BACHELOR OF COMPUTER APPLICATIONS
(BCA)

(Revised Syllabus)

BCA(Revised Syllabus)/ASSIGN/SEMESTER-III

ASSIGNMENTS

(July - 2020 & January - 2021)

MCS-021, MCS-023, MCS-014, BCS-031, BCSL-032, BCSL-033, BCSL-034,

SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
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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 BCA 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 BCA Programme Guide.

Course Code	**:**	**MCS-021**
Course Title	**:**	**Data and File Structures**
Assignment Number	**:**	**BCA(3)/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. 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. All the algorithms should be written nearly to C programming language. No need to give attention to Syntax as its an algorithm.

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-023**
Course Title	**:**	**Introduction to Database Management**
Assignment Number	**:**	**BCA (3)/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:

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

Q3. **(10 Marks)**

(a) "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.

(b) 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:

(i) List all the suppliers who supply the part with p_id=32.
(ii) List the parts whose colour is BLUE.
(iii) List those parts which are RED and whose cost is more than Rs.2000/- .
(iv) List all the suppliers who are from GUJARAT.

(v) List all the part_ids, colour, cost from the supplier EZPREX.
(vi) 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-014**
Course Title	**:**	**Systems Analysis and Design**
Assignment Number	**:**	**BCA(3)/014/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 three questions of 80 marks. Rest 20 marks are for viva voce. Answer all questions. You may use illustrations and diagrams to enhance the explanations.Please go through the guidelines regarding assignments given in the Programme Guide for theformat of presentation.

Q1. Develop SRS for an **Online Examination Management System**for a University**.** SRS should be as per IEEE standard SRS template. Make necessary assumptions. **(30 Marks)**

Q2. Draw the DFDs upto 3rd level for **Online Examination Management System** for a University. **(30 Marks)**

Q3. Draw ERD for an**Online Examination Management System**for a University.Make necessary assumptions. **(20 Marks)**

Course Code	**:**	**BCS-031**
Course Title	**:**	**Programming in C++**
Assignment Number	**:**	**BCA(3)/031/Assignment/2020-2021**
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 five questions carrying a total of 80 marks. Answer all the questions. 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. Wherever required, you may write C++ program and take its output as part of solution.

Q1.

(a) What is Object Oriented Programming? Explain concept of Object, Class and Inheritance with example of each. **(6 Marks)**

(b) Explain different operators available in C++ programming language. **(4 Marks)**

(c) Explain the use of followings in C++ programming with an example program for each. **(6 Marks)**

(a) for
(b) :?
(c) ::
(d) while

Q2.

(a) What is access specifire ? Explain uses different types of access specifiers in C++ with the help of example programs. **(7Marks)**

(b) Explain the following in detail, in context of C++ programming. **(9 Marks)**

i. Fried function
ii. Encapsulation and data hiding
iii. Abstract Class

Q3.

(a) What is inheritance? Explain advantages of inheritance. What are different types of inheritance in C++. Explain order of constructor calling in multilevel inheritance with the help of example program. **(8 Marks)**

(b) What is polymorphism? Explain different types of polymorphism in C++ with the help of example programs. **(8 Marks)**

Q4.

(a) Write a C++ program to overload '+' operator to add two murices. Make necessary assumptions require. **(8 Marks)**

(b) Explain use of different stream manipulators in C++? **(4 Marks)**

(c) Write a C++ program to explain exceptions handling in C++. **(4 Marks)**

Q5.

(a) What is function template and class template? Write appropriate statements to create a template class for Queue data structure in C++. **(6 Marks)**

(b) What is function overriding, explain with examples. Also explain advantages of function overriding. **(4 Marks)**

(c) Write C++ program to create an Account class to manage saving bank account activities. Make necessary assumptions. **(6 Marks)**

Course Code	**:**	**BCSL-032**
Title	**:**	**C++ Programming Lab**
Assignment Number	**:**	**BCA (3)/BCSL-032/Assignment/2020-21**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last date of Submission	**:**	**31st October, 2020 (For July, 2020 Session)**
	:	**15th April, 2021 (For January, 2021 Session)**

This assignment has two questions. Answer both the questions. These questions carry 40 marks. Rest 10 marks are for viva-voce. Write C++ program and take its output as part of solution. Please go through the guidelines regarding the assignments given in the programme guide for the format of presentation.

Q1(a):

Write a C++ program to display the table of a given number. Use appropriate formatting to display the table. **(4 Marks)**

Q1(b):

Write C++ program to demonstrate use of followings: **(6 Marks)**

(i) ::
(ii) :?
(iii) sizeof( )

Q1 (c)

Write a C++ program to create class named Book. Define appropriate constructors (using concept of overloading) to create differ objects. Define methods for displaying book details including book's author name, publisher, price of book. Make necessary assumptions wherever required. **(10 Marks)**

Q2(a):

Write C++ program for concatenation of two strings using '+' operator overloading. Make necessary assumptions wherever required. **(10 Marks)**

Q2(b):

Write a C++ program to demonstrate exception handling. This program takes marks of ten students in a subject as input and store it in an array. Make provisions so that if marks entered as input is less than 0 or greater than 100 then message "Invalid Input" is displayed and program terminate normally. **(10 Marks)**

Course Code	**:**	**BCSL-033**
Course Title	**:**	**Data and File Structures Lab**
Assignment Number	**:**	**BCA(III)-033/Assign/2020-21**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**31st October, 2020 (For July, 2020 Session)**
	:	**15th April, 2021 (For January, 2021 Session)**

This assignment has two questions, each of 20 marks.10 marks are for viva-voce. Attach input and output of the program to the assignment. Write programs in 'C' language.

Q1. Write an algorithm and program accepts the following list of integers and uses Heap Sort to sort and print them: **(20 marks)**

6, 2, 9, 12, 89, 34, 99, 3, 100

Q2. Write an algorithm and program for multiplication of three Sparse matrices **(20 marks)**

Course Code	**:**	**BCSL-034**
Course Title	**:**	**DBMS Lab**
Assignment Number	**:**	**BCA(3)/034/Assignment/2020-21**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last Date of Submission	**:**	**31st October, 2020 (For July, 2020 Session)**
	:	**15th April, 2021 (For January, 2021 Session)**

This assignment has only one question. Answer the question. This question carries 40 marks. Rest 10 marks are for viva voce. You may use illustrations and diagrams to enhance the explanation. Please go through the guidelines regarding the assignments given in the programme guide for the format of presentation

Q1. A ***Hostel Management System*** for a University requires a computerized system to automize its operations that support the following activities:

- Registration for UG/PG students
- Hostel Rooms Allocation
- Hostel Warden
- Hostel Mess
- Basic amenities in the room
- Hostel community room maintenance
- Maintenance/complaints handling (lights, fans, taps, electricity, stair-case lighting etc.,)
- Query support
- Report generation

Perform the following tasks:

(i) Using any of the drawing tools like smartdraw, dia, visio, conceptdraw etc. or else by your own hand, draw the complete ER diagram for the above event management system by identifying the entities, relationships, cardinality and key constraints. Follow proper conventions.

(ii) Create database to support/accommodate all the functionalities referred above. Perform Normalization till required NF and prepare Normalized tables.

(iii) Using MS-Access, implement by designing various forms to support the above modules

(iv) Report generation should include the expenditure statement for list of students along with room-nos., reports of expenditure in hostel-mess, expenditure incurred in hostel maintenance etc..

Note: You must perform the above said activities and also take prints of screenshots of the layouts, sample input and output along with the necessary documentation for this practical question. Assumptions can be made wherever necessary.