SETH JAI PARKASH MUKAND LAL NSTITUTE OF ENGINEERING & TECHNOLOGY, RADAUR

Academic Calendar

Session (2019-2022)

Fourth Semester

Name. . . . .
Roll No. . . . .

Department of Computer Science & Applications

(BCA-IV SEM)

EXAMINATION SCHEME FOR BACHELOR OF COMPUTER APPLICATIONS (BCA)

(FOURTH-SEMESTER PROGRAMME)

Semester – IV					
Paper No.	**Title of the Paper**	**Duration Of Exam**	**Maximum Marks**		**Total**
			Theory	**Sessional***	
BCA-241	Advanced Data Structures	3 Hours	80	20	100
BCA-242	Advanced Programming using C++	3 Hours	80	20	100
BCA-243	E-Commerce	3 Hours	80	20	100
BCA-244	Relational Data Base Management System	3 Hours	80	20	100
BCA-245	Computer Oriented Statistical Methods	3 Hours	80	20	100
BCA-246	Management Information System	3 Hours	80	20	100
BCA-251	Lab – I Based on BCA- 242	3 Hours	80	20	100
BCA-252	Lab – II Based on BCA-241	3 Hours			100
				Total	**800**

BCA – 241 ADVANCED DATA STRUCTURE

Maximum Marks:100   **External:80**
Minimum PassMarks:35   **Internal: 20**
Time: 3 hours

Note: Examiner will be required to set nine questions in all. First question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I
Tree: Introduction, Definition, Representing Binary tree in memory, Traversing binary trees, Traversal algorithms using stacks, Binary search trees: introduction, storage, Searching, Insertion and deletion in a Binary search tree, Huffman's algorithm, General trees.

UNIT – II
Graph: Introduction, Graph theory terminology, Sequential and linked representation of graphs, operations on graphs, traversal algorithms in graphs and their implementation, Warshall's algorithm for shortest path, Dijkstra algorithm for shortest path.

UNIT – III
Sorting: Internal & external sorting, Radix sort, Quick sort, Heap sort, Merge sort, Tournament sort, Comparison of various sorting and searching algorithms on the basis of their complexity.

UNIT – IV
Files: Introduction Attributes of a file, Classification of files, File operations, Comparison of various types of files, File organization: Sequential, Indexed-sequential, Random-access file.
Hashing: Introduction, Collision resolution.

TEXT BOOKS
1. Seymour Lipschutz, "Data Structure using C",Tata-McGraw-Hill
2. Horowitz, Sahni& Anderson-Freed, "Fundamentals of Data Structures in C",University Press

REFERENCE BOOKS
 1. Trembley, J.P. And Sorenson P.G., "An Introduction to Data StructuresWith Applications", Mcgrraw- Hill International Student Edition, NewYork.
 2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C",Addison- Wesley, (An Imprint of Pearson Education), Mexico City.

Lecture Plan
BCA-241

Week	Theory	
	Lecture Day	**Topic (including assignment/test)**
1st	Tree: Introduction, Definition	Teaching
	Representing Binary tree in memory	Teaching
	Traversing binary trees(Inorder, Preorder)	Teaching
	Traversing binary trees(Postorder)	Teaching
2nd	Traversal algorithms using stacks(Preorder Traversal)	Teaching
	Traversal algorithms using stacks(PostorderTraversal)	Teaching
	Traversal algorithms using stacks(Inorder Traversal)	Teaching
	Binary search trees: introduction	Teaching
3rd	Test	Assessment
	Binary search trees: storage	Teaching
	Binary search trees: Searching	Teaching
	Insertion in a Binary search tree(Case A,B)	Teaching
4th	Insertion in a Binary search tree(Case C)	Teaching
	Huffman's algorithm	Teaching
	General trees	Teaching/ Assignment
	Assignment: Binary Search Tree	Teaching
5th	Graph: Introduction	Teaching
	Graph theory terminology	Teaching
	Sequential and linked representation of graphs	Teaching
	Test	Assessment
6th	Operations on graphs(Insertion)	Teaching
	Operations on graphs(Deletion)	Teaching/Assignment
	Traversal algorithms in graphs(BFS)	Teaching
	Traversal algorithms in graphs (DFS)	Teaching
7th	Implementation of DFS and BFS	Teaching
	Warshall's algorithm for shortest path	Teaching
	Dijkstra algorithm for shortest path	Teaching
	Test	Assessment
8th	Doubt Session	Teaching
	Sorting: Internal & external sorting	Teaching
	Radix sort	Teaching
	Quick sort	Teaching
9th	Heap sort	Teaching
	Merge sort	Teaching
	Tournament sort	Teaching
	Comparison of various sorting and searching algorithms on the basis of their complexity	Teaching/ Assignment
10th	Discussion on assignment	Teaching
	Files: Introduction Attributes of a file	Teaching
	Classification of files	Teaching
	File Operations	Teaching

11th	Comparison of various types of files	Teaching
	------do----------	Teaching
	File organization: Sequential	Teaching/ Assignment
	File organization: Indexed-sequential	Teaching
12th	File organization: Random-access file	Teaching
	Hashing: Introduction	Teaching
	Test	Assessment
	Types of hashing	Teaching
13th	----------------do-------------	Teaching
	Collision resolution	Teaching
	Revision	Teaching
	Test	Assessment

Tutorial sheet-1

1. What do you mean by binary searchtree.
2. Explain insertion, deletion ans searching in a binary searchtree.
3. Write short note on general tree and preorder traversal oftree
4. Define weighed pathlength.
5. Explain the process of of traversing in binarytree.

Tutorial sheet-2

1. Explain dijkstra's algorithm for shortestpath.
2. Explain various types of graph traversal by giving suitableexample.
3. Define complete binary tree withexample.
4. What is path matrix. How is it obtained from adjacencymatrix.

Tutorial sheet-3

1. What do you mean by sorting. Write algorithm for heap sort and radixsort.
2. Write short note onfollowing:
   (a) Internal andexternalsorting.   (b)Tournamentsort.
3. Define graph. What are the operations performed ongraph.
4. Differentiate between linear and binarysearch.

