

KATHMANDU UNIVERSITY  
End Semester Examination [C]  
January, 2018

Marks scored:
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Level : B.Sc.  
Year : II

Course : COMP 202  
Semester: I

Exam. Roll No:

Time: 30 mins.

F.M. : 10

Registration No.:

Date JAN 17, 2018

SECTION "A"

[20 Q.×0.5=10 marks]

Tick (✓) the correct answer(s).

1. In an ordinary queue we can insert items from .....  
 front                       rear                       front and rear                       from the middle
  
2. Maintain the hierarchy from top to bottom concerning the tree.  
 leaf nodes, internal nodes, root                       internal nodes, root, leaf nodes  
 root, internal nodes, leaf nodes                       root, leaf nodes, internal nodes
  
3. A linked-list is a collection of records, called .....  
 vertices                       leafs                       branches                       nodes
  
4. The postfix expression for the given infix expression is :  $(a + b) * (c - d)$   
 a b c d + \* -                       + \* - a b c d                       a b + c d - \*                       a b c + d - \*
  
5. What does the following piece of code do?  

```
void func(Tree root)
{
    func(root.left());
    func(root.right());
    printf(root.data());
}
```

 Preorder traversal                       Inorder traversal  
 Postorder traversal                       Level order traversal Merge sort uses
  
6. In a complete binary tree if number of internal nodes is I, then numbers of leaves L are?  
  $L = 2I$                         $L = I + 1$                         $L = I - 1$                         $L = 2I - 1$
  
7. Here is an infix expression:  $4 + 3 * (6 * 3 - 12)$ . Suppose that we are using the usual stack algorithm to convert the expression from infix to postfix notation. The maximum number of symbols that will appear on the stack AT ONE TIME during the conversion of this expression is .....  
 1                       2                       3                       4
  
8. Consider the following operation performed on a stack of size 5.  
 Push (1); Pop (); Push (2); Push (3); Pop (); Push (4); Pop (); Push (5);  
 After the completion of all operation, the numbers of elements present in stack are  
 1                       2                       3                       4
  
9. What is the result after post order traversal in the given tree in Fig. 1?  
 EBACFD                       EBFDC A  
 ABECFD                       EFDBCA

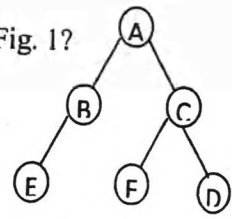
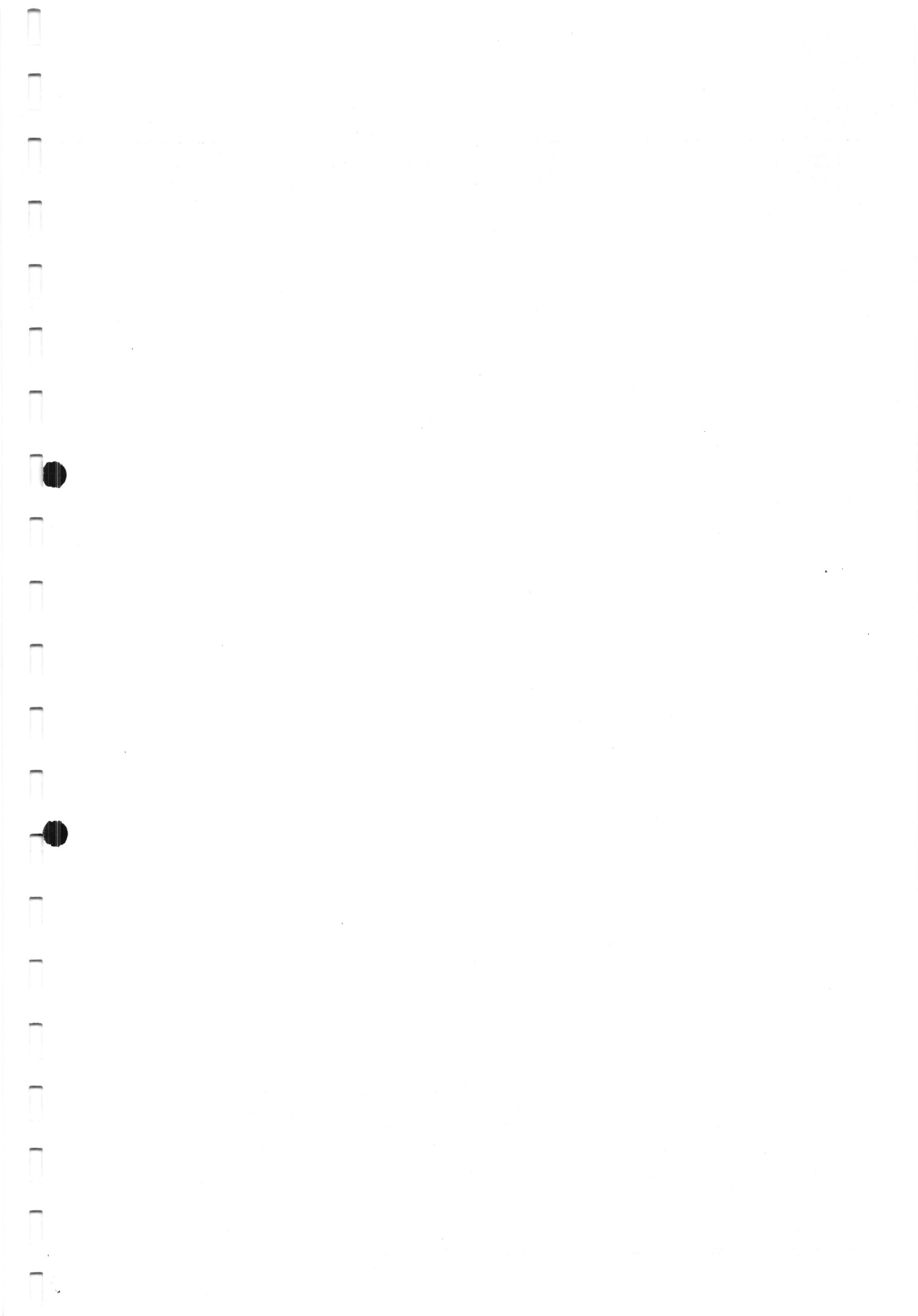


