

MASTER OF COMPUTER APPLICATIONS (MCA)

MCA/ASSIGN/SEMESTER-II

ASSIGNMENTS

(July - 2020 & January - 2021)

MCS-021, MCS-022, MCS-023, MCS-024, MCSL-025



**SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI – 110 068**

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Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to MCA Programme Guide.
3. To become eligible for appearing the Term End Practical Examination for the lab courses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the MCA Programme Guide.
4. The viva voce is compulsory for the assignments. For any course, if a student submitted the assignment and not attended the viva-voce, then the assignment is treated as not successfully completed and would be marked as ZERO.

Course Code : **MCS-021**
Course Title : **Data and File Structures**
Assignment Number : **MCA(II)/021/Assignment/2020-21**
Maximum Marks : **100**
Weightage : **25%**
Last Dates for Submission : **31st October, 2020 (For July, 2020 Session)**
15th April, 2021 (For January, 2021 Session)

This assignment has four questions which carry 80 marks. Answer all the questions. Each question carries 20 marks. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide. All the implementations should be in C programming language.

Q1: (20 Marks)

Write an algorithm that accepts a Tree as input and converts it into a Binary Tree and then prints all the leaf nodes that are part of both Tree and Binary Tree

Q2: (20 Marks)

Is it possible to implement multiple stacks in a Queue. If Yes, (i)Is there any limit on the number of Stacks that can be implemented in a Queue.(ii) Implement two Stacks in a Queue

Q3: (20 Marks)

List the names of all Algorithms along with their Complexities that find Minimum Cost Spanning Tree. List as many names as possible. Also, write the source of your finding adjacent to each Algorithm found.

Q4: (20 Marks)

Show the effect of making the following insertions into an initially empty red-black tree:

50, 30, 40, 60, 10, 80, 90, 5, 100

Course Code	:	MCS-022
Course Title	:	Operating System Concepts and Networking Management
Assignment Number	:	MCA(II)/022/Assignment/2020-21
Maximum Marks	:	100
Weightage	:	25%
Last Dates for Submission	:	31st October, 2020 (For July, 2020 Session)
	:	15th April, 2021 (For January, 2021 Session)

Answer all the questions of the assignment having 80 marks in total. 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation. Answer of each part of the question should be confined to about 300 words.

- Q1.** How the following concepts are improve the system performance? **(6 Marks)**
- Spooling compared to buffering
 - Multiprocessing compared to sequential execution
- Q2.** Discuss the basic design issues in distributed OS which are different from traditional OS and network OS and how are they implemented? **(5 Marks)**
- Q3.** What are the steps involved in configuring IP address in your system? **(6 Marks)**
What is the use of DHCP and BOOTP in this process? Why a subnet mask is required as an input for configuring IP address?
- Q4. (a)** Draw DNS hierarchy for ignou.ac.in and explain **(2 Marks)**
- (b)** Discuss the type of security vulnerabilities in DNS and what measures are taken to prevent it? **(5 Marks)**
- Q5.** Answer the following questions related to Linux commands: **(5 Marks)**
- List all the directories using echo command only
 - List all the files within a directory including hidden files
 - Display a Calendar for a specific month and year
 - What will be the output of the following:
who| more
who -a
 - What options can be used with a grep command? Show output with each option
- Q6. (a)** What are the objectives of dynamic addressing and directory services in Windows 2000? How are they configured? **(4 Marks)**
- (b)** How is static IP address different from dynamic IP address? **(2Marks)**
- Q7.** What is the meaning of map drive in Windows 2000? What are the benefits in mapping a network drive? Write all the steps for mapping a network drive. ? **(5 Marks)**

