**Shri Shivaji Education Society Amravati's**
**SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR**
**Master in Computer Application (MCA) Semester-I**

## Department of Computer Science

## MCA –I Semester-I (2019-2020)

## Assignment on

## Computer Organization and Architecture

1. What is an Instruction ? How instruction set is classified ? Explain with suitable example.

2. What is Instruction cycle ? Explain execution cycle and also draw its timing diagram.

3. Explain the terms :
   (i) Displacement Addressing
   (ii) Base-Register Addressing

4. How does software work with hardware ? Explain.

5. What are the different types of buses ? Explain in detail Draw the block diagram of datapath portion of instruction cycle and explain the function of each block.

6. Explain the concept of pipelining in detail.

7. Explain SPEC marks in detail. Classify the memory on the basis of storage and speed. Explain.

8. Explain memory array organization.

9. What is priority interrupts ? Draw the block diagram of daisy chain priority interrupts and explain.

10. Describe in detail transaction processing benchmarks.

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**Master in Computer Application (MCA) Semester-I**

## Department of Computer Science

## MCA –I Semester-I (2019-2020)

## Assignment on

## OBJECT ORIENTED PROGRAMMING USING C++

1. Explain the following : assembler, compiler, interpreter and linker.
2. What characteristics are desirable for a good programming language ? Explain.
3. Explain basic concepts of OOPs and its applications.
4. Discuss different data types in C++. Write a program to find average of ten numbers.
5. Explain function overloading with suitable example.
6. Describe static data members and static member function with example.
7. Explain operator overloading. Explain rules for operator overloading.
8. Discuss about constructors in derived classes with example.
9. Explain 'this' pointer with example.
10. What is file mode ? Explain different file modes use to operate on file.

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**Master in Computer Application (MCA) Semester-I**

## Department of Computer Science

## MCA –I Semester-I (2019-2020)

## Assignment on

## OPERATING SYSTEM

1. Explain in brief about Memory Management.

2. What is Operating System ? Explain operating system as an extended machine.
   (i) Monolithic Systems
   (ii) Layered Systems.

3. Define Threads. State the implementation of threads in user space and kernel space.

4. Explain producer — consumer problem in detail.

5. What is meant by shared files ? Explain in brief.

6. Explain memory mapped files in detail.

7. Explain different security aspects of UNIX.

8. Explain the implementation of input as well as output in UNIX.

9. What is Registry ? Explain Registry in Windows 2000.

10. Discuss categories of Win - 32 API Calls.

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**Master in Computer Application (MCA) Semester-I**

## Department of Computer Science

## MCA –I Semester-I (2019-2020)

## Assignment on

### DIGITAL ELECTRONICS AND MICROPROCESSOR

1. Explain binary to octal hexadecimal interconversion with example.
2. Explain the weighted and unweighted codes. State the advantages of weighted code. ExplainASCII and EBCDIC in detail.
3. Explain working of EX-OR and EX-NOR gates.
4. Explain NOR gate as a universal gate.
5. Solve by using K-map : f(A, B, C, D) = Σm(1, 2, 3, 4, 6, 10, 12 +d (7, 14))
6. What is K-Map ? State the rules required to solve the expression by using K-map.
7. Draw the block diagram of decade (mod10) counter and explain.
8. Explain working of JKMSFF in detail.
9. Draw the block diagram of IC 8086 μp and explain the function of Bus Interface Unit(BIU).
10. Write an ALP for IC 8086 μp to add the elements of an array containing 10 elements.

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**Master in Computer Application (MCA) Semester-I**

## Department of Computer Science

## MCA –I Semester-I (2019-2020)

## Assignment on

## SYSTEM ANALYSIS & DESIGN

1. What are the different elements of a System ? Explain in detail.
2. Explain the phases of system development life cycle in detail.
3. What are the issues, problems and limitations in interview ? Explain the advantages of interview.
4. How will you conduct an on-site observation ? Lay out a plan and specify the pros and cons of this tool.
5. Define cost/benefit determination. Explain any two methods in detail.
6. What are the factors to be considered while designing the good form ?
7. What is test plan ? Explain with one example.
8. Why is quality assurance required ? Explain its different levels.
9. What is project management ? Explain the characteristics that define a project.
10. What is Gantt Chart ? How does it differ from a PERT Chart ?

