BTCS 403 / BTEE 306

III / IV Semester Examination, May 2018

B.Tech. / B.Tech. + M.Tech. / B.Tech. + MBA [CSE / CCE / EE]

Data Structure & Algorithms

Choice Based Credit System (CBCS)

Duration: 3 Hrs. **Maximum Marks : 60**

Minimum Pass Marks: 24

Note: (1) All questions carry equal marks, out of which part 'A' and 'B' carry 3 marks and part 'C' carries 6 marks.

(2) From each question, part 'A' and 'B' are compulsory and part 'C' has internal choice.

(3) Draw the neat diagram wherever necessary.

(4) Assume suitable data, wherever necessary.

Q.1.(A) Differentiate between Abstract Data Type specification and implementation. **03**

(B) What is dangling pointer? How this situation can be avoided? **03**

(C) Consider a 2D array declared in 'C'- A [20] [30], element type is integer. If the base address is 1076, what will be the address of A[17] [29]? Consider Memory byte oriented. **06**

OR

How one dimensional and two dimensional arrays are stored in memory? Write accessing function for two dimensional arrays.

Q.2.(A) Discuss about the implementation of fixed size block and variable size block dynamic memory allocation. **03**

(B) What is Stack and how it is implemented using Array? List few applications of stack. **03**

(C) Write function for the following for the implementation of queue in circular array with index values to indicate emptiness:

i. Finding size ii. Checking empty iii. Checking full **06**

OR

Write an algorithm to convert infix to postfix expression with the help of suitable example.

Contd.....

Q.3.(A) Why it is disadvantageous for representing a stack or queue by linked list? Justify your answer **03**

(B) How a linked list can be implemented using array. Explain the answer with example **03**

(C) Explain and write an algorithm to insert a node into a linked list (taking all cases) **06**

OR

Explain how the polynomial can be represented using linked list

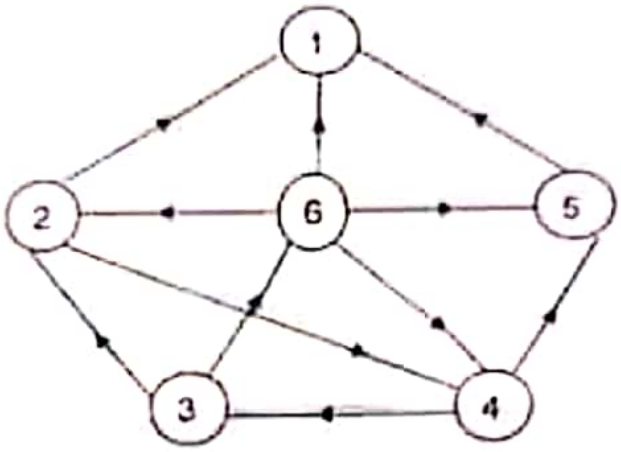
$7x^2y^2 - 4x^2y + 5xy^2 - 2$

Q.4.(A) Prove that a tree with K-nodes has exactly (K-1) edge or branches **03**

(B) For following graph find **03**

i In degree and out degree of vertex **06**

ii Adjacency matrix



(C) Construct of binary tree using given preorder and in order traversal

Preorder A B D E F C G H J L K

Inorder D B F E A G C L J H K

OR

Compare graph traversal techniques with example

Q.5.(A) What are the disadvantages of sequential search? How these disadvantages can be minimized? **03**

(B) Differentiate between internal sorting and external sorting with example **03**

(C) Sort the following integers using quick sort

95, 55, 42, 36, 12, 18, 48, 65, 72, 82 **06**

OR

What do you understand by merge sort? Write the algorithm to sort using merge sort. Take an example to explain your answer.

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BTIT 204

B.Tech. / B.Tech. + MBA / B.Tech. + M.Tech.

