Reg. No. : | | | | | | | | | | |

Question Paper Code: 12033

M.E. DEGREE EXAMINATION, MAY 2014.

First Semester

Computer Science and Engineering

01PCS102 – ANALYSIS OF ALGORITHMS AND DATA STRUCTURES

[Common to Computer Science and Engineering (with Specialization in Networks)]

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. List the steps to transform a forest into a binary tree.
2. Define Big Omega Notