

KATHMANDU UNIVERSITY
End Semester Examination
August/September, 2017

Mark Scored:

Level : B. Sc.
Year : II

Course : COMP 202
Semester : I

Exam Roll No. :

Time: 30 min

F. M. : 10

Registration No.:

Date SEP 12 2017

SECTION "A"

[20 Q × 0.5 = 10 marks]

Tick (✓) the correct answer(s) or fill the blanks with most appropriate word/phrase.

1. What is the postfix form of the expression $(A + B) * (C * D - E) * F / G$?
 $AB + CD * E - FG / **$ $AB + CD * E - F ** G /$
 $AB + CD * E - * F * G /$ $AB + CDE * - * F * G /$
2. In linear search algorithm the worst case occurs when
 The item is somewhere in the middle of the array
 The item is not in the array at all
 The item is the last element in the array
 The item is the last element in the array or is not there at all
3. What does Merge sort use?
 divide-and-conquer Backtracking
 heuristic approach Greedy approach
4. A variable P is called pointer if
 P contains the address of an element in DATA
 P points to the address of first element in DATA
 P can store only memory addresses
 P contains the DATA and the address of DATA
5. The in order traversal of tree will yield a sorted listing of elements of tree in
 Binary trees Binary search trees Heaps Expression Trees
6. If every node u in G is adjacent to every other node v in G, A graph is said to be
 isolated complete finite strongly connected
7. Assume that the operators +, -, X are left associative and \wedge is right associative. The order of precedence (from highest to lowest) is \wedge , X, +, -. The postfix expression corresponding to the infix expression $a + b X c - d \wedge e \wedge f$ is
 $a b c X + d e f \wedge \wedge -$ $a b c X + d e \wedge f \wedge -$
 $b + c X d - e \wedge f \wedge$ $- + a X b c \wedge \wedge d e f$
8. Suppose we are sorting an array of eight integers using quick sort, and we have just finished the first partitioning with the array looking like this: 2 5 1 7 9 12 11 10 which statement is correct?
 The pivot could be either the 7 or the 9
 The pivot could be the 7, but it is not the 9
 The pivot is not the 7, but it could be the 9
 Neither the 7 nor the 9 is the pivot.
9. The condition $top = -1$ indicates that
 Stack is empty Stack is full
 Stack has only one element None of these

10. If the sequence of operations push(1), push(2), pop(), push(1), push(2), pop(), pop(), pop(), push(2), pop() are performed on a stack, the sequence of popped out values are ?
 2 2 1 2 2 2 2 1 1 2 2 1 2 2 1 2 1 2 2 2
11. To delete an item in the middle of a circular doubly linked list, _____ no. of points to be manipulated
 2 4 6 8
12. A linear list of elements in which deletion can be done from one end (front) and insertion can take place only at the other end (rear) is known as?
 Queue Stack Tree Linked list

13. 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

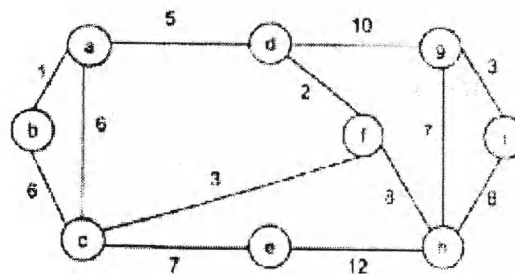
14. What is the output of following function for start pointing to first node of following linked list?

