MASTER OF COMPUTER APPLICATIONS

(MCA)

ASSIGNMENTS
Year, 2014-15

(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

CONTENTS

Course Code   :   **MCS-021**

Course Code   :   **MCS-021**
Course Title   :   **Data and File Structures**
Assignment Number   :   **MCA(2)/021/Assign/2014-15**
Maximum Marks   :   **100**
Weightage   :   **25%**
Last Dates for Submission :   **15th October, 2014 (For July 2014 Session)**
                                           15th April, 2015 (For January 2015 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 Circular Doubly   *(20 marks)*
                    Linked Lists.

Question 2:   Implement multiple stacks in a single dimensional array. Write   *(20 marks)*
                    algorithms for various stack operations for them.

Question 3:   Write a note of not more than 5 pages summarizing the   *(20 marks)*
                    latest research in the area of "Sorting Algorithms". Refer
                    to various journals and other online resources. Indicate
                    them in your assignment.

Question 4:   Explain reverse-delete algorithm. What are its applications?   *(20 marks)*

Course Code	:	**MCS-022**
Course Title	:	**Operating System Concepts**
Assignment Number	:	**MCA(2)/022/Assign/2014-15**
Maximum Marks	:	**100**
Weightage	:	**25%**
Last Dates for Submission	:	**15th October, 2014 (For July 2014 Session)**
		15th April, 2015 (For January 2015 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 of each part of the question should be confined to about 300 words.

Q.1. *a)* What are the various methods of authentication available in the Linux operating system? *(5 marks)*

b) List the drawbacks of Windows 2000 operating system. *(5 marks)*

Q.2. *a)* Which users/ groups have access to audit logs in windows 2000? Why are audit policies disabled by default? *(6 marks)*

b) How does the group policy relate to local policy in windows 2000? Explain. *(4 marks)*

Q.3. Write the steps for installing a network printer in Windows 2000 and LINUX operating system. *(10 marks)*

Q.4. *a)* Draw and explain the features of various networking components: Switch, Hub, Nods, Cables, Router, and Bridges. *(6 marks)*

b) Why is the audit view limited to specific users only in windows 2000? *(4 marks)*

Q.5. *a)* Do the local policies cover security management functions for administrators also in windows 2000? Can different security functions be created for each user in Linux? *(6 marks)*

b) Is the quota limit applicable to all the users in windows 2000? Is there any user that is not limited by the quota management? *(4 marks)*

Q.6. *a)* What is the difference between security logs and system logs? What is the minimum size of the log allowed in windows 2000? *(5 marks)*

b) Which other user other than from the administrator group enable or disable quota management in windows 2000? *(5 marks)*

Q.7. *a)* What is backup? What are the strategies followed in Linux for backup?　*(6 marks)*

b) What encryption function is used by Windows 2000 operating system?　*(4 marks)*

Q.8. Examine the file system of Windows 2000 and Linux and answer the following questions:

a) What are the available file system structures in both systems?　*(5 marks)*

b) List the Key features of these file systems. Also, explain how recovery of a file system take place in these files systems.　*(5 marks)*

Course Code	:	MCS-023
Course Title	:	**Introduction to Database Management Systems**
Assignment Number	:	**MCA (2)/023/Assign /2014-15**
Maximum Marks	:	**100**
Weightage	:	**25%**
Last Dates for Submission	:	**15th October, 2014 (For July 2014 Session)**
		15th April, 2015 (For January 2015 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.

Q.1. Construct an ER diagram for a Banking System. Clearly indicate the entities, relationships, cardinality and the key constraints. Also, derive the un-normalized relational database tables with the help of this diagram. *(15 Marks)*

Q.2. Explain decomposition of a database in database design. Why consolidation of a database after normalization is considered while designing a database. Explain with the help of a suitable example. *(20 Marks)*

Q.3. *a)* What is non-loss decomposition in database? How it is useful in database? *(5 Marks)*

b) Explain evaluation of expression process in query optimization. *(5 Marks)*

Q.4. We have following relations: *(1 x 15 = 15 Marks)*
Supplier(S#,sname,status,city)
Parts(P#,pname,color,weight,city)
SP(S#,P#,quantity)

Answer the following queries in SQL.

(i) Find name of supplier for city = 'Delhi'.
(ii) Find suppliers whose name start with 'AB'
(iii) Find all suppliers whose status is 10, 20 or 30.
(iv) Find total number of city of all suppliers.
(v) Find s# of supplier who supplies 'red' part.
(vi) Count number of supplier who supplies 'red' part.
(vii) Sort the supplier table by sname.
(viii) Find name of parts whose color is 'red'
(ix) Find parts name whose weight less than 10 kg.
(x) Find all parts whose weight from 10 to 20 kg.