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**Master in Computer Application (MCA) Semester-III**

## Department of Computer Science

## MCA –II Semester-III (2019-2020)

### E-COMMERCE

1. What are AICPA in E- commerce ? Explain its assurance services.

2. Explain three pillars structure of E-commerce with potential benefits of E-commerce.

3. Explain the financial EDI. Explain EDI systems and the internet in brief.

4. Explain various privacy issues used in E-commerce.

5. List the five stages in the risk management paradigm and explain.

6. Distinguish between control weakness and control risk.

7. What do you mean by key management ? Explain various key management tasks.

8. Explain the man-in-middle attack on public key cryptography. How can it be prevented ?

9. What are intelligent agents ? How intelligent agents have the potential to impact E-commerce ?

10. Which four P's are applied to internet marketing ?

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## Department of Computer Science

## MCA –II Semester-III (2019-2020)

### DATA COMMUNICATION AND NETWORK

1. Explain analog and digital data transmission.
2. Explain error detection techniques.
3. Write a short note on communication network.
4. What is network topology ? Explain star topology.
5. Explain TCP/IP protocol in detail.
6. What is difference between a bridge and router ? Explain.
7. Explain light weight transport protocol.
8. What are session characteristics ? Explain.
9. Explain the working structure of ISDN.
10. Write short notes on :
    (i) Transmission structure
    (ii) User access.

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## Department of Computer Science

## MCA –II Semester-III (2019-2020)

### DESIGN AND ANALYSIS OF ALGORITHM

1. Write an algorithm for binary search using recursion and iteration. Compare with an example.

2. Explain order of asymptotic notation in detail.

3. Write and explain general characteristics of greedy algorithms with example.

4. Prove that Dijkstra algorithm finds the shortest path from source to destination.

5. Describe general template for divide and conquer with an example.

6. Write and explain Strassen's matrix multiplication algorithm with an example.

7. State and explain principle of optimality with an example.

8. Write and analyse Floyd's algorithm use to find shortest path using dynamic programming.

9. Explain 8 queens problem with respect to backtracking.

10. Explain :
    (i) Polynomial Reductions
    (ii) NP-Hard Problems.

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**Master in Computer Application (MCA) Semester-III**

# Department of Computer Science

# MCA –II Semester-III (2019-2020)

## OPERATION RESEARCH

1. Solve using "2-phase" method :

   Min. $6x_1 + 3x_2$
   subject to constraints :
   $x_1 + x_2 \geq 1$
   $2x_1 - x_2 \geq 1$
   $3x_2 \leq 2$
   $x_1, x_2 \geq 0$ 8

2. Solve the following LPP by using Graphical Method :

   Max $Z = 3x_1 + 5x_2$
   subject to constraints :
   $2x_1 + 3x_2 \leq 7$
   $4x_1 + 5x_2 \leq 14$
   $3x_1 + 8x_2 \leq 20$
   where $x_1, x_2 \geq 0$

   Also explain the limitations of Graphical Method. 8

3. Explain "Hungarian Method" and solve following assignment problem.
   Four jobs J1, J2, J3, J4 have to be executed by workers W1, W2, W3, W4. The matrix below
   shows assignment cost :

| | J1 | J2 | J3 | J4 |
|---|---|---|---|---|
| W1 | 82 | 83 | 69 | 92 |
| W2 | 77 | 37 | 49 | 92 |
| W3 | 11 | 69 | 5 | 86 |
| W4 | 8 | 9 | 98 | 23 |

   Find the minimum cost.

4. Write the mathematical formulation of transportation problem and obtain the basic feasible
   solution by using VAM method :

| | $Q_1$ | $Q_2$ | $Q_3$ | $Q_4$ | Supply |
|---|---|---|---|---|---|
| 01 | 8 | 7 | 9 | 11 | 18 |
| 02 | 12 | 11 | 10 | 09 | 12 |
| 03 | 09 | 10 | 12 | 11 | 15 |
| 04 | 13 | 14 | 11 | 10 | 20 |
| 10 | 11 | 13 | 09 | 25 | |
| Demand | 35 | 25 | 14 | 16 | 8 |

5. Explain decision making under uncertainty and also explain Laplace criteria with example.

6. Explain the rules of network construction and also discuss "Logical Sequencing" in network
   scheduling with example.

7. Define ordering cost, shortage cost and EOQ problem with uniform demand and no shortages.

8. A contractor has to supply 20,000 units per day. He can produce 30,000 units per day. Thecost of holding a unit in stock in Rs. 3/year and set-up cost per run is Rs. 50. How frequently and of what size, the production run be made ?

9. What do you mean by Queue ? Explain the input process, queue discipline, service mechanism and capacity of queuing system.

10. A petrol pump has two pumps. The service time follows the exponential distribution with a
mean of 4 minutes and car arrives for service in Poisson process at the rate of 10 cars/hour.
Find the probability that a customer has to wait for service. What proportion of time the pumps remain idle ?

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# SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

**Master in Computer Application (MCA) Semester-III**

## Department of Computer Science

## MCA –II Semester-III (2019-2020)

**DATABASE ADMINISTRATION**

1. Explain the different roles and responsibilities of DBA in Database Management System.

2. Discuss in detail the architecture of ORACLE.

3. Explain string functions with example of each.

4. Write a PL/SQL procedure that accepts the name of professor and raises a user defined exception if salary is above 55,000 using table "Professor."