Tutorial sheet-4

1. What do you mean by file. Explain its types and operations onfiles.
2. What are difference between direct access and indexed sequential fileorganization?
3. Write short note on (a) hashing algorithm (b) collisionresolution.
4. Draw the tree for the expression:
   $X=(3a+b)(7c-d)^5$

Roll No. ....   Total Pages : 03

OBCA/M-20   1912
DATA STRUCTURE-II
BCA-242

Time : Three Hours]   [Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

(Compulsory Question)

1.   Define the following terms :   **6×2=12**

   (a)   Complete Graph

   (b)   B-Trees

   (c)   Diagraph

   (d)   Collision

   (e)   AVL Search Tree

   (f)   Hashing

   (g)   Name the two algorithms to calculate shortest path. **1**

   (h)   How   External   sorting   differs   from   Internal sorting ?   **3**

Unit I

2. Explain Binary Search Tree in detail. How can you represent it in memory ? What are the applications of binary search tree ? **16**

3. Generate Hauffman's tree with the following data : **16**

Data Item	:	A	B	C	D	E	F	G	H
Weight	:	18	6	10	21	3	12	25	7

Unit II

4. Explain Wharshall's Algorithm to calculate shortest path in detail. **16**

5. What do you mean by topological sorting ? Explain with example. **16**

Unit III

6. Explain Heapsort with the help of example. What are the benefits of using it ? **16**

7. Compare various different sorting algorithms by giving one suitable example for each on the basis of their complexity. **16**

Unit IV

8. Explain various hashing algorithms with the help of suitable examples. **16**

9. (a) Differentiate between Sequential *vs.* Random *vs.* Index Sequential File Organisations. **10**

   (b) Define File along with its attributes. Explain various file types and give example of each. **6**

BCA – 242 ADVANCED PROGRAMMING USING C++

Maximum Marks:100   **External:80**
Minimum PassMarks:35   **Internal: 20**
Time: 3 hours

Note: Examiner will be required to set nine questions in all. First question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I
Dynamic Polymorphism: Function Overriding, Virtual Function and its Need, Pure Virtual Function, Abstract Class, Virtual Derivation, Virtual Destructor.

UNIT – II
Type Conversion: Basic Type Conversion, Conversion between objects and basic types, Conversion between objects of different classes, Inheritance: Rules of Derivations – Private, Protected and Public Derivations.

UNIT – III
Different Forms of Inheritance – Single, Multiple, Multilevel, Hierarchical and Multipath Inheritance Roles of Constructors and Destructors in Inheritance, Genericity in C++: Templates in C++, Function templates.

UNIT – IV
Class templates in C++, Exception Handling in C++: try, throw and catch, Files I/O in C++: Class Hierarchy for Files I/O, Text versus Binary Files, Opening and Closing Files, File Pointers, Operation on files.

TEXT BOOKS:
1. Herbert Scildt, C++, The Complete Reference, TataMcGraw-Hill
2. Robert Lafore, Object Oriented Programming in C++, SAMSPublishing

REFERENCE BOOKS:
1. Bjarne Stroustrup, The C++ Programming Language, Pearson Education
2. Balaguruswami, E., Object Oriented Programming In C++, TataMcGraw-Hill

Lecture Plan
BCA-242

Week	Theory	
	Lecture Day	**Topic (including assignment/test)**
1st	Brief: static data member and member functions	Teaching
	Friend function and function overloading	Teaching
	Inline functions	Teaching
	Operator overloading	Teaching
2nd	Polymorphism, Types	Teaching
	Static and dynamic polymorphism	Teaching
	Do---------	Teaching
	Function overriding	Teaching
3rd	Do-------	Teaching
	Virtual function and its need	Teaching
	Pure virtual function	Teaching
4th	Abstract Class	Teaching/Quiz on sorting
	Virtual derivation	Teaching/
	Destructor	Teaching
	Virtual destructors	Teaching
5th	function overloading	Teaching
	Basic type conversion	Teaching
	Conversion between objects and basic types	Teaching
	Conversion between Objects of different classes	Teaching
6th	Inheritance rules of derivation: private, public and Protected	Teaching
	TEST	Teaching/Assignment
	Inheritance: Base and Derived Classes	Teaching
	Inheritance and Types of Inheritance	Teaching
7th	Single Inheritance	Teaching/Quiz
	Multiple Inheritance	Teaching
	Multilevel Inheritance	Teaching
	Hierarchical Inheritance	Assessment
8th	Multipath Inheritance	Teaching/Assignment
	TEST	Teaching
	Role of constructors in inheritance	Teaching
	Role of destructors in inheritance	Teaching
9th	Genericity in C++	Teaching
	Function Templates	Teaching
	Class Template	Teaching
	Overloading Template Functions	Teaching
10th	Exception Handling: Try, Throw, Catch	Teaching
	Throwing an Exception,	Teaching
	TEST	Teaching/Quiz
	Catching an Exception, Re-throwing an Exception	Teaching
11th	File Handling	Teaching
	Hierarchy of File Stream classes	Teaching/Assignment
	Opening and Closing files	Teaching
	File modes, testing for errors	Teaching
12th	File pointers and their manipulations	Teaching
	Operation on files	Teaching
13th	Text versus binary files	Teaching
	Revision of syllabus	Teaching

Tutorial sheet-1

1. a) What is polymorphism? What are its types? Also differentiate between thetwo.
   b) Explain the concept of function overriding with suitable example.
   c) Define pure virtual function. Give itssyntax.
2. What are virtual functions? Justify the need and also explain itssignificance.
3. Write any program in C++ using virtualfunction.

Tutorial sheet-2

4. a) What is inheritance? Why it is needed?
   b) What rules of derivation are applied for deriving a class from a private, public and protected base class. Illustrate each with suitable example.
5. Write a program in C++ to demonstrate the conversion from basic data type to object datatype.

Tutorial sheet-3

6. Illustrate with the help of suitable example the role of constructors anddestructors ininheritance.
7. What is a class template? Explain the syntax of class template with the help of suitableexample.
8. What is genericity in C++? How is itachieved?