(xi) Find average weight of all parts.
(xii) Find S# of supplier who supply part 'p2'
(xiii) Find name of supplier who supply maximum parts.
(xiv) Sort the parts table by pname.
(xv) Find the parts which weigh 10kg or above and are in 'red' colour

Q.5. *a)* Explain ACID properties of Transaction with suitable example. *(5 marks)*

b) Explain TWO phase locking. *(5 marks)*

Q.6. *a)* Consider table R(A,B,C,D,E) with FDs as A->B, BC->E and ED-> A. The table is in which normal form? Justify your answer. *(5 marks)*

b) Explain system recovery procedure with check point record. *(5 marks)*

Course Code	:	MCS-024

Course Code : **MCS-024**
Course Title: **Object Oriented Technologies and Java Programming**
Assignment Number : **MCA (2)/024/Assign/2014-15**
Assignment Marks : **100**
Maximum Marks : **25%**
Last Dates for Submission : **15th October, 2014 (For July 2014 Session)**
15th April, 2015 (For January 2015 Session)

There are **eight questions** in this assignment which **carries 80 marks. Rest of 20 marks is for viva-voce. Answer all the questions. Write and execute the program given in this assignment and submit along with output.** 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.

Q.1. *a)* What is Object Oriented Programming? Explain features of Object Oriented Programming. Write a program in java to show data hiding. *(5 Marks)*

b) Explain why java is platform independent. Also explain how memory is managed in java. *(5 Marks)*

Q.2. *a)* What is static method? Explain application of static method with example. *(3 Marks)*

b) What are different arithmetic and logical operators in java? Write a Java program and show uses of all arithmetic operators. *(5 Marks)*

c) What is final keyword in java ? Explain different uses of final keyword. *(2 Marks)*

Q.3. *a)* What is method overloading? How it is different from method overriding? Write a java program to explain overloading and overriding of methods. *(5 Marks)*

b) What is abstract class? Explain why abstract class is used in java, with the help of an example program. *(5 Marks)*

Q.4. *a)* What is inheritance? Explain different types of inheritance supported by java. *(5 Marks)*

b) What is an exception? Explain haw an exception is handled in Java. Create your own exception class to handle undesirable operation in your program. *(5 Marks)*

Q.5. *a)* Write a java program to create a file of given name and directory and copy a file named myjava.java available at desktop.   *(5Marks)*

    b) What is String class in java? Explain different constructors and method of String class. Also write a java program to find the length of a given string.   *(5 Marks)*

Q.6. *a)* What is multithreading? Write a java program to explain how concurrency control is done.   *(5 Marks)*

    b) What is I/O stream in Java? Explain what is byte stream? How byte stream is different from character stream.   *(5 Marks)*

Q.7. *a)* What is Java Applet? Create an Applet program to display your details including your academic and personal information. Use appropriate GUI components and images to make your applet more attractive and informative.   *(5 Marks)*

    b) What are principles of event delegation model? Explain different sources of events and event listener.   *(5 Marks)*

Q.8. *a)* What is InetAddress class in Java ? Explain its methods and their uses.   *(5 Marks)*

    b) What is RMI? Explain architecture of RMI.   *(5 Marks)*

Course Code	:	MCSL-025
Course Title:		Lab (Data Structures using C, WINDOWS 2000, LINUX / UNIX, Java and MS ACCESS, My SQL)
Assignment Number	:	MCA (2)/025L/Assign/2014-15
Assignment Marks	:	100
Maximum Marks	:	25%
Last Dates for Submission	:	31st October, 2014 (For July 2014 Session)
		30th April, 2015 (For January 2015 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: Write a program in C language for converting an Input tree into a Binary tree. *(5 marks)*

Question 2: Write a program in C language to implement Two-Way Merge Sort. Input the following data to the program. Show all intermediate steps: *(5 marks)*

84, 83, 78,90,23,123,98,159,8,200

PART-2: MCS-022

Question 1: Write a shell script in Linux/Unix that accepts a text file as input and prints the number of sentences in the file as output. *(5 marks)*

Question 2: Your PC is on a network. Connect a Scanner to your PC which is physically connected to another PC on the same network. *(5 marks)*

PART-3: MCS-023

Question 1: Create a database consisting of Study Center Code, Study Center Name, Study Center Address, Programmes that are offered at Study Center, Number of Students enrolled *(10 marks)*

programme-wise at the Study Center

After creating the database, perform the following tasks:

(i) List the study center codes programme-wise where the enrollment is less than 10.

Part-4: MCS-024

Question 1: Write a program in Java for the multiplication of two sparse matrices. *(5 marks)*

Question 2: Write a program in Java that connects to a database and generates a report consisting of the courses in whom the total percentage of number of students failed is more than 80% of the total number of students who appeared in the examinations. Make assumptions wherever necessary. *(5 marks)*

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.