

**Prof. G. Ram Reddy Centre for Distance Education  
Osmania University  
MCA – II Year 2018 ASSIGNMENTS**

**M.C.A  
INTERNAL ASSIGNMENT QUESTIONS  
(Aug/Sept- 2018)**



**PROF. G. RAM REDDY CENTRE FOR DISTANCE EDUCATION**

(RECOGNISED BY THE DISTANCE EDUCATION BUREAU, UGC, NEW DELHI)

**OSMANIA UNIVERSITY**

(A University with Potential for Excellence and Re-Accredited by NAAC with "A+" Grade)

Prof. C. GANESH  
**DIRECTOR**

**Prof. G. Ram Reddy Centre for Distance Education  
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Dear Students,

All the MCA-I, II & III Year students has to write 2 Assignments for each paper and submit **Assignments**. The submission of Assignments compulsorily. Each assignment carries **20 marks**. University Examinations will be held for **80 marks**. The concerned faculty evaluates these assignment scripts. The marks awarded to you will be forwarded to the Controller of Examination, OU for inclusion in the University Examination marks. If you fail to submit Internal Assignments before the stipulated date, the internal marks will not be added to University examination marks under any circumstances. **The assignment marks will not be accepted after the stipulated date**. You are required to **pay Rs.500/- fee** towards Internal Assignment marks through DD (in favour of Director, PGRRCDE, OU) and submit the same along with assignment at the concerned counter **on or before 31-05-2018** and obtain proper submission receipt.

**ASSIGNMENT WITHOUT THE DD WILL NOT BE ACCEPTED**

**Assignments on Printed / Photocopy / Typed papers will not be accepted and will not be valued at any cost.**

**Only hand written Assignments on A/4 size paper (one side only) will be accepted and valued.**

**Methodology for writing the Assignments:**

1. First read the subject matter in the course material that is supplied to you.
2. If possible read the subject matter in the books suggested for further reading.
3. You are welcome to use the PGRRCDE Library on all working days including Sunday for collecting information on the topic of your assignments. (10.30 am to 5.00 pm).
4. Give a final reading to the answer you have written and see whether you can delete unimportant or repetitive words.
5. The cover page of the each theory assignments must have information as given in FORMAT below.

**FORMAT**

- a. NAME OF THE COURSE : \_\_\_\_\_
- b. NAME OF THE STUDENT : \_\_\_\_\_
- c. ENROLLMENT NUMBER : \_\_\_\_\_
- d. NAME OF THE PAPER : \_\_\_\_\_
- e. DATE OF SUBMISSION : \_\_\_\_\_
6. Write the above said details clearly on every assignment paper, otherwise your paper will not be valued.
7. Tag all the assignments paper-wise and submit.
8. Submit the assignments on or before **31.05.2018** at the concerned counter at PGRRCDE, OU on any working day and obtain receipt.

**Prof. C. GANESH**

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**DATA COMMUNICATIONS AND COMPUTER NETWORKS  
ASSIGNMENT – I**

1. (a) Distinguish between Datagram Subnet and Virtual Circuit Subnet.  
(b) Write about Optimality Principle and Shortest Path Routing.
2. (a) Write about  
(i) LAN Architecture (ii) ISDN  
(b) Write about IEEE 802.4 (or) Token Bus.
3. (a) Write about Transport Service Primitives.  
(b) Write about Connection Establishment.
4. (a) Write about  
(i) Flow based Routing (ii) Flooding  
(b) Write about  
(i) Loading Shedding (iv) Traffic Shaping
5. (a) Write about  
(i) CSMA/CD (ii) Transmission Media  
(b) Explain Token Ring (or) IEEE 802.5.
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.

**DATA COMMUNICATIONS AND COMPUTER NETWORKS  
ASSIGNMENT – II**

1. (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.
2. (a) Write about  
(i) Different topologies of network.  
(ii) Stop-and-Wait Flow Control  
(b) Explain HDLC
3. (a) Write about Distance vector Routing  
(b) Write about  
(ii) Tunneling (ii) Fire Walls (iii) Fragmentation
4. (a) Write about

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- (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.

**Database Management System  
Assignment – I**

- 1) a) What is a Relationship? Explain different types of Relationships with an example.
- b) What is an Entity? Explain weak and strong Entities with an example.
- 2) Explain Three-Levels of Abstraction? What is Data Independence ? Explain different types of Data Independence.
- 3) a) What is QBE? Write the syntax of QBE .Explain with an example
- b) Explain aggregate functions in QBE with an example
- 4) a) What is an Index? Explain the Properties of an Index.
- b) Explain about Cost-Model.
- 5) Explain the structure of ISAM? Explain insertion and deletion operations on ISAM with an example.
- 6) Explain Dynamic Hashing Techniques.
- 7) a) What is DBA? Explain the Functions of DBA.
- b) What is DBM? Explain the roles of DBM.
- 8) a) What is Transaction? Explain the ACID properties?
- b) What is a schedule? Explain different types of Schedules.
- 9) a) Explain about Time-Stamp based Protocols.
- b) Explain validation protocols.
- 10) Explain about Access Control Mechanism.

**Database Management System  
Assignment – II**

- 1) Explain the structure of DBMS.

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- 2) What is Normalization ? Explain different types of Normalization with example.
- 3) a) Write the Syntax of Tuple Relational Calculus and Domain Relational Calculus.  
b) Explain different types of Operators supported by Relational Algebra with an example.
- 4) **Consider the following Schema**  
**Supplier(sid:Integer, sname:string, address: string)**  
**Parts(pid:integer, pname : string , color : string)**  
**Catalog( sid : integer, pid : integer, cost : real)**  
**Write the following queries in relational algebra, tuple relational calculus and domain relational calculus:**
  - a) Find the names of suppliers who supply some red part
  - b) Find the *sid* of suppliers who supply some red or green part.
  - c) Find the sid of suppliers who supply some red part or are at 221 Packer Ave.
  - d) Find the sid of the suppliers who supply red part and cost = 1000.
5. Explain different types of File Organizations.
  6. What is B+ -Tree? Explain the operations performed on B+-Tree with an example.
  7. Explain about Hash Function? Explain about Static Hashing? Differentiate between linear and extendible hashing.
  8. a) Explain about View Serializability?  
b) Explain about Conflict Serializability.
  9. a) Explain about Locks? Explain about Two-Phase Locking Technique.  
b) Explain about Distributed Operating System
  10. What is Deadlock? Explain about deadlocks.

**Operating System**  
**Assignment – I**

- 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 – I**

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.

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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  
P0 0 1 2 0 0 1 2 1 5 2 0  
P1 1 0 0 0 1 7 5 0  
P2 1 3 5 4 2 3 5 6  
P3 0 6 3 2 0 6 5 2  
P4 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.

**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 RiskManagement
7. Discuss about Interaction Diagrams
8. Explain about Building blocksof UML
9. Explain USDP
10. Write about Workers& their Rolein Designworkflow

**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 diagramfor ATMSystem

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8. Differentiate between Analysis & Design Classes
9. What are the activities in Design workflow?
10. Differentiate between State-chart and Activity diagrams

**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 at least 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 algorithm 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. Devise a ternary search algorithm that first tests the element at position  $n/3$  for equality with some value x, and then 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.

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10 . Compare and contrast deterministic and non-deterministic algorithms

**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

**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?



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- 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 varioustypes 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 :  
31-05-2018**