Tutorial sheet-4

9. Differentiate between class template and function template inC++.
10. Explain the following with suitableexample:
    a) Functionoverriding
    b) Typeconversion

BCA/M-20   **1894**
ADVANCED PROGRAMMING USING C++
BCA-242

Time : Three Hours]   [Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. (a)   What is a constructor ? What is a parameterized constructor ?

    (b)   What is an abstract class ?

    (c)   What is the difference between private and protected member of a class ?

    (d)   What is the advantage of exception handling ?

Unit I

2.   What is run-time polymorphism ? Write an object oriented program in C++ to compute the area of a triangle, a rectangle and a circle using function overloading.

3.   What is Virtual Destructor ? Explain the use of virtual destructor using suitable example.

Unit II

4. What are the different modes of inheritance ? Discuss the rules associated with them using suitable examples.

5. What do you understand by type conversion ? What is the difference between implicit and explicit type conversion ? Write a program in C++ illustrating the conversion between objects of different classes.

Unit III

6. Discuss the order of execution of constructors and destructors in multiple inheritance using suitable examples.

7. What is multiple inheritance ? What are the problems with it ? Discuss the solutions in C++.

Unit IV

8. What are the different modes to open a file in C++ ? Write a program in C++ to read and write the contents into a file.

9. What is a template class ? What is the advantage of using them ? Write a template function to implement bubble sort.

BCA – 243 E-Commerce

Maximum Marks:100   **External:80**
Minimum PassMarks:35   **Internal: 20**
Time: 3 hours

Note: Examiner will be required to set nine questions in all. First question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I

Introduction to E-Commerce:-Business operations; E-commerce practices vs. traditional business practices; concepts of b2b, b2c,c2c,b2g,g2h,g2c; Features of E-Commerce, Types of Ecommerce Systems, Elements of E-Commerce, principles of E-Commerce,Benefits and Limitations of E-Commerce.
Management Issues relating to e-commerce. Operations of E-commerce: Credit card transaction; Secure Hypertext Transfer Protocol (SHTP); Electronic payment systems; Secure electronic transaction (SET); SET`s encryption; Process; Cybercash; Smart cards; Indian payment models.

UNIT – II

Applications in governance: EDI in governance; E-government; E-Governance applications of Internet; concept of government –to- business, business-to-government and citizen-to government; E-governance models; Private sector interface in Egovernance.
Applications in B2C: Consumers shopping procedure on the Internet; Impact on disinter mediation and re-intermediation; Global market; Strategy of traditional departmentstores.

UNIT – III

Products in b2c model; success factors of e-brokers; Broker-based services on-line; Online travel tourism services; Benefits and impact of e-commerce on travel industry; Deal estate market; online stock trading and its benefits; Online banking and its benefits; Online financial services and their future; E-auctions – benefits, implementation and impact.

UNIT – IV

Applications in B2B: Key technologies for b2b; architectural models of b2b, characteristics of the supplier –oriented marketplace, buyer-oriented marketplace and intermediary-oriented marketplace; Just In Time delivery in b2b; Internet-based EDI from traditional EDI; Marketing Issues in b2b. Emerging Business models: Retail model; Media model; advisory model, made-to-order manufacturing model; Do-it- yourself model; Information service model; Emerginghybrid models; Emerging models in India, Internet & E-Commerce scenario in India;Internetsecurity Issues; Legal aspects of E-commerce

TEXT BOOKS:

1. Turban E,. Lee J., King D. and Chung H.M: "Electronic commerce-aManagerial Perspective", Prentice-Hall International, Inc.
2. Bhatia V., "E-commerce", Khanna Book Pub. Co.(P) Ltd.,Delhi.

Lecture Plan
BCA-243

Week	Theory	
	Lecture Day	**Topic (including assignment/test)**
1st	Introduction to E-Commerce	Teaching
	Business operations, E-commerce practices vs. traditional business practices	Teaching
	Concepts of b2b, b2c,c2c,b2g,g2h,g2c	Teaching
	Features of E-Commerce	Teaching
2nd	Types of Ecommerce Systems	Teaching
	Elements of E-Commerce	Teaching
	Principles of E-Commerce,	Teaching
	Benefits and Limitations of E-Commerce	Teaching
3rd	Management Issues relating to e-commerce	Teaching/Assignment
	Operations of E-commerce	Teaching
	Credit card transaction	Teaching
	Secure Hypertext Transfer Protocol (SHTP)	Teaching/Quiz
4th	Electronic payment systems	Teaching
	Secure electronic transaction (SET)	Teaching
	SET`s encryption; Process; Cyber cash; Smart cards, Indian payment models.	Teaching
	Applications in governance: EDI in governance	Teaching
5th	E-government; E-Governance applications of Internet	Teaching
	Concept of government –to- business,	Teaching
	Business-to-government and citizen-to government	Teaching
	E-governance models	Teaching
6th	Private sector interface in E governance	Teaching/Assignment
	Applications in B2C: Consumers shopping procedure on the Internet	Teaching
	Impact on disinter mediation and re-intermediation	Teaching/Quiz
	Global market; Strategy of traditional department stores.	Teaching
7th	Products in b2c mode	Teaching
	Success factors of e-brokers	Teaching
	Broker-based services on-line	Teaching
	Online travel tourism services	Teaching
8th	Benefits and impact of e-commerce on travel industry	Teaching/Assignment
	Deal estate market; online stock trading and its benefits	Teaching
	Online banking and its benefits	Teaching
	Online financial services and their future	Teaching
9th	E-auctions – benefits, implementation and impact	Teaching
	Applications in B2B	Teaching
	Key technologies for b2b	Teaching
	Architectural models of b2b	Teaching
10th	Characteristics of the supplier	Teaching
	Oriented marketplace	Teaching
	Buyer-oriented marketplace and intermediary-oriented marketplace	Teaching/Quiz
	Just In Time delivery in b2b	Teaching
11th	Internet-based EDI from traditional EDI	Teaching

	Marketing Issues in b2b	Teaching/Assignment
	Emerging Business models: Retail model; Media model	Teaching
	Advisory model, made-to-order manufacturing model	Teaching
12th	Do-it- yourself model	Teaching
	Information service model; Emerging hybrid models	Teaching
	Emerging models in India, Internet & E-Commerce scenario in India	Teaching
	Internet security Issues	Teaching/Quiz
13th	Legal aspects of E-commerce	Teaching
	Revision	
	Revision	

Tutorial sheet-1

1. What do you mean by E-Commerce? Describe framework ofE-Commerce?
2. Describe various types of electronic paymentsystems.
3. What is encryption? Distinguish between symmetric and asymmetricencryption?
4. Distinguish between credit cards, debit cards and smartcards?