5. Discuss in detail internal memory architecture of ORACLE.

6. Explain various types of locks and their allowed and prohibitted actions as permitted by lock monitor of SQL DBA.

7. Explain file structure involved in recovery process.

8. Explain how cumulative and incremental exports is better over complete export.

9. How lock contentions are detected ? Why is it necessary ? Explain.

10. Explain tuning in ORACLE. How do we tune shared pool ?

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## Department of Computer Science

## MCA –II Semester-IV (2019-2020)

## Computer Hardware Interfacing

1. What is bus ? Explain the different types of buses used in microprocessor system.
2. What is DMA ? Draw the block diagram of DMA controller and explain its working.
3. Draw the block diagram of IC 8251, and explain the function of modem control and Read/write logic control.
4. Explain the various types of serial data communication methods.
5. Explain monochrome graphics adapter with suitable diagram.
6. Explain the construction and working of colour CRT terminal.
7. What is auxiliary storage in computer ? Explain any one in detail.
8. Explain speech recognition in detail.
9. Draw the block diagram of a motherboard and explain the function of each block.
10. Explain multi-serial I/O card in detail.

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## Department of Computer Science
## MCA –II Semester-IV (2019-2020)
## Distributed Database Management System

1. What components are being distributed in Distributed Database System ?
2. How could you relate the problem across of DDBMS ?
3. Define Primary horizontal fragmentation and write COM-MIN algorithm.
4. Explain ANSI/SPARC architecture in detail.
5. Discuss the layer of query processors.
6. Define Relational Calculus, Relational Algebra and objective of query processing.
7. Discuss how workflows are better than flat and nested transactions.
8. Explain isolation property of transaction with one example.
9. Explain ACID properties of transaction.
10. Explain optimistic concurrency control algorithm.
11. What is two phase locking rule ? Explain with 2 PL lock graph.

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## Department of Computer Science

## MCA –II Semester-IV (2019-2020)

## Distributed Operating Systems

1. What are different issues related to designing of distributed operating system ?
2. Explain advantages of distributed computing system over centralized systems.
3. Explain in detail the characteristics of good message passing system.
4. Explain Buffering and Synchronization in message passing.
5. Explain the implementation of RPC Mechanism.
6. Explain exception handling in RPC system.
7. Explain architecture of distributed shared memory (DSM).
8. Explain thrashing in DSM. What are the methods to solve thrashing problem in DSM ?
9. Explain the characteristics of good global scheduling algorithm.
10. What is dead lock ? Explain various dead lock conditions.

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**Master in Computer Application (MCA) Semester-V**

## Department of Computer Science

## MCA –II Semester-V (2019-2020)

### DATAWAREHOUSING AND DATA MINING

1. Explain in detail the ETL process.
2. What are the software components and technical support for Data Mart ?
3. Explain software schema in detail.
4. Write a note on Brio Technology.
5. What is Association ? What are the resets prediction by it ? Explain any one algorithm for it.
6. Explain different tools used for Data Mining.
7. Explain Data Warehouse Back-End tools and utilities.
8. What are the technological considerations of Data Warehouse ?
9. Write note on census data.
10. What are the objectives of Web-Enabled Data Warehouse ?

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**Master in Computer Application (MCA) Semester-V**

## Department of Computer Science

## MCA –II Semester-V (2019-2020)

### NETWORK SECURITY

1. What is key management ? Explain KDC, KCC.
2. Which are the portable location of installing encryption devices ? Explain.
3. Explain the concept of Message Digests. How is it implemented ? Explain access control.
4. What are the policies and mechanisms of access control ?
5. Explain Euclid Algorithm using example.
6. Discuss the process and delivery mechanism of non-repudiation.
7. What do you understand by Authentication Protocols ? How does Kerberos work ?
8. What is Address Based Authentication ? Explain with example.
9. What is SET (Secure Electronic Transaction) ? Explain the process with diagram.
10. Explain the client/server authentication systems.

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## Department of Computer Science

## MCA –II Semester-V (2019-2020)

### SOFTWARE ENGINEERING

1. What is software engineering ? What are the roles of software engineer need to perform during software development process ?

2. What are the characteristics of a good quality software ? Give the classification of software qualities.

3. Give and explain objectives of software design activity.

4. What do you mean by object oriented design ? Explain associations and aggregation.

5. Explain the following with respect to software specifications :
   (i) Classification of specification styles
   (ii) Operational specification.

6. What is software testing ? Explain white box and black box testing.

7. Explain in detail 'Waterfall Model'.

8. Explain risk management in software production.

9. Explain the role of programming language in software engineering environment.

10. What is software engineering tool ? Write the features commonly provided by an ideal S.E. tool.

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