SHIVAJI COLLEGE ,UNIVERSITY OF DELHI
DEPARTMENT OF COMPUTER SCIENCE
INTERNAL ASSIGNMENT
(Academic Year 2023-2024)

Name of the course : Bsc. (PS) with Computer Sc. Semester : IV
Name of the paper : Data Structures Max. Marks : 25
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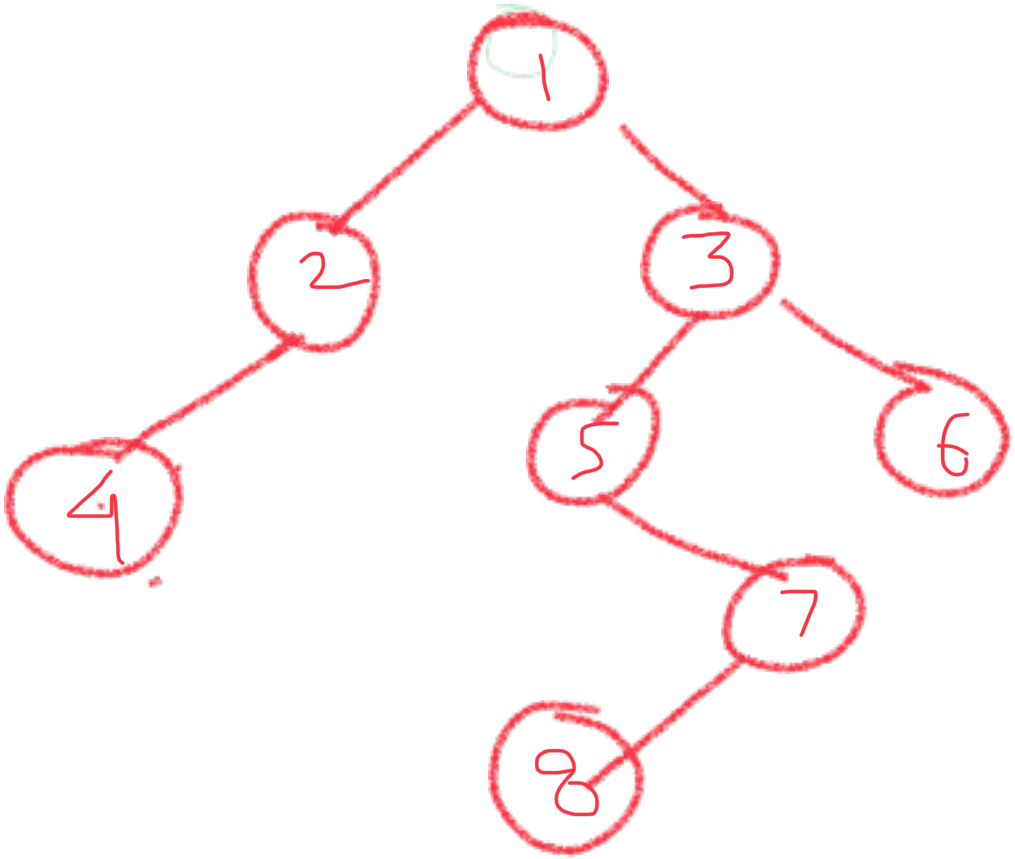
Q1. State true or false :

1. QUEUES use the LIFO method of access
2. A Doubly linked List uses more space than a Singly Linked List
3. Implementation of Bubble sort involves successively dividing the list into two halves
4. The arithmetic expression that uses parenthesis to define the order of evaluation is POSTFIX.
5. The nodes of a tree that have no children are called INTERNAL nodes.
6. A priority Q reorders the elements after each addition.
7. Nodes of a Strictly Binary Tree May have 0 1 or 2 children.
8. Selection Sort considers a portion of the array to be sorted and one by one places elements from the unsorted portion to the sorted portion.

Q2. (a) Construct a Binary Search Tree by successive insertion of the following keys showing the tree after each insertion :
27, 13, 89, 56, 34, 8, 67, 16, 4, 91

(b) Perform Inorder , Preorder and Postorder Traversals on the following Binary Tree :



Q3. Convert the following infix expression to postfix expression using a stack
Show each step
(2 * 6 + 6)/ (3 + 5 - 2)

(b) solve the following postfix expression using a stack
. Show the position of stack at every step

5 3 + 6 2 / * 3 5 * +

Q4. Write the recursive function for calculating the factorial of a number.
Now write a main program to call this function to print a table of factorials of 4 to 15
Take snapshots of program and the output.

Q5. Give the formula and calculate the address of the element A[2][4] of the 2D array defined as:
int A[6][6], if the elements are stored in:

i. Row major order

ii. Column major order

The beginning address of the array is 100 and Every element requires 4 bytes of storage.

Q6. Sort the following Data using insertion sort and selection sort
44 , 23, 51, 5, 61, 89, 2, 55
Show each iteration and report the number of comparisons in each case

Q7. (a) Write the class definition of the node of a doubly linked list.
(b) write a function to reverse a singly linked list. The function takes head
Of the list as a parameter .
(c) What operation does the following code perform on a singly linked list accessed by
the node pointer head. Explain how

```
int test ()
{ int temp;
  for ( node*temp=head, a=0;temp!=0;temp = temp -> next, a++);
  return a ;
}
```

(Preeti Sharma)