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06CS35

Third Semester B.E. Degree Examination, June-July 2009
Data Structures with C

Time: 3 hrs. Max. Marks:100

Note : ***1. Answer any FIVE full questions, selecting atleast TWO questions from each part.***
2. Assume missing data if any.

PART - A

1 a. What is a pointer variable? Can we have multiple pointer to a variable? Explain Lvalue and Rvalue expression. **(06 Marks)**

b. Write a note on dynamic memory allocation. **(08 Marks)**

c. Show the output of the following block.

```
Main ( )
{
        int num [5] = {3, 4, 6, 2, 1}
        int * p = num;
        int * q = num+2;
        int * r = & num [1];
        printf ("\n %d %d", num[2], *(num+2));
        printf ("\n %d %d", * p, *(p+1));
        printf ("\n %d %d", * q, *(q+1));
        printf ("\n %d %d", * r, *(r+1));
}
```

(06 Marks)

2 a. What is a structure? How it is different from array? Explain different types of structure declaration with examples and its initialization. **(08 Marks)**

b. Write a function that accepts a string and returns 1 if the string is palindrome else '0' if string is not a palindrome without using any built in function. **(06 Marks)**

c. Write a note on fseek ( ) and ftell ( ) functions. **(06 Marks)**

3 a. What is a stack? List and Implement basic operation in stack using C. **(10 Marks)**

b. Write an algorithm to evaluate a postfix expression. Trace the same algorithm with stack contents for the following expression A B C + * C B A - + * with A = 1, B = 2 , C = 3. **(10 Marks)**

4 a. Define recursion. Write a recursive function for computing n^{th} term of a Fibonacci sequence. Hence give the trace of stack contents for n = 4. **(10 Marks)**

b. What is a circular queue? Write implementation of circular queue using array. Also write following routine of circular queue.
i) Insertion ii) Deletion iii) Display. **(10 Marks)**

PART - B

5 a. What is linked list? With a neat diagram show how an element is added and removed from the front end of the list. **(10 Marks)**

b. What is a Header node? Give example with neat diagram. **(04 Marks)**

c. Write a C function insend (plist, x) to insert the element 'x' at the end of the list 'list'. **(06 Marks)**

6 a. List out the advantages and disadvantages of doubly linked list over singly linked list. **(04 Marks)**

b. Write a program to insert a given value into an ordered doubly linked list into its proper position. **(06 Marks)**

c. Write a C program to perform following operation
   i) Create a list adding nodes at front
   ii) Delete a node at given position. **(10 Marks)**

7 a. Define following terms : i) Binary tree ii) Strictly binary tree iii) Complete binary tree iv) Almost complete binary tree. **(08 Marks)**

b. Write a C routine to construct a binary search tree and check for duplicate data. Draw binary search tree constructed for following input.
14, 5, 6, 2, 18, 20, 16, 18, -1, 21. **(12 Marks)**

8 a. Draw a binary tree for the following expression 3 + 4 * (6 – 7) / 5 + 3. Traverse above constructed tree using pre order and post order. **(06 Marks)**

b. Write a C function that accepts a pointer to a binary tree and a pointer to a node of the tree and returns the level of the node in the tree. **(06 Marks)**

c. What do you mean by a threaded binary tree? Discuss the impact of such a representation on tree traversal procedure. **(08 Marks)**

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