Fig. 1



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18. In delete operation of BST, we need inorder successor (or predecessor) of a node when the node to be deleted has both left and right child as non-empty. Which of the following is true about inorder successor needed in delete operation?
- Inorder Successor is always a leaf node
  - Inorder successor is always either a leaf node or a node with empty left child
  - Inorder successor may be an ancestor of the node
  - Inorder successor is always either a leaf node or a node with empty right child
19. What does the following function do for a given Linked List with first node as head?
- ```
void fun1(struct node* head)
{
    if(head == NULL)    return;
    fun1(head->next);
    printf("%d ", head->data);
}
```
- Prints all nodes of linked lists
  - Prints all nodes of linked list in reverse order
  - Prints alternate nodes of Linked List
  - Prints alternate nodes in reverse order
20. In the given list what time does the linear search take to find 7?
- ```
int num[] = {7, 14, 15, 20, 67, 85, 94};
```
- $O(n)$                         $O(1)$                         $O(n^2)$                         $O(n \log n)$



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Semester: I  
F.M. : 40

SECTION "B"  
[6 Q.×4=24 marks]

Attempt any *SIX* questions.

1. Convert the following infix notation to postfix notation. Show step by step process. [2+2]
  - a)  $(A + B) * C / D$
  - b)  $(A + B) * C / D + E ^ F / G$
2. Briefly discuss on array based and linked list based implementation of a stack data structure. [2+2]
3. Consider a circular linked list storing integer value in each node. A pointer *list* is pointing to any node in that circular linked list. Write an algorithm or pseudo code or program to find the sum of all values in that circular linked list.
4. What do you understand by Collision in Hashing? Discuss different types of collision resolution techniques. [1+3]
5. Consider a binary search tree (BST) whose elements are the integer values. Starting with an empty BST, show the effect of successively adding the following values: [2+2]  
20, 10, 30, 40, 12, 24, 56, 9, 7, 18, 15, 16, 17, 20  
Also show the effect of successively deleting 12 and 18.
6. What do you mean by a Graph? Briefly discuss methods of graph representation. Illustrate with examples and necessary figures. [1+3]
7. What is a Binary Tree? List out the traversal methods in a Binary Tree with examples. [1+3]

SECTION "C"  
[2 Q.×8=16 marks]

Attempt any *TWO* questions.

8. Discuss the partition strategy for Quick Sort and Merge sort algorithm. How is divide and conquer approach different than linear sorting? [6+2]
9. Define data structure and also mention its importance. Explain the types of structured data types. Briefly discuss abstract data type and time complexity. [2+2+2+2]
10. Write short notes on: [4 Q.×2=8]
  - a. Quadratic Probing
  - b. Queue linked list
  - c. Postfix expression evaluation using a STACK
  - d. Insertion algorithm in Binary Search Tree

