORITHMS
ASSIGNMENT – 1

1. What is an Algorithm ? Explain the various properties of an algorithm.
2. Determine the frequency counts for all statements in the following algorithm
i = 1;
while (i<=n) {
 x = x + 1;
 i = I + 1;
}
3. Let G be an undirected connected graph with atleast one vertex of odd degree. Show that G contains no Eulerian Walk.
4. Write an algorithm for implementing a priority Queuing using heap.
5. Explain about the strategy of divide and conquer strategy.
6. Explain about Knapsack problem with suitable examples.
7. Prove that Kruskal's algorithm generates a minimum cost spanning tree for every connected undirected graph G
8. Write an algoirhtm to construct an optimal binary search tree given the roots r(I,j), $0 \leq i < j \leq n$. show that this can be done in $O(n)$ time.
9. Define the following
(a) Articulation points , (b) Game Trees , (c) DFS ,(d) BFS
10. What is satisfiability? Write a non-deterministic algorithm satisfiability.

ASSIGNMENT – 2

1. If S is a set of n elements, the power set of S is the set of all possible subsets of S. Write an algorithm to compute the powerset.
2. Explain the usage of Asymptotic analysis and notations of it.
3. Explain the various collision resolution techniques
4. Device a ternary search algorithm that first tests the element at position $n/3$ for equality with some value x, and then n checks the element $2n/3$ and either discover x or reduces the set size to one-third the size of the original. Compare the binary search tree.
5. Write an algorithm that multiplies two $n \times n$ matrices using $O(n^3)$ operations. Determine the precise number of multiplications, additions and array element accesses.
6. Explain the Prim's minimum spanning algorithm with an example.
7. Find an optimal binary merge pattern for ten files whose lengths are 45,78,88,79,84,53,91,35,3 and 11.
8. Explain and prove the correctness of BellmanFord Algorithm
9. Write an algorithm for graph color problem with suitable examples.
- 10 . Compare and contrast deterministic and non-deterministic algorithms

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INFORMATION SYSTEM CONTROL AND AUDIT
ASSIGNMENT - I

- 1) a) What are the major objectives of information system auditing? Explain four of these objectives.
b) Explain the contribution of information system management and behavioural science to information system auditing.
- 2) a) Explain the purpose served by factoring a system into a number of subsystem. What should be the basis of factoring?
b) Briefly explain the necessity for control and audit of computer system.
- 3) a) Write brief notes on the planning and organizing functions of an information audit system.
b) Explain the advantage of centralized programming.
- 4) a) How do you manage a programming group for an information system design? Explain in detail.
b) Write brief notes on the control functions of an information audit system.
- 5) a) Explain the functions of a Data Administrator(DA) and database administrator with respect to concurrency control and existence control.
b) What are the different threats to the physical security of information systems? Write brief notes on these threats.
- 6) a) Explain a mechanism to perform network operations to conduct operations management control.
b) Explain briefly the different quality assurance functions used in operations management control.
- 7) a) What are the types of data coding errors that are present? Explain the factors that affect the frequency with which data coding errors are likely to be made.
b) What are the relative strengths and limitations of link encryption versus end to end encryption?
- 8) a) Write an essay on communication controls.
b) Write notes on the use of plastic cards as a security mechanism.
- 9) a) What is an audit charter? What are the major components of an audit charter?
b) Why does the information system audit function need an audit?
- 10) Write short notes on the following topics:
 - a) Generalized audit software
 - b) Types of concurrent auditing techniques

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c) Utility software.

MCA II YEAR
INFORMATION SYSTEM CONTROL AND AUDIT
ASSIGNMENT - II

1. a) What are the issues of an Auditor in Computer operations, Scheduling and maintenance?
b) Explain the work of a Production Control group.
- 2 a) Why do we need Quality Assurance? What are its functions?
b) What are Auditors concerns in Quality Assurance?
- 3 a) What are Cryptographic controls and how do they work.
b) Give the role of Digital Signatures, PIN and Plastic cards in Access Control.
- 4 a) Why the Input Controls are important? What are Batch controls.
b) Write about Input error reporting and handling.
- 5 a) How do we validate input instructions?
b) What are Input Audit trials and existence controls?
- 6 a) Write about Communication Subsystem exposures.
b) Explain the controls over Subversive threats.
- 7 a) Explain the motivation for using Audit software.
b) List the benefits and limitations of Audit Software.
- 8 a) Write about the Utility software used in Evidence collection.
b) Why do we need Specialized Audit Software?
- 9 a) Write the need for Concurrent Audit Software.
b) Write a paragraph about various types of concurrent Audit Software.
- 10 a) Write about Staffing and Leading functions in Managing as IS Audit.
b) Write about Standards and Procedures laid down by ISACA (Information System Audit and Control Association).

**Note: Last date for submission of MCA I, II & III assignments :
30-05-2014**