MASTER OF COMPUTER APPLICATIONS

(MCA)

MCA/ASSIGN/II/YEAR/2013

ASSIGNMENTS
Year, 2013-14

(2nd Semester)

(MCS-021, MCS-022, MCS-023, MCS-024, MCSL-25)

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

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Course Code	:	MCS-021
Course Title	:	Data and File Structures
Assignment Number	:	MCA(2)/021/Assign/13
Maximum Marks	:	100
Weightage	:	25%
Last Dates for Submission	:	15th October, 2013 (For July 2013 Session)
		15th April, 2014 (For January 2014 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. Ensure that you don't copy the program from course material or any other source. All the implementations should be in C language.

Question 1:

Write an algorithm for the implementation of Doubly Linked Lists.

Question 2:

Implement multiple queues in a single dimensional array. Write algorithms for various queue operations for them.

Question 3:

Write a note of not more than 5 pages summarizing the latest research in the area of "Searching Algorithms". Refer to various journals and other online resources. Indicate them in your assignment.

Question 4:

What are the applications of Tries?

Course Code   :   **MCS-022**
Course Title   :   **Operating System Concepts**
Assignment Number   :   **MCA(2)/022/Assign/13**
Maximum Marks   :   **100**
Weightage   :   **25%**
Last Dates for Submission   :   **15th October, 2013 (For July 2013 Session)**
                              15th April, 2014 (For January 2014 Session)

This assignment has four questions. Answer all questions. 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. Answer to each part of the question should be confined to about 300 words.

Question 1:

a) Briefly describe the Microsoft's 2000 DNS management. **(5 Marks)**

b) Draw the IP datagram header format. "IP datagram has a checksum field still its called unreliable protocol." Justify. **(5 Marks)**

c) Compare FAT 16 and FAT 32 file systems. **(5 Marks)**

d) Discuss the features of GNOME configuration tool. **(5 Marks)**

Question 2:

a) Compare and contrast the layers, services and protocols of OSI and TCP/IP models. **(10 Marks)**

b) What are the different types of user groups supported by Windows 2000? Discuss the scope and limitations of each group. Also, list the tools available in Windows2000 for user management. **(10 Marks)**

Question 3:

a) Discuss the tasks performed by LinuxConf package. **(5 Marks)**

b) Explain the advantages and disadvantages of different LAN topologies. **(5 Marks)**

c) Assume a University has 150 LANs operating in the country with 100 hosts in each LAN. Suppose it has one class B address. Design an appropriate subnet addressing scheme. **(5 Marks)**

d) Explain the use of different command line tools to perform network monitoring in Linux. **(5 Marks)**

Question 4:

(a) What is a networking management system? Explain. **(4 Marks)**

(b) Explain the role and importance of following tools for quota management in Linux:
  - quotacheck
  - repquota
  - quota **(6 Marks)**

(c) Write the purpose of VPN and name the VPN technologies supported by Windows 2000. **(5 Marks)**

(d) Compare the security features/mechanism of Windows2000 and Linux operating systems. **(5 Marks)**

Course Code	:	MCS-023
Course Title	:	**Introduction to Database Management Systems**
Assignment Number	:	**MCA (2)/023/Assign /13**
Maximum Marks	:	**100**
Weightage	:	**25%**
Last Dates for Submission	:	**15th October, 2013 (For July 2013 Session)**
		15th April, 2014 (For January 2014 Session)

This assignment has SIX questions. Answer all questions of total 80 marks. 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.

Question 1: **(20 Marks)**

Design an ER diagram for an XYZ Information Technology Training Institute that will meet the information needs for their training programmes. Clearly indicate the entities, relationships, cardinality and the key constraints. The description of the environment is as follows:

The Institute has 15 instructors and can handle upto 100 trainees for each training session. The Institute offers 5 advanced technology courses, each of which is taught by a team of 2 or more instructors. Each instructor is assigned to a maximum of two teaching teams or may be assigned to do research each trainee undertakes one Advanced technology course per training session.

Question 2: **(20 Marks)**

Staff No.	Branch No.	Branch Address	Name	Position	Hrs/Week
E101	B02	Sun Plaza, Delhi, 110001	Rahul	Assistant	16
E101	B04	2/3 UT, Delhi, 110111	Rahul	Assistant	9
E122	B02	Sun Plaza, Delhi, 110001	Medha	Assistant	14
E122	B04	2/3 UT, Delhi, 110111	Medha	Assistant	10

Perform the Normalization for the above given table.

Question 3: **(10 Marks)**

Explain how the "GROUP By" clause works. What is the difference between the WHERE and HAVING clauses? Explain them with the help of an example for each.