- Q8.** Answer the following questions related to Windows 2000 server? **(6 Marks)**
- What features and services are provided?
 - How are network resources accessed?
- Q9.** Define Kerberos? What are the key benefits of Kerberos? How is it managed in Windows 2000 system ? **(7 Marks)**
- Q10.** What computer security control measures are applied at your study centers? Against what kind of attacks these measures are taken? Prepare a brief note . **(6 Marks)**
- Q11. (a)** Differentiate between dial-up connection and and VPN connection for remote access . List the requirements to set up a VPN connection. Explain the steps for configuring Windows 2000 VPN **(6 Marks)**
- (b)** Discuss the protocols and tools for providing secure VPN services **(4 Marks)**
- Q12.** Explain in details the tasks performed by firewall. What is the need of firewall policy ? **(5 Marks)**
- Q13.** What strategies are used in hardening Windows 2000 OS and its file system? Discuss **(6 Marks)**

Course Code : **MCS-023**
Course Title : **Introduction to Database Management**
Assignment Number : **MCA (II)/023/Assignment/2020-21**
Maximum Marks : **100**
Weightage : **25%**
Last Date of Submission : **31st October, 2020 (For July, 2020 Session)**
15th April, 2021 (For January, 2021 Session)

This assignment has six questions carrying a total of 80 marks. Answer all questions. Rest 20 marks are for viva-voce. You may use illustrations and diagrams to enhance your explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation. Answer to each part of the question should be confined to about 300 words.

Q1. (20 Marks)

Study online banking system requirements and design an ER diagram for an Online Banking System. List and write the entities, corresponding attributes, relationships and cardinality.

Hint: Assumptions can be made wherever necessary.

Q2. (10 Marks)

Design the Relational Schema for the E-R diagram that you have drawn for part **Question 1**. The relations must be at least in 2 NF. Perform the following on the relations:

- Enter about 5 sets of meaningful data in each of the relations.
- Identify the domain of various attributes.
- Identify the Primary keys of all the relations.
- Identify the Foreign keys and referential integrity constraints in the relations.

Q3. (10 Marks)

- “For creating this Online Banking System as shown in **Question 1**, using a DBMS is better option or file management system.” Justify the statement given above.
- Talk to any Database Administrator (DBA) of any good s/w company and try to list all the key responsibilities that he have to handle in the said company.

Q4. (12 Marks)

Given the *relational schema*:

Suppliers (s_id:integer, s_name:string, s_adress:string)
Parts (p_id:integer, p_name:string, p_color:string)
Catalog (s_id:integer, p_id:integer, p_cost:real)

Write SQL statements for the following:

- List all the suppliers who supply the part with p_id=32.
- List the parts whose colour is BLUE.
- List those parts which are RED and whose cost is more than Rs.2000/- .
- List all the suppliers who are from GUJARAT.
- List all the part_ids, colour, cost from the supplier EZPREX.
- List the cost of the part_id=41.

Note: Make suitable assumptions, if any.

Q5.

(10 Marks)

Discuss all the file organization techniques with suitable examples.

Q6.

(6X3=18 Marks)

- a) Discuss the ACID properties of a database transaction with appropriate examples.
- b) How are views created and dropped? Explain, how the views are implemented and updated?
- c) Discuss 3-tier architecture with necessary diagram and suggest an example application for the real world domain.

Course Code	:	MCS-024
Course Title	:	Object Oriented Technologies and Java Programming
Assignment Number	:	MCA(2)/BCA (4)/024/Assignment/2020-2021
Maximum Marks	:	100%
Weightage	:	25%
Last Dates for Submission	:	31st October, 2020 (for July, 2020 session) 15th April, 2021(for January, 2021 session)

There are eight questions in this assignment which carried 80 marks. Rest 20 marks are for viva-voce. Answer all the questions. Give appropriate comments in programs to increase readability/understandability. Wherever required, you may write java program, run it on machine and take its output as part of solution. Please go through the guidelines regarding assignments given in the Program Guide for the format of presentation.

Q1.

