MASTER OF COMPUTER APPLICATIONS

(MCA)

MCA/ASSIGN/II/YEAR/2012

ASSIGNMENTS
Year, 2012-13

(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 Code   :   **MCS-021**
Course Title   :   **Data and File Structures**
Assignment Number   :   **MCA(2)/021/Assign/12**
Maximum Marks   :   **100**
Weightage   :   **25%**
Last Dates for Submission :   **15ᵗʰ October, 2012 (For July 2012 Session)**
                                    15ᵗʰ April, 2013 (For January 2013 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 multiplication of two sparse matrices using Linked Lists.

Question 2:

Implement multiple stacks in a single dimensional array. Write algorithms for various stack operations for them.

Question 3:

Write a note of not more than 5 pages summarizing the latest research in the area of "Shortest Path Algorithms" for graphs. Refer to various journals and other online resources.

Question 4:

What are the applications of Red-Black Trees.

Course Code : **MCS-022**
Course Title : **Operating System Concepts**
Assignment Number : **MCA(2)/022/Assign/12**
Maximum Marks : **100**
Weightage : **25%**
Last Dates for Submission : **15ᵗʰ October, 2012 (For July 2012 Session)**
15ᵗʰ April, 2013 (For January 2013 Session)

This assignment has seven questions which carries 80 marks, rest 20 marks are for viva voce. Answer all questions given in the assignment. You should use illustrations and diagrams to enhance the explanations of your answers. Please must go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Question 1
(a) Explain the working of Token Ring? Compare it with token Bus.   **(5 Marks)**
(b) Describe kerberos management in Windows 2000 operating system.   **(5 Marks)**

Question 2: Give the answer of following in context of Linux Operating system.

(a) Write the purpose and syntax of nice and renice commands.   **(5 Marks)**
(b) Explain the use and importance of FSCK commond.   **(5 Marks)**
(c) Describe the ext2 and ext3 file systems?   **(10 Marks)**

Question 3

(a) What are the contents of Password files and where are they
    located in Windows? Also, explain the concept of Shadow passwords? **(5 Marks)**

 (b) Explain "Distributed File System" with reference to Windows 2000.   **(5 Marks)**

Question 4: Write a shell script that searches the file contents in a
directory and its sub-directories for a text string given by the user. It list
all such file names having that given string and store in a temp file "abc". **(10 Marks)**

Question 5: What are different kinds of user groups in windows 2000?
Explain each main features and privileges of each group.   **(10 Marks)**

Question 6: How does Windows 2000 manage the domains? Also, trust
relationship is created and managed between domains?   **(10 Marks)**

Question 7
(a) How are CIA (Confidentiality, Integrity and Availability) issues of Security
    are being provided by Windows 2000 Operating System?   **(5 Marks)**

(b) Explain the purpose and features of registry management. Also, explain
    the uses of it.   **(5 Marks)**

Course Code   :   **MCS-023**
Course Title   :   **Introduction to Database Management Systems**
Assignment Number   :   **MCA (2)/023/Assign /12**
Maximum Marks   :   **100**
Weightage   :   **25%**
Last Dates for Submission :   **15ᵗʰ October, 2012 (For July 2012 Session)**
                                        15ᵗʰ April, 2013 (For January 2013 Session)

This assignment has five questions. Answer all questions of total 80 marks. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance 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: Describe briefly all the possible applications of a database system in a University? **(15 Marks)**

Question 2: Identify all the associated entities for a Study Centre Management System, their corresponding attributes, relationships and cardinality and design an ER diagram for it. **(20 Marks)**

Question 3: Consider the E-R diagram of **Question 2** and design the tables. Perform Normalization till the required normal form. Implement it using MS-Access. **(25 Marks)**

Question 4: Consider a "Project Management System" that maintains the database using the following tables: **(10 Marks)**

Project (pid, ptitle, startdate, enddate, duration_in_months, cid, Cost)
Clients (cid, cname, caddress, cphone)
Employee (eid, name, address, phone)
Project-person (pid, eid)

Please note that an employee may be working on more than one project in the organization at any given time. Write and run the following SQL queries on the tables:

(a) Find the cid and cname of the clients who have given only one project to the company.
(b) List the details of all the employees whoever are working on the project with project code (pid) = 111.
(c) List all the project details those are currently under development.
(d) Find the projects whose cost is more than 11 lakhs.
(e) Find the employee who is not working on any of the project.