II Semester Examination, June 2017

[IT / ICT]

DATA STRUCTURE

Choice Based Credit System (CBCS)

Time: 3 Hrs. **Maximum Marks : 60**

Minimum Pass Marks: 24

Note: (1) All questions carry equal marks, out of which part 'A' and 'B' carry 3 marks and part 'C' carries 6 marks.

(2) From each question, part 'A' and 'B' are compulsory and part 'C' has internal choice.

(3) Draw the neat diagram, wherever necessary.

(4) Assume suitable data wherever necessary.

Q.1.(A) What is Array? Differentiate between one - Dimension and two Dimension arrays. **03**

(B) Explain Data Types. Why do we need Data types? **03**

(C) Write an algorithm for Tower of Hanoi. Explain with the help of suitable example. **06**

OR

Describe the following (Any Three)

- Garbage Collection
- Sparse Matrices
- Algorithm complexity notations
- Address Calculation of Array.
- Tail Recursion.

Q.2.(A) What is Stack? Describe its operation in brief. **03**

(B) What is circular Queue? How do you represent it? **03**

(C) Write a C program to create a doubly linked list in ascending sorted order of information. **06**

OR

How elements are Inserted and Deleted in a Circular Queue. Explain with diagram.

Contd.....

Q.3.(A) Define Binary Tree and its applications. 03

(B) Describe different types of trees. 03

(C) Describe the different types of operation on Binary search tree. 06

OR

The following data are to be inserted in an AVL tree in the following order

20,25,30,40,45,60,55,57

Show the tree each time, when balancing is required.

03

Q.4.(A) Define internal and external sorting. 03

(B) Write a C program for Bubble Sort. 06

(C) Explain Quick Sort and sort the following

48,17,35,55,77,90,40,60,97,20,81,65

OR

Describe different searching techniques. Search 15 in given list using Binary Search

65,17,35,55,77,90,40,15,97,20,48

03

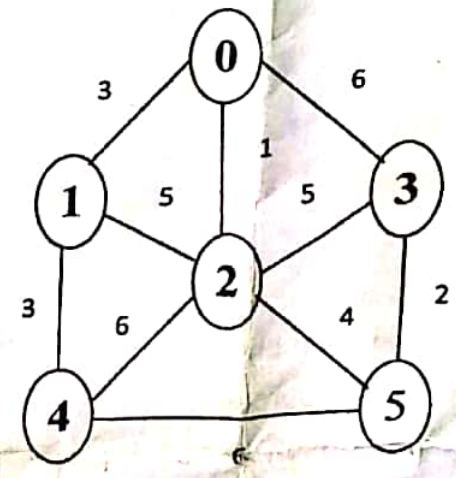
Q.5.(A) Define Graph, Undirected Graph and Directed Graph. 03

(B) Describe the method of graph representation in brief. 06

(C) Explain Graph Traversal methods in detail. (BFS and DFS)

OR

Find minimum cost spanning tree of graph G using Kruskal's algorithm.



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SHRI VAISHNAV INSTITUTE OF INFORMATION TECHNOLOGY, INDORE
DEPARTMENT OF COMPUTER SCIENCE AND ENGG.

Vision of the Department
"To be renowned for excellence in Computer Science & Engineering."

Mission of the Department
"To impart quality education, meeting the latest industry requirements, futuristic research & developments in Computer Science & Engineering.

MID SEM TEST-I

CLASS: - I YEAR SECTION: CS-C/D SEM:-II TIME- 01 Hr
Subject Name: Data Structures & Algorithms (BTCS-403) Max Marks: 20

NOTE :-1. Attempt any 4 questions.
2. All questions carry equal marks (5).

Q. No.	Questions	Max Marks	CO Mapped
Q.1	What do you mean by ADT ? Draw diagram for classification of data structures.	5	CO1
Q.2	What do you mean by Complexity and explain its different types.	5	CO1
Q.3	Write a C/C++ Program for traversing in m*n matrix.	5	CO2
Q.4	Differentiate between Primitive and Non Primitive Data Structure.	5	CO1
Q.5	What do you mean by Asymptotic Notations. Draw its diagrams and write its equations.	5	CO1
Q.6	Write algorithms for PUSH and POP operations in Stack.	5	CO2

MID SEM TEST-II

CLASS: - I YEAR SECTION: CS-C/D SEM:- II

Subject Name: Data Structures & Algorithms (BTCS-403)

NOTE :-1. Attempt any 4 questions.

