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10MCA23

Second Semester MCA Degree Examination, June/July 2011
Data Structures Using C

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1 a. What is dynamic memory allocation? Write the syntax and explain with examples, the functions that support dynamic memory allocation. (10 Marks)
b. What are the two major criteria to judge a program for performance analysis? Explain how the space complexity is determined. Mention all the components used to find total space requirement S(P) with example. (10 Marks)
- 2 a. What is abstract data type? Write the ADT for an array. (08 Marks)
b. List the advantages and disadvantages of arrays over linked lists. (04 Marks)
c. What is sparse matrix? Explain how sparse matrix is represented. (08 Marks)
- 3 a. What is postfix expression? Write algorithm to evaluate postfix expression using stack. (10 Marks)
b. What are circular queues? Discuss the implementation issues of circular queues using dynamically allocated arrays. (10 Marks)
- 4 a. What is linked list? Write C-function to insert a node at the beginning and deleting the last node from the list. (10 Marks)
b. List the advantages of circular linked list over singly linked list. Write C module to concatenate two circular lists. (10 Marks)
- 5 a. Explain the concept of threaded binary tree. Write C-module to find the in-order successor of a node. (10 Marks)
b. Define binary search tree (BST). Write and explain C-module to insert an item into BST, if it does not exist on it already. (10 Marks)
- 6 a. What are forests? Give algorithm for transforming a forest into a binary tree. Explain it with example. (08 Marks)
b. What is graph? Write an abstract data type for graph. (08 Marks)
c. List the applications of stack. (04 Marks)
- 7 a. What are top-down splay trees? If 'x' be the begin node i.e., root, mention the 7 cases to consider in partition process in top-down trees. (10 Marks)
b. What are AVL trees? Explain with example. (10 Marks)
- 8 Write short notes on the following :
 - a. Self-referential structures
 - b. Priority queues
 - c. Representation of disjoint sets
 - d. Doubly linked list. (20 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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07MCA23

Second Semester MCA Degree Examination, June/July 2011
Data Structures using C

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1 a. Give the difference between:
 - i) Structure and union
 - ii) Call by value and call by reference
 - iii) malloc() and calloc()
 - iv) (*m)[5] and *m [5] (12 Marks)
- b. Implement a C program using struct-COMPLEX for addition of two complex numbers. (08 Marks)
- 2 a. What is a stack? Discuss the applications. (06 Marks)
- b. Write an algorithm for converting the given infix expression to postfix. (12 Marks)
- c. Convert the given infix expression to postfix, $((6 + (3 - 2) * 5 \wedge 2 * 3))$. (02 Marks)
- 3 a. What is recursion? Write a recursive junction to find largest of 'n' elements in an array. (08 Marks)
- b. Implement priority queues using structure. (12 Marks)
- 4 a. What is a linked list? Name the different types of lists and state the advantages of linked lists over arrays. (08 Marks)
- b. Implement a program to insert an item at the specified position and display the contents of circular lists. (12 Marks)
- 5 a. What is a binary tree? What are the various operations that can be performed on trees? Write a function to traverse the tree in post order taking an example. (10 Marks)
- b. Define i) Acyclic graph ii) Total degree of a node. Write a function to construct the threaded binary tree. (10 Marks)
- 6 a. What is binary tree sort? Explain how you implement heap sort. (10 Marks)
- b. Write a C program to sort numbers, using address calculation sort. (10 Marks)
- 7 a. List the various searching techniques. Explain in detail the interpolation search. (10 Marks)
- b. What is hashing? Explain any two techniques for resolving hash collisions. (10 Marks)
- 8 Write short notes on:
 - a. Abstract data types
 - b. Doubly linked lists
 - c. Conversion and evaluation of expressions using trees.
 - d. Applications of sorting and searching techniques. (20 Marks)

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