Note: Make suitable assumptions, if any.

Question 5: Consider the Relation R={A, B, C, D, E, F, G, H } and the set of functional dependencies. **(10 Marks)**
A→C   B→CG   AD→EH   C→DF   A→H
What is the key for R? Decompose R into 2NF, 3NF and finally in BCNF relation.

Course Code   :   MCS-024
Course Title: **Object Oriented Technologies and Java Programming**
Assignment Number   :   MCA (2)/024/Assign/12
Assignment Marks   :   100
Maximum Marks   :   25%
Last Dates for Submission : 15th October, 2012 (For July 2012 Session)
                              15th April, 2013 (For January 2013 Session)

There are eight questions in this assignment which carried **80 marks. Rest 20 marks** are for **viva-voce.** Answer all the questions. Also in your programs give appropriate comments **to increase understandability**. **You are advised to** go through the guidelines regarding assignments given in the Program Guide for the format of presentation.

Question 1: a) What is Object Oriented Paradigm? Explain advantages of
                   Object Oriented Programming.   (5 Marks)

              b) What is polymorphism? Explain the advantages of polymorphism
                   with an example.   (5 Marks)

Question 2: a) What is platform independence? Explain why java is secure
                   and platform independent.   (3 Marks)

              b) Write a program in java to generate Fibonnaci Series.   (3 Marks)

              c) Explain the advantage of of Unicode.   (2 Marks)

              d) Explain the significance of PATH and CLASS PATH.   (2 Marks)

Question 3: a) What is an exception? Create an exception subclass named
                   MyException to handle user generate exceptions in Java. (5 Marks)

              b) What is abstract class? What are advantages of using
                   abstract class? Write a program in Java to explain abstract
                   class and multilevel inheritance.   (5 Marks)

Question 4: Differentiate the following and support with example: (10 Marks)
                   Final and static member
                   Inheritance and Aggregation
                   Abstract class and Interface
                   String and String Buffer

Question 5: a) What are the classes in Java available for file handling?
                   Write a program in Java to append content at the end of an
                   already existing file.   (5 Marks)

b) Explain the difference between checked and unchecked exceptions with example. (5 Marks)

Question 6: a) What is multithreading? Explain the two ways of creating threads in Java programs. Also explain difference between notify() and notify All( ) methods. (5 Marks)

b) What is need of Layout Manager? Explain different layouts available in Java. (5 Marks)

Question 7: a) What is an Applet? Write an applet that prints "Lear Java it is useful" at the current cursor position whenever the mouse left button is clicked. (5 Marks)

b) Consider a class that stores a Bank account holder's name, account number, ATM card number, account balance and ATM PIN. Write a program to store the data onto a disk file, except for the account balance and ATM PIN. Use serialization and transient variables. (5 Marks)

Question 8: a) Write a Java program to set up JDBC and execute the following SQL statement on a database table employee-t with the fields emp-id, emp name, emp-department, empbasic "SELECT * FROM employee-t where emp-basic < 10000. (7 Marks)

b) What is Java Bean ? What are its advantages? (3 Marks)

Course Code   :   MCSL-025
Course Title: Lab Course
Assignment Number   :   MCA (2)/025L/Assign/12
Assignment Marks   :   100
Maximum Marks   :   25%
Last Dates for Submission :   31st October, 2012 (For July 2012 Session)
                                30th April, 2013 (For January 2013 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 implement 2-way merge sort. Input the following data to the program. Show all intermediate steps:

104,50,20,39,206,29,409,26,298,3,10,8

Question 2:   **(5 marks)**

Write a program in C language to convert a Tree into a Binary Tree.

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 number of words which consist of at least one vowel.

Question 2:   **(5 marks)**

Your PC is on a network. Now, take a print from a printer which is not the default printer for your PC.

PART-3: MCS-023

Question 1:   **(10 marks)**

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

After creating the database, perform the following tasks:

    (i) Find the no. of students who failed only in 1 course in all the 6 semesters.
    (ii) Generate a report indicating the no. of students who secured marks between 60-
        70%, >70 – 80% and >80%

Part-4: MCS-024

Question 1:   **(5 marks)**

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

Question 2:   **(5 marks)**

Write a program in Java that connects to a database and generates grad cards of the students. Make necessary assumptions.

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.