2. All questions carry equal marks (5).

Q. No.	Questions	Max Marks	CO Mapped
Q.1	What do you mean by Queues ? Explain different types of Queues with their diagram.	5	CO1
Q.2	Perform Binary Search on following numbers to search 45 : **9 12 24 30 36 45 70** Also write algorithm of Binary Search.	5	CO3
Q.3	Perform Bubble Sort on following numbers: **11 2 15 13 6** Also write algorithm of Bubble Sort.	5	CO3
Q.4	Give Postfix form for : **A + (B * C - (D / E ^ F) * G) * H**	5	CO2
Q.5	Give Prefix form for : **(A * B + (C / D)) - F**	5	CO2
Q.6	Evaluate the expression in tabular form showing stack after every step : **A B C + * D E / -** where A=5 , B=6 , C =2, D= 12 and E=4	5	CO2

in Computer Science & Engineering.

MID SEM TEST-I

CLASS: - II YEAR SECTION: B SEM:-IV

SUBJECT NAME: Data Structure (BTCS-403)

TIME- 01 Hr

MAX MARKS: 20

NOTE :-1. Attempts any 4 question out of 6.

Q. No.	Question	Max Marks	CO Mapped
Q.1	Define data structure ? Difference between primitive data structure & non primitive data structure ?	4	CO1
Q.2	What is an Array ? Explain types of Array ?	4	
Q.3	Differentiate between Linear & Non Linear data structure?	4	CO1
Q.4	Name various data structure & explain them briefly?	4	CO2
Q.5	What are the operation perform on data structure? Explain them.	4	CO4
Q.6	Difference between program & algorithm ?	4	CO5

MID SEM TEST - II

CLASS: - II YEAR **SECTION: B** **SEM:-IV** **TIME- 01 Hr**

SUBJECT NAME: Data Structure (BTCS-403) **MAX MARKS: 20**

NOTE: Attempt any 4 question. All carry equal marks

Q. No.	Question	Max Marks
Q.1	When do you get the error message 'queue overflow' & 'queue underflow' ? Explain with example.	5
Q.2	What is stack ? what operation can be performed on stack. Write its algorithm ?	5
Q.3	What is circular queue ? How it is different from ordinary queue. Explain the Operations performed by circular queue ?	5
Q.4	What is link list? How it is different from array. Write the different types of link list Or What is doubly linked list? What advantages does a doubly link list have over linear link lists?	5
Q.5	Implement an algorithm for insert & delete element in a queue and implement the same using array.	5

MID SEMESTER TEST-II

CLASS: - I YEAR SECTION: CS-C/D SEM:- II TIME- 01 Hr

Subject Name: Data Structures & Algorithms (BTCS-403) Max Marks: 20

NOTE :-1. Attempt any 4 questions.
2. All questions carry equal marks (5).

Q. No.	Questions	Max Marks	CO Mapped
Q.1	What do you mean by Queues ? Explain different types of Queues with their diagram.	5	CO1
Q.2	Perform Binary Search on following numbers to search **45** : **9 12 24 30 36 45 70** Also write algorithm of Binary Search.	5	CO3
Q.3	Perform Bubble Sort on following numbers: **11 2 15 13 6** Also write algorithm of Bubble Sort.	5	CO3
Q.4	Give Postfix form for : **A + (B * C - (D / E ^ F) * G) * H**	5	CO2
Q.5	Give Prefix form for : **(A * B + (C / D)) - F**	5	CO2
Q.6	Evaluate the expression in tabular form showing stack after every step : **A B C + * D E / -** where A=5 , B=6 , C =2, D= 12 and E=4	5	CO2