Tutorial sheet-2

1. Explain the concept of EDI. What are its advantages anddisadvantages?
2. Explain broadcasting models by using anexample.
3. What is E-Governance? How will E-Governance improve the qualityof government?
4. Explain the consumers shopping procedure on theinternet?

Tutorial sheet-3

1. What are E-Brokers? Explain the factors necessary to make the E-Broker business successful.
2. Describe online travel and tourism services. Write advantages and benefits ofonline travelservices.
3. How does online stock trading works? What are benefits of online stocktrading?
4. Explain various online financialservices?

Tutorial sheet-4

1. Explain architectural models ofB2B.
2. What do you mean by firewall?Explain.
3. Write short note on thefollowing:
    (a) E-Commerce scenario inIndia
    (b) Advantages of E-Retailing.
    (c) Flipcartmodel.
    (d) SnapdealModel.
4. Distinguish between B2B andB2G
5. What isRTGS.
6. What are the risks of usinginternet.

Roll No. ....   Total Pages : 2

E-COMMERCE
Paper–BCA-306

Time : Three Hours]   [Maximum Marks : 80

Note : Attempt *five* questions in all, selecting *one* question from each unit. Question No. 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. (a) What do you mean by the B2B (Business to Business) types of e-commerce?

    (b) What do you mean by disinter mediation and re-intermediation?

    (c) How on-line services boost tourism and travel industry?

    (d) Write a note on just-in-time delivery in b2b.

                                              (4×4=16)

UNIT–I

2. What do you mean by e-commerce? Discuss the important principles of e-commerce. How e-commerce practices differentiate with traditional business practices?   16

3. Explain the essential security requirements for safe electronic payments. Explore the various steps for secure electronic transaction (SET).   16

UNIT–II

4. What are the principles of e-governance for developing countries like India? Differentiate between people participating in e-governance and conventional governance models. **16**

5. Briefly explain the following :

   (a) Citizen to government.

   (b) Consumer shopping procedure on internet. **(8+8=16)**

UNIT–III

6. Discuss the benefits of new competitive environment in Electronic banking. Illustrate open model and closed model for electronic banking. **16**

7. How does electronic brokerage facilitate search and retrieval of information? Explain the success factors of e-brokers. **16**

UNIT–IV

8. Discuss the characteristics of supplier-oriented, buyer-oriented and intermediary-oriented marketplace. **16**

9. (a) Discuss the factors affecting the security of e-commerce scenario in India.

   (b) Explain the features of retail as an emerging business model. **(8+8=16)**

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BCA – 244 RELATIONAL DATABASE MANAGEMENT SYSTEM

Maximum Marks:100   **External:80**
Minimum PassMarks:35   **Internal:20**
Time: 3 hours

Note: Examiner will be required to set nine questions in all. First question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I
Relational Model Concepts, Codd's Rules for Relational Model, Relational Algebra:- Selection and Projection, Set Operation, Renaming, Join and Division, Relational Calculus: Tuple Relational Calculus and Domain Relational Calculus.

UNIT – II
Functional Dependencies and Normalization:-Purpose, Data Redundancy and Update Anomalies, Functional Dependencies:-Full Functional Dependencies and Transitive Functional Dependencies, Characteristics of Functional Dependencies, Decomposition and NormalForms (1NF, 2NF, 3NF & BCNF)

UNIT – III
SQL: Data Definition and data types, SQL Operators, Specifying Constraints in SQL, Basic DDL, DML and DCL commands in SQL, Simple Queries, Nested Queries, Tables, Views, Indexes, Aggregate Functions, Clauses.

UNIT – IV
PL/SQL architecture, PL/SQL and SQL*Plus, PL/SQL Basics, Advantages of PL/SQL, The Generic PL/SQL Block: PL/SQL Execution Environment, PL/SQL Character set and Data Types, Control Structure in PL/SQL, Cursors in PL/SQL, Triggers in PL/SQL, Programming using PL/SQL.

TEXT BOOKS:
1. Elmasri&Navathe, "Fundamentals of Database Systems", 5th edition,Pearson Education.
2. Ivan Bayross, "SQL, PL/SQL-The Programming Language of ORACLE",BPB Publications 3rd edition.

REFERENCE BOOKS:
1. C. J. Date, "An Introduction to Database Systems", 8th edition, Addison WesleyN. Delhi.
2. Oracle 8 –PL/SQL programming –ScottUrman
3. A Guide to the SQL Standard, Data,C. and Darwen, H.3rd Edition, Reading,MA:1994, Addison-Wesley Publications, NewDelhi.

Lecture Plan
BCA-244

Week	Theory	
	Lecture Day	**Topic(including assignment/test)**
1st	Relational Model Concepts	Teaching
	Codd's Rules for Relational Model	Teaching
	Selection Operations	Teaching
	Set Operation	Teaching
2nd	Join and Division	Teaching
	Renaming	Teaching
	Tuple Relational Calculus	Teaching/ Assignment
	Projection Operations	Teaching
3rd	Domain Relational Calculus	Assessment
	Functional Dependencies	Teaching
	Normalization Purpose, Data	Teaching
	Normalization Redundancy	Teaching/ Assignment
4th	Insertion, deletion and Update Anomalies	Teaching
	Full Functional Dependencies	Teaching/
	Transitive Functional Dependencies	Assessment
	Characteristics of Functional Dependencies	Teaching
5th	Decomposition	Teaching
	Normalization Forms (1NF, 2NF)	Teaching
	3NF, BCNF	Teaching
	Join Dependency	Teaching
6th	4 NF and 5 NF	Teaching
	SQL: Data Definition and data types	Assessment
	SQL Operators	Teaching
	Basic DDL, DML and DCL commands in SQL	Teaching
7th	Simple Queries and Specifying Constraints in SQL	Teaching
	Nested Queries	Teaching
	Tables	Teaching
	Views	Assessment
8th	Indexes	Teaching/Assignment
	Aggregate Functions	Teaching
	Clauses	Teaching
	PL/SQL architecture	Teaching
9th	PL/SQL and SQL*Plus.	Teaching
	PL/SQL Basics	Teaching
	The Generic PL/SQL Block	Teaching
	PL/SQL Character set	Teaching
10th	PL/SQL Execution Environment	Assessment
	Data Types	Teaching
	Control Structure in PL/SQL	Teaching
	------Do------	Teaching

11th	Cursors in PL/SQL	Technical activity
	Examples of Cursors	Teaching/Assignment
	Triggers in PL/SQL	Teaching
	Programs of Triggers	Assessment
12th	Programming using PL/SQL.	Teaching
	Procedures	Teaching
	Examples of Procedures	Teaching
	Advantages of PL/SQL	Teaching
14th	Queries	Assessment
	Revision	Teaching
	Revision	Assessment
	Revision	Teaching

Tutorial sheet-1

1. What do you mean by relational algebra. Discuss the different operationsperformed in relational algebra with suitableexample.
2. What do you mean by domain relational calcus.Discuss.
3. Write and explain 14 rules being provided by dr. E.F. Codd for relationalmodel.
4. Differentiate between relation algebra an relationalcalcus.

Tutorial sheet-2

1. What do you mean by normalization. Why we normalize our database . Discuss normal forms based on primary key withillustrations.
2. Write notes on the following with supportiveexample:
   (a) Trivial and non trivial functionaldependencies.
   (b) Transitive and multivalvedependencies.
   (c) Closure of functionaldependencies.
3. What are anomalies. Write insertion and deletionanomaly.

Tutorial sheet-3

1. What are the data type we use in SQL. Discuss differentclauses.
2. How views are created and destroyed in SQL.Explain.
3. Write meaning , syntax, and example of the following SQLstatements:
   (a) Create statement with primary key and nullconstraint.
   (b) To update a specific tuple in thetable.
   (c) To truncate table indatabase.
   (d) To select distinct tuples frotables.

Tutorial sheet-4

1. What are rhe advantages of PL/SQL. How control statements are used in PL/SQL. Give an example in support to theanswer.
2. What do you mean by cursors in PL/SQL. Why we need cursors. How cursorsare created and replaced. Write specimen syntax forcursor.

BCA/M-20   **1896**
RELATIONAL DATABASE MANAGEMENT SYSTEM
BCA-244

Time : Three Hours]   [Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting *one* question from each Unit in addition to Compulsory Q. No. **1**. All questions carry equal marks.

Compulsory Question

1. (a) Write a short note on Relational Model Concepts. 4

    (b) Explain various anomalies in RDBMS.   4

    (c) Write a short note on Data types in SQL.   4

    (d) What are the advantages of PL/SQL ?   4

Unit I

2. What are the Codd's rules for RDBMS ? Explain in detail.   16

3. Explain various operations in Relational Algebra along with suitable examples.   16

Unit II

4. Write short notes on the following :
   (a) Functional Dependencies   **4**
   (b) Fully Functional Dependencies   **4**
   (c) Transitive Dependencies   **4**
   (d) Decomposition.   **4**

5. Define Normalization. What is its significance ? Explain the various types of normal forms along with suitable examples.   **16**

Unit III

6. Explain the basic DDL and DML commands in SQL along with suitable examples.   **16**

7. Explain the concept of Indexes and Aggregate functions in SQL with suitable examples.   **16**

Unit IV

8. Elaborate the following :
   (a) PL/SQL architecture   **4**
   (b) Loop Control Statements in PL/SQL.   **12**

9. Define Cursors in PL/SQL. Explain various types of Cursors. Write any program of your choice in PL/SQL that makes use of Cursors.   **16**

BCA – 245 COMPUTER-ORIENTED STATISTICAL METHODS

Maximum Marks:100   **External: 80**
Minimum PassMarks:35   **Internal: 20**
Time: 3 hours

Note: Examiner will be required to set nine questions in all. First question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I

Basic Statistics: Preparing Frequency Distribution Table and Cumulative frequency, Measure of Central Tendency, Types: Arithmetic mean, Geometric Mean, Harmonic Mean, Median, Mode.
Measure of Dispersion: Range, Quartile Deviation, mean deviation, Coefficient of mean Deviation, Standard Deviation Moments : Moments About mean, Moments about any point, Moment about origin, Moment about mean in terms of moment about any point, Moment about any point in terms of Moment about mean.

UNIT – II

Probability Distribution: Random Variable- Discrete Random and Continuous Random variable, Probability Distribution of a Random Variable, Mathematical Expectation Types: Binomial, Poisson, Normal Distribution, Mean and Variance of Binomial,Poisson, and Normal Distribution. Correlation: Introduction, Types, Properties, Methods of Correlation: Karl Pearson's Coefficient of Correlation, Rank Correlation and Concurrent Deviation method, Probable error.

UNIT – III

Regression: Introduction, Aim of Regression Analysis, Types of Regression Analysis, Lines of Regression, Properties of Regression Coefficient and Regression Lines, Comparison with Correlation. Curve Fitting: Straight Line, Parabolic curve, Geometric Curve and Exponential Curve Baye's Theorem in Decision Making, Forecasting Techniques.

UNIT – IV

Sample introduction, Sampling: Meaning, methods of Sampling, Statistical Inference: Test of Hypothesis, Types of hypothesis, Procedure of hypothesis Testing, Type I and Type II error, One Tailed and two tailed Test, Types of test of Significance: Test of significancefor Attribute-Test of No. of success and test of proportion of success, Test of significance for large samples - Test of significance for single mean and Difference of mean, Test of significance for small samples (t-test) – test the significance between the mean of a random sample, between the mean of two independent samples Chi square Test, ANOVA: Meaning, Assumptions, One way classification, ANOVA Table for One-Way Classified Data.