1->2->3->4->5->6

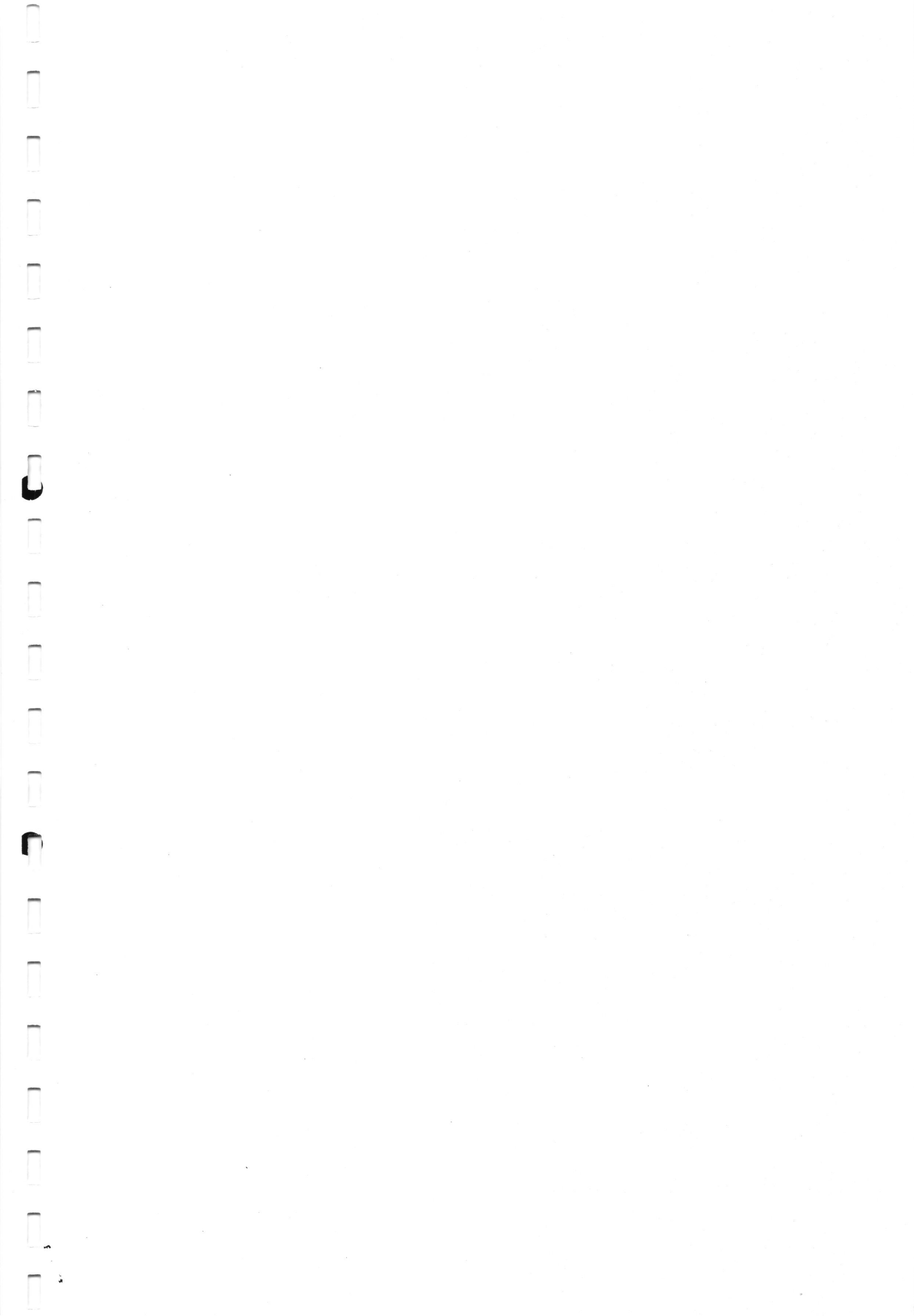
```
void fun(struct node* start)
{
    if(start == NULL) return;
    printf("%d ", start->data);
    if(start->next != NULL )
        fun(start->next->next);
    printf("%d ", start->data);
}
```

- 1 4 6 6 4 1 1 3 5 1 3 5 1 2 3 5 1 3 5 5 3 1

15. For the undirected, weighted graph given below, which of the following sequences of edges may represents a correct execution of Prim's algorithm to construct a Minimum Spanning Tree?



- (a, b), (d, f), (f, c), (g, i), (d, a), (g, h), (c, e), (f, h)
 (c, e), (c, f), (f, d), (d, a), (a, b), (g, h), (h, f), (g, i)
 (d, f), (f, c), (d, a), (a, b), (c, e), (f, h), (g, h), (g, i)
 (h, g), (g, i), (h, f), (f, c), (f, d), (d, a), (a, b), (c, e)



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SECTION "B"

[6 Q. × 4 = 24 marks]

Attempt *ANY SIX* questions.

1. Trace quick sort on the array $L = \{35, 18, 67, 10, 7, 78, 99, 12, 80, 100\}$. Show the first partition and second partition results.
2. What is Binary Search? How can you perform binary search over the data stored in an array? In what way it is different from Binary Search Tree?
3. Compare adjacency matrix representation with adjacency list representation. Define the terms path and acyclic graph.
4. Write down the algorithm to evaluate postfix expression. Trace a postfix expression as an example.
5. Discuss linear queue as an abstract data type. How can you handle problems of linear queue?
6. Trace to find minimum spanning tree using Prim's algorithm for figure 1. In what way it is different from Kruskal's algorithm?

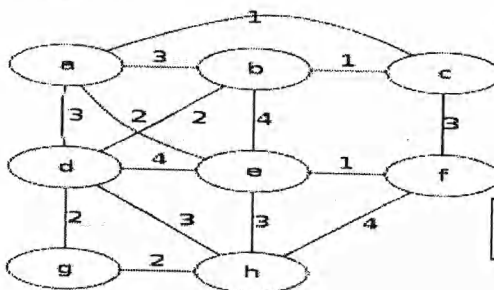


Figure 1

7. What is asymptotic analysis? Explain the use of Big – oh notation in analyzing algorithm.

SECTION "C"

[8 Q. × 2 = 16 marks]

Attempt *ANY TWO* questions.

8. Discuss the techniques to sort elements using selection sort and insertion sort. [4+4]
9. Write down the algorithm to delete elements in a Binary Search Tree. Discuss all the possible cases to delete the elements of nodes. Discuss post-order algorithm with a suitable binary tree. [5+3]
10. How can you implement insertion and deletion on doubly linked list? Discuss, how can you reverse the DLL? [6+2]

