Final Assessment Test – May 2024

VIT® Vellore Institute of Technology

Course: ISWE102L - Data Structures and Algorithms

Class NBR(s): 3050 / 3062 / 3066 Slot: G2+TG2

Time: Three Hours Max. Marks: 100

- KEEPING MOBILE PHONE/ELECTRONIC DEVICES EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
- DON'T WRITE ANYTHING ON THE QUESTION PAPER

Answer any TEN Questions

(10 X 10 = 100 Marks)

1. Convert the given infix expression in to prefix expression using stack. Write the routine to implement infix to prefix.

   Infix expression: ((A+B)*(C-D)/E+F)

2. Write the pseudocode and perform the following operations on circular queue.
   a) Enqueue()
   b) Dequeue()
   c) Isempty()
   d) Isfull()

3. Explain the following operations on singly linear linked list with neat diagram.
   i) Insertion
   ii) Deletion
   iii) Display
   iv) Find min (find the minimum value)

4. You are given two polynomial equations p1 and p2 having terms n and m respectively. Write a function to perform polynomial addition. Give example.

5. Find the recurrence relation of the following function. For the obtained recurrence relation use substitution method to find its time complexity and also verify the time complexity using tree method.

```
void test(int n)
{
if(n>0)
{
for(i=0;i<n;i=i*2)
printf("%d",i);
}
test(n-1);
}
```

6. Construct binary search tree for the following input and determine its in-order, pre-order and post-order traversals and also write its routine.

   100, 76, 11, 35, 86, 25, 6

7. Show the step by step working of binary search for the following input and write down its recurrence relation and time complexity analysis in detail.

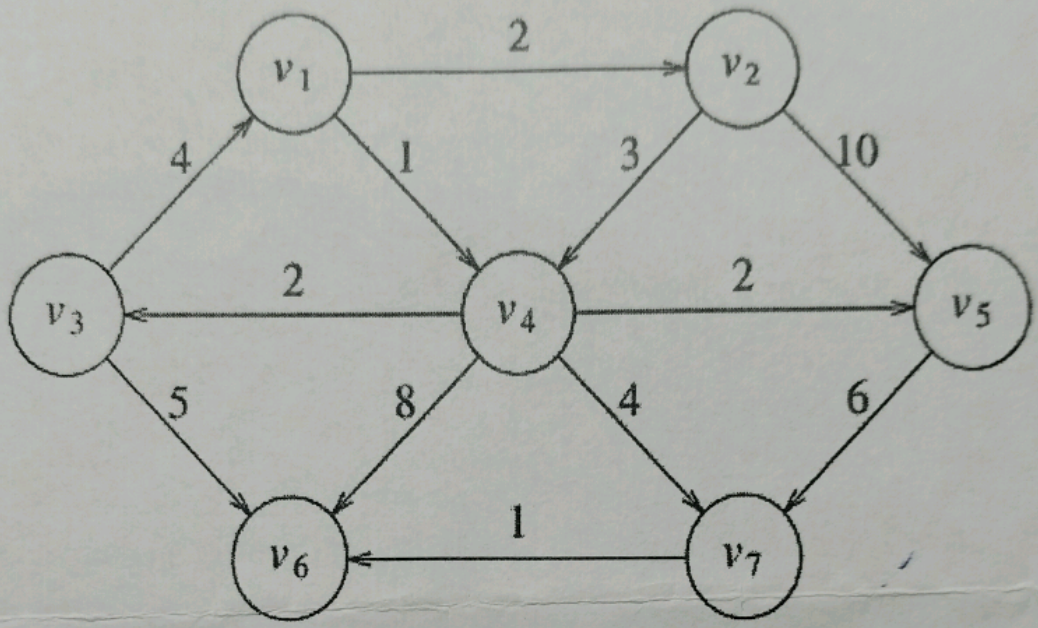
   35, 45, 60, 90, 100, 120, 222

8. Apply shell sort to arange the following data sequence. Write down the step by step working of shell sort and also write its routine.

100, 95, 90, 85, 80, 75, 70, 65, 88, 77, 55

9. Explain in detail about Prim's minimum spanning tree algorithm with your own example and also explain how it can be used for finding maximum spanning tree.

10. Find the shortest path for the following graph using Dijkstra's algorithm. Assume the source vertex is v1.



11. What are the steps involved in divide and conquer technique. Explain how quick sort will sort the following elements in ascending order and also write its routine.

54, 100, 98, 6, 2, 99, 112

12. What is collision? Explain different types of collision techniques with your own example.

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