REFERENCE BOOKS

1. Gupta S.P. and Kapoor, V.K., Fundamentals of Applied statistics,Sultan Chand & Sons, 1996.
2. Gupta S.P. and Kapoor, V.K., Fundamentals of Mathematical statistics, SultanChand and Sons,1995.
3. Graybill, Introduction to Statistics,McGraw.
4. Anderson, Statistical Modelling,McGraw.

Lecture Plan
BCA-245

Week	Theory	
	Lecture Day	**Topic (including assignment/test)**
1st	Basic Statistics: Preparing Frequency Distribution Table and Cumulative frequency	Teaching
	Basic Statistics: Preparing Frequency Distribution Table and Cumulative frequency	Teaching
	Measure of Central Tendency	Teaching
	Types: Arithmetic mean, Geometric Mean, Harmonic Mean, Median, Mode.	Teaching
2nd	Class Test	Teaching/Test
	Measure of Dispersion: Range, Quartile Deviation, mean deviation	Teaching
	Coefficient of mean Deviation	Teaching
	Standard Deviation Moments : Moments About mean	Teaching
3rd	Moment about mean in terms of moment about any point	Teaching
	Moment about any point in terms of Moment about mean	Teaching
	--------DO-------------	Teaching
	UNIT-1	Teaching/ Doubt Session/ Oral Revision
4th	Probability Distribution: Random Variable	Teaching
	Discrete Random and Continuous Random variable	Teaching
	--------DO-------------	Teaching
	ASSIGNMENT	Teaching/Assignment
5th	Probability Distribution of a Random Variable	Teaching
	Mathematical Expectation	Teaching
	Binomial Distribution	Teaching
	Poisson Distribution	Teaching
6th	Normal Distribution	Teaching
	Correlation: Introduction, Types, Properties	Teaching
	Methods of Correlation: Karl Pearson's Coefficient of Correlation	Teaching
	Rank Correlation	Teaching
7th	CLASS TEST	Teaching/Test
	Concurrent Deviation method	Teaching
	Probable error	Teaching
	Unit-2	Teaching
8th	Regression: Introduction, Aim of Regression Analysis	Teaching
	Types of Regression Analysis	Teaching
	Lines of Regression	Teaching
	Properties of Regression Coefficient and Regression Lines	Teaching
9th	Comparison with Correlation	Teaching
	--------DO-------------	Teaching/ Doubt Session/ Oral Revision
	Curve Fitting: Straight Line, Parabolic curve	Teaching
	Geometric Curve, Exponential Curve	Teaching
10th	Baye's Theorem in Decision Making	Teaching
	Forecasting Techniques	Teaching
	CLASS TEST	Teaching/Test
	UNIT-3	Teaching
11th	Sample introduction, Sampling: Meaning	Teaching
	ASSIGNMENT	Teaching/Assignment

	Methods of Sampling	Teaching
	Statistical Inference: Test of Hypothesis	Teaching
12th	Procedure of hypothesis Testing, Type I and Type II error	Teaching/ Doubt Session/ Oral Revision
	One Tailed and two tailed Test	Teaching
	Types of test of Significance: Test of significance for Attribute- Test of No. of success and test of proportion of success	Teaching
	ASSIGNMENT	Teaching/Assignment
13th	Test of significance for small samples(t-test)- between the mean of two independent samples Chi square Test	Teaching
	ANOVA: Meaning, Assumptions	Teaching
	One way classification ANOVA Table for One-Way Classified Data	Teaching
	UNIT-4	Teaching/Doubt Session/ Oral Revision

Tutorial sheet-1

1. Define range.
2. Define discrete randomvariables.
3. (a) Given below is a grouped frequency distribution of marks. Convertthis frequency tableinto:
    (a) Less thanform
    (b) More thanform

Marks	0-10	10-20	20-30	30-40	40-50	50-60
Students	5	8	7	6	4	9

(b) weights of trainees in a wrestling coaching camp are given in the table below: calculate the average weight

Wt. in kgs.	Below	40-45	45-50	50-55	55-60
No. of trainees	40	5	6	10	12

Tutorial sheet-2

1. Two unbiased dice are thrown together at random. What is the expected valusof sum of the numbers shown by the twodice.
2. A die is thrown 6 times. Getting an odd number is a success. What is the probability of
    (a) 5successes.
    (b) At least 5successes.
    (c) At most 5successes.
3. Find cov.(x,y) between x and y,if:

X!	3	4	5	6	7
Y!	8	7	6	5	4

4. Ten students success the following marks in statistics and mathematics:

Marks instat.	31	45	39	48	24	33	42	36	29
Marks in maths	41	47	27	38	29	37	40	30	35

Compute their ranks in two subjects also, find the coefficient of rank correlation.

Tutorial sheet-3

1. (a) Find the line of regression of y on x for the followingdata:

X	10	9	8	7	6	4	3
Y	8	12	7	10	8	9	6

    (b) (i) Mean $\bar{x}$ and $\bar{y}$.
       (ii) Regression coefficients bxy andbyx.
       (iii)coefificients of correlation between x and y when the two lines of
      regression are 3x+13y=19 andx+3y=5.
2. Define two differences between correlation andregression.

Tutorial sheet-4

1. Define tailed test of hypothesis and also define itstypes.
2. A random sample of 500 pineapples were taken from a large consignment and 65 were found rotten. Show that S.E. of the proportion of rotton ones in a sample of this size is 8.5% and17.5%.
3. Define two charachterstics ofANOVA.

BCA/M-20   1897
COMPUTER ORIENTED STATISTICAL METHODS
BCA-245

Time : Three Hours]   [Maximum Marks : 80

Note : A candidate will be required to answer *five* questions in all, selecting *one* question from each Unit in addition to compulsory Q. No. **1**. All questions will carry equal marks.

(Compulsory Question)

1. (a) Write the types of continuous series. Explain any *two* of these.   **4**

    (b) Merits and demerits of Mode.   **4**

    (c) Define mean and variance of Poisson Distribution. **4**

    (d) Define Estimation theory and its classes.   **4**

Unit I

2. (a) Define types of measures of central tendency. Give its characteristics for an ideal measure of central tendency.   **8**

(b) Find the relative frequency distribution of the following data : **8**

Class	Frequency
0-5	172
5-10	383
10-15	486
15-20	265
20-25	565
25-30	193

3. (a) Compute the standard deviation for the following data : **8**

x_i	f_i
1	6
2	12
3	18
4	26
5	16
6	10
7	8

(b) Calculate the first four moments about the mean of the following data : **8**

Wages	No. of Persons
0-10	15
10-20	23

20-30	35
30-40	49
40-50	32
50-60	28
60-70	12
70-80	6

Unit II

4. (a) Find the probability distribution of the no. of white balls drawn in a random draw of 3 balls without replacement from a bag containing 4 white and 6 red balls. Also find the mean and variance of the distribution. **8**

   (b) If x be the normal variate with mean 50 and standard devivation 8; find the probabilities that :

   (i) $x \geq 60$

   (ii) $x \leq 60$

   (iii) $40 \leq x \leq 70$. **8**

5. (a) Calculate Karl Pearson's coefficient of correlation between X and Y for the following data : **8**

x	y
18	17
19	17

20	18
21	18
22	18
23	19
24	19
25	20
26	21
27	21

(b) Ten students secured the following marks in Statistics and Maths : **8**

Marks in Statistics	Marks in Maths
31	41
45	47
39	27
48	38
24	29
33	37
42	40
36	30
29	35
41	39

Compute their ranks in two subjects and coefficient of rank correlation.

(3)L-1897   4

Unit III

6. (a) Find the equation of lines of regressions : **8**

x	y
1	12
3	8
5	6
6	9
7	11
8	8

(b) Find the standard error of estimate y on x : **8**

x	y
1	9
2	8
3	10
4	12
5	11

7. (a) The observed values of a function are 168, 120, 72 and 73 at the positions 3, 7, 9 and 10 of the independent variable respectively. What is the best estimate of the function at the position 6 of the independent variable ? **8**

(b) State and prove Bayes' theorem in decision making.

8

Unit IV

8. (a) A population consists of three numbers 3, 6, 9. Consider all possible sample of size two which can be drawn with replacement from the population. Calculate the standard error of the sample means. **8**

   (b) In a hospital 480 female babies and 520 male babies were born in a week. Do these figures confirm that males and females are born in equal number ? **8**

9. (a) The theory predicts the proportion of beans in the four groups A, B, C and D should be 9 : 3 : 3 : 1. In an experiment with 1600 beans the nos. in four groups were 882, 313, 287, 118. Does the experimental result support the theory ? (Value of χ^2 for 3 d.f. at 5% level of significance 7.81). **8**

   (b) Three different machines are used for the production. On the basis of the outputs, test whether the machines are equally effective or not :

Output of Machine

I	II	III
10	9	20
5	7	16
11	5	10
10	6	14

   (Given : Value of F at 5% level of significance with degrees of freedom 2 and 9 = 4.26). **8**

BCA – 246 MANAGEMENT INFORMATION SYSTEM

Maximum Marks: 100   **External: 80**
Minimum PassMarks:35   **Internal:20**
Time: 3 hours

Note: Examiner will be required to set nine questions in all. First question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I
Introduction to system and Basic System Concepts, Types of Systems, The Systems Approach, Information System: Definition & Characteristics, Types of information, Role of Information in DecisionMaking, Sub-Systems of an Information system: EDP and MIS management levels, EDP/MIS/DSS.

UNIT – II
An overview of Management Information System: Definition & Characteristics, Components of MIS, Frame Work for Understanding MIS: Information requirements & Levels of Management, Simon's Model of decision-Making, Structured Vs Un-structured decisions, Formal vs.Informal systems.

UNIT – III
Developing Information Systems: Analysis & Design of Information Systems: Implementation & Evaluation, Pitfalls in MIS Development.

UNIT – IV
Functional MIS: A Study of Personnel, Financial and production MIS, Introduction to e-business systems, ecommerce – technologies, applications, Decision support systems – support systems for planning, control and decision-making

TEXT BOOK:
1. J. Kanter, "Management/Information Systems",PHI.
2. Gordon B. Davis, M. H. Olson, "Management Information Systems –Conceptual foundations, structure and Development", McGrawHill.

REFERENCE BOOK:
1. James A. O'Brien, "Management Information Systems", TataMcGraw-Hill.
2. James A. Senn, "Analysis & Design of Information Systems", Second edition,McGraw Hill.
3. Robert G. Murdick& Joel E. Ross & James R. Claggett, "Information SystemsforModern Management",PHI.
4. Lucas, "Analysis, Design & Implementation of Information System", McGrawHill.

Lecture Plan
BCA-246

Week	Theory	
	Lecture Day	**Topic (including assignment/test)**
1st	Introduction to system and Basic System Concepts	Teaching
	Types of Systems	Teaching
	The Systems Approach	Teaching
	Information System: Definition	Teaching
2nd	Information System: Characteristics	Teaching
	Types of information	Teaching
	Revision	Teaching
	Class test	Teaching
3rd	Role of Information in Decision-Making,	Teaching/Assignment
	Sub-Systems of an Information system: EDP and MIS	Teaching
	Management levels	Teaching
	EDP/MIS/DSS.	Teaching/Quiz
4th	An overview of Management Information System	Teaching
	Characteristics	Teaching
	Components of MIS	Teaching
	Frame Work for Understanding MIS	Teaching
5th	Assignment viva	Teaching
	Information requirements	Teaching
	Levels of Management	Teaching
	Simon's Model of decision-Making	Teaching
6th	Structured Vs Un-structured decisions	Teaching/Assignment
	Formal vs.Informal systems.	Teaching
	Class test	Teaching/Quiz
	Developing Information Systems	Teaching
7th	Developing Information Systems: Analysis	Teaching
	Design of Information Systems	Teaching
	Implementation	Teaching
	Revision	Teaching
8th	Doubt session and viva	Teaching/Assignment
	Class test	Teaching
	Evaluation	Teaching
	Pitfalls in MIS Development	Teaching
9th	Functional MIS	Teaching
	A Study of Personnel system	Teaching
	Financial MIS	Teaching
	Subject viva	Teaching
10th	Production MIS,	Teaching
	Introduction to e-business systems	Teaching

	Ecommerce – technologies		Teaching/Quiz
	Ecommerce – applications		Teaching
11th	Revision		Teaching
	Revision		Teaching/Assignment
	Decision support systems		Teaching
	Support systems for planning,		Teaching
12th	Class test		Teaching
	Revision		Teaching
	Support systems for planning, control		Teaching
	Decision-making		Teaching/Quiz
13th	Subject viva		Teaching
	Structured Vs Un-structured decisions		Teaching
	Sub-Systems of an Information system: EDP and MIS		Teaching
	Revision		Teaching
	Class test		Teaching/class test

Tutorial sheet-1

1. Distinguishbetween
   (a) TPS andDSS
   (b) Physical system and abstractsystem
   (c) Open system and closesystem
   (d) Data andinformation
2. Briefly discuss concept of boundary. Interface and blackbox.
3. Briefly describe characteristics and capabilities ofDSS.

Tutorial sheet-2

1. Distinguishbetween
   (a) Formal and informalsystems.
   (b) Structured and un structureddecisions
2. What is the purpose of decision making? Discuss Simon's model of Decesion making.

Tutorial sheet-3

1. What do you mean by system maintenance? Why we need it? Brieflydescribe various types of system maintenance?
2. What do you mean by system implementation? Briefly describe two types of system implementation giving their advantages anddisadvantages.
3. Briefly describe pitfalls in MISdevelopment.

Tutorial sheet-4

1. Distinguish between e-commerce and traditional businesspractices.
2. Write short note on (i) B2G (ii)G2C
3. What is the relevance of MIS in decisionmaking.
4. Briefly Describe components ofDSS.
5. Briefly describe few appplications of e-commerce
6. How is DSS used in planning andcontrol.

BCA/M-20   1898
MANAGEMENT INFORMATION SYSTEM
BCA-246

Time : Three Hours]   [Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory.

Compulsory Question

1. (a) What role does information play in decision-making ?   4
    (b) Differentiate between structured and unstructured systems.   4
    (c) What is the difference between logical DFD and physical DFD ?   4
    (d) What are the benefits of e-Commerce ?   4

Unit I

2. Distinguish between :
    (a) Open and Closed Systems
    (b) MIS and DSS
    (c) Deterministic and Probabilistic Systems.   16

3. What is the need of information ? Also discuss various types of information.   16

Unit II

4. What is Management Information System ? Discuss the characteristics and functions of management information system.   **16**

5. What is the purpose of decision-making ? Explain Simon's model of decision-making.   **16**

Unit III

6. What are the objectives of system design ? Also discuss different design methods and the steps required for the design of information systems.   **16**

7. What do you understand by evaluation of information systems ? Explain various evaluation approaches in brief.

    16

Unit IV

8. Discuss Human Resource/Personnel Management System. What are various key elements of Human Resource/ Personnel Management System ? Also discuss the advantages of HRM Systems.   **16**

9. What do you mean by Decision Support Systems ? Explain the characteristics and functions of Decision Support Systems.   **16**

Software Lab. I (BCA-251)
(Lab Based on BCA-242)
Advanced Programming using C++

Examination:100   **Total:100**

1. Create a class to represent a bank account, include the data members: name,accountno, balance. And memberfunction
   i) To deposit anamount.
   ii) To withdraw an amount offer checking thebalance.
   iii) To display name andbalance.
2. WAP to obtain the largest of three numbers using inlinefunctions.
3. WAP using operator overloading to overload Unary and binaryoperator
4. WAP to implement the concept of overriding in functions inC++.
5. WAP to illustrate the applications of virtual functions inc++
6. Createaabstractclassnamedfigurehavingdatamemberare,colourandmemberfunction
   i)   Void area(): to calculate the area of givenfigure.
   ii)   Void volume(): to calculate the volume of givenfigure.
7. Write a function power() to raise a number m to a power n. use default value of 2 for nto make the function to calculate squares. Consider two cases, the functiontakes
   i)   Double value for m, Int value forn.
   ii)   Int value for both m andn

   Both the function should have same name. Write a main that gets the values of m and n from the user to test the function. Use the concept of function overloading.

8. Create a class employee extends from person class of question 3 having datamembers employeeID, department, salary, tax and the following memberfunctions:
   i)   Void data() to collect the details of theemployee.
   ii)   Void display() to display the details of theemployee
   iii)   Void calculate() to calculate the tax of employee depending upon theannual salary, if the salary is below 1 lakh, then tax to bepaid
           a) Between 1-2 lakh, tax paid is5%
           b) Above 2 lakh, tax paid is10%
9. WAP to override base class members in a derived class.
10. WAP to implement constructor and destructor ininheritance.
11. Write a function template to perform selection sorting in anarray.
12. WAP to overload templatefunctions.

13. WAPtoillustrateexceptionhandlinginC++bymakinguseoffunctionstry(),throw()and catch().

14. WAP for exception handling divide byzero.

15. WAP for rethrowing exception handling infunction.
16. WAP that illustrates the application of multiple catchstatements.
17. **W**AP to read and display contents of file and creates another file that is identical except that every sequence of consecutive blank spaces is replaced by singlespace.
18. Write a program to maintain telephone directory system usingfiles.
19. WAP that uses STOCK.DAT file containing item name, code and cost. Perform the following operations on the file using randomaccess.
i)   Adds a new item to thefile
ii)   Modifies the details of anitem.
20. Display the contents of thefile.

Examination:100   **Total:100**

1. Implement Inorder Traversal UsingC.
2. Implement Preorder Traversal UsingC.
3. Implement Postorder Traversal UsingC.
4. Evaluate Infix Expression using C.
5. Convert infix expression to postfix usingstack.
6. Implement searching in Binary SearchTree.
7. Implement Insertion in a binary SearchTree.
8. Implement Deletion in a Binary search tree.
9. Implement Breadth First Search in agraph.
10. Implement Depth first search inGraph.
11. Implement Dijkastra algorithm to find the shortest path ingraph.
12. Implement Warshall's algorithm to find the shortest path ingraph.
13. Implementation QuickSort.
14. ImplementMergesort.
15. Implement Heapsort.
16. To implement HuffmanAlgorithm.
17. Implement Tournamentsort