Question 4: **(10 Marks)**

Given the *relational schema:*

ENROL (S#, C#, Class) - S# represents student number
TEACH (Prof, C#, Class) - C# represents course number
ADVISE (Prof, S#) - Prof is project guide of S#
PRE_REQ (C#, Pre_C#) - Pre_C# is prerequisite course
GRADES (S#, C#, Grade, Year)
STUDENT (S#, Sname) - Sname is student name

Give queries expressed in relational algebra, tuple calculus and domain calculus for the following:
(i)   List all students taking courses with Prof Ashok.
(ii) List all student names who have selected Prof Rahul as project Guide.
(iii) List those professors who teach more than one class.
(iv) List all the student names who got Grade A in the year 2012 in C# P202.
(v) List all the students who has taken the pre-requisite course Pre_C# P304.
Note: Make suitable assumptions, if any.

Question 5: **(10 Marks)**

What are the advantages of indexed-sequential file organisation? With the help of an example explain the structure of indexed-sequential file.

Question 6: **(10 Marks)**

Illustrate the differences between Hierarchical, Network and Relational data models with the help of suitable examples. Explain why relational data model is a better choice over the two. Justify your answer.

Course Code	:	MCS-024
Course Title:		**Object Oriented Technologies and Java Programming**
Assignment Number	:	MCA (2)/024/Assign/13
Assignment Marks	:	100
Maximum Marks	:	25%
Last Dates for Submission	:	15th October, 2013 (For July 2013 Session)
		15th April, 2014 (For January 2014 Session)

There are **eight questions** in this assignment which **carries 80 marks. Rest of 20 marks are for viva-voce. Answer all the questions. Write and execute the program given in this assignment.** Also in your programs give appropriate comments to increase understandability. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Question 1 : a) What is Object Oriented Paradigm? Explain features of Object Oriented Paradigm. Why Object Oriented Programming are preferred over structured programming ? **(5 Marks)**

b) Explain basic features of Java programming language. **(5 Marks)**

Question 2 : a) What is static method? Explain why main method in Java is always static. **(2 Marks)**

b) What are different bitwise operators available in Java? Write a Java program to explain the use of bitwise operators. **(5 Marks)**

c) What is constructor? Explain constructor overloading. Write a program in java to create Book class and define its constructor(s). **(3 Marks)**

Question 3 : a) What is overloading of methods? Explain with an example how overloading of methods is different from overriding of methods. **(5 Marks)**

b) What is abstract class? Explain advantages of abstract class with the help of an example. **(5 Marks)**

Question 4 : a) What is polymorphism? Write a java program to show the advantage of polymorphism. **(5 Marks)**

b) What is package in Java ? Explain how to decide the need of package(s) in a system which is to be developed using Java. **(5 Marks)**

Question 5: a) What is an exception? Explain haw an exception is handled in Java. Also explain hierarchy of different exception classes in Java. **(5 Marks)**

b) What is String class in java? Explain how it is different from String Buffer class. Also write a java program to find whether a given string is a palindrome or not. **(5 Marks)**

Question 6 :   a) What is multithreading ? Explain advantages of multithreaded programming with the help of a Java program.   **(5 Marks)**

b) What is I/O stream in Java? Write a program in Java to create a file to store a Java program in it.   **(5 Marks)**

Question 7 :   a) How a Java Applet is different from Java Application program? Create an Applet program to display current date and time.   **(4 Marks)**

b) What is layout manager? Which is the default layout manager? Differentiate among the way of managing components by 5 different layouts.   **(6 Marks)**

Question 8 :   a) What is a socket ? Explain how a network socket is created using Java.   **(5 Marks)**

b) What is DNS? Explain components of DNS.   **(5 Marks)**

Course Code	:	MCS-025L
Course Title:		Lab (Data Structures using C, WINDOWS 2000, LINUX / UNIX, Java and MS? ACCESS, My SQL)
Assignment Number	:	MCA (2)/025L/Assign/13
Assignment Marks	:	100
Maximum Marks	:	25%
Last Dates for Submission	:	31st October, 2013 (For July 2013 Session)
		30th April, 2014 (For January 2014 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

Question 1: **(5 marks)**

Write a program in C language to create a Binary Tree. The program should also print the results of preorder, postorder and inorder traversals of nodes of the Binary Tree created.

Question 2: **(5 marks)**

Write a program in C language to implement Heap Sort. Input the following data to the program. Show all intermediate steps:
68, 23, 987, 45, 123,86, 2, 234, 653, 345

PART-2: MCS-022

Question 1: **(5 marks)**

Write a shell script in Linux/Unix that accepts a text file as input and prints the last line as first line and so on to the standard output

Question 2: **(5 marks)**

Your PC is on a network. Now, change the default printer connected to your printer.

PART-3: MCS-023

Question 1: **(10 marks)**

Create a database consisting of student's Enroll. No. , Programme of study, year of admission and marks secured in each of the courses in MCA.

After creating the database, perform the following tasks:

(i) Generate hall ticket for each student for the courses in which s/he secured less than 40%

Part-4: MCS-024

Question 1: **(5 marks)**

Write a program in Java for the implementation of a circularly linked list.

Question 2: **(5 marks)**

Write a program in Java that connects to a database and generates a report consisting of the number of students allotted programme-wise to each study center. 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.