- (a) What is Object Oriented Programming (OOP)? Explain its advantages. Also describe concept of data hiding in OOP. **(4 Marks)**
- (b) Explain different data types available in Java. **(4 Marks)**
- (c) Describe features of Java programming language. **(2 Marks)**

Q2.

- (a) What is a class? Define a class in Java and with the help of that class describe meaning of data members and member functions. Also describe use of different types of access spcifiers available in Java. **(6 Marks)**
- (b) Describe advantages of abstract method. Write a java program to create a Shape class with an abstract method Find_Area(). Inherit Circle and Rectangle classes from Shape class. Implement Find_Area() method in derived classes. Make necessary assumptions. **(4 Marks)**

Q3.

- (a) Explain use(s) of following keywords of Java with the help of program/example. **(6 Marks)**
 - i. final
 - ii. finally
 - iii. super
- (b) What is interface? How interface is different from abstract class? Write a program in Java to explain how interfaces are implemented. **(4 Marks)**

Q4.

- (a) What is polymorphism? Explain use of polymorphism in java programming. **(4 Marks)**
- (b)What is exception? What are different types of exceptions? Explain need of exceptions handling with the help of a program. **(6 Marks)**

Q5.

(a) What is multithreading? Explain advantages of multithreading. Describe use of setPriority and getPriority methods for Java multithreading. Also describe how threads are synchronized in Java with the help of a program. **(6 Marks)**

(c) Write program to create an Applet which draw a circle inside a triangle. Keep color of circle blue and triangle yellow. **(4 Marks)**

Q6.

(a) What is layout manager? Describe use of flow layout and grid layout with the help of program code. **(6 Marks)**

(b) What is event driven program? Describe different components of event in Java. **(4 Marks)**

Q7.

(a) Explain use of stream classes in Java. Write a java program to read the contents of a given file and display it. **(6 Marks)**

(b) Explain use of Socket and DatagramPacket classes. **(4 Marks)**

Q8.

(a) What is Servlet ? Explain Servlet life cycle. Also explain use of GET and POST methods of Servlet. **(4 Marks)**

(b) What is JDBC? Explain how connection is established in JDBC. **(3 Marks)**

(c) What is RMI? Explain RMI architecture. **(3 Marks)**

Course Code	:	MCSL-025
Course Title	:	Lab Course
Assignment Number	:	MCA(2)/025/Assign/20-21
Maximum Marks	:	100
Weightage	:	25%
Last Dates for Submission	:	31st October, 2020 (for July, 2020 session) 15th April, 2021(for January, 2021 session)

This assignment has four parts. Answer all questions of each part. Each part is of 10 marks. Lab records of each part will carry 10 marks. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

PART-1: MCS-021

Q1: **(5 marks)**

Write a program in C language for addition of two polynomials using Pointers

Q2: **(5 marks)**

Write a program in C language that will accept a Graph as input and will perform a Depth First Search on it. Make necessary assumptions.

PART-2: MCS-022

Q1: **(5 marks)**

Write a shell script in Linux/Unix that accepts a text file as input and prints the number of words that have at least one vowel

Q2: **(5 marks)**

Your PC is on a network. Find the number of Printers on whom you can command a Print from your PC.

PART-3: MCS-023

Q1: **(10 marks)**

Create a database consisting of Name of Bank, Number of Branches, Total number of Customers, Average number of Customers who visit Bank in a Day

After creating the database, perform the following tasks:

- (i) List the names of Banks which have more than 1000 branches

Part-4: MCS-024

Q1:

Write a program in Java for multiplication of two sparse matrices

(5 marks)

Q2:

(5 Marks)

Write a program in Java that connects to a database and generates a report that consists of the list of Universities which are offering a specific Programme of Study. Input to the Java program will be name or abbreviation of a Programme of Study (such as MCA) . Make assumptions wherever necessary.

Note: You must execute the program and submit the program logic, sample inputs and outputs along with the necessary documentation for this question. Assumptions can be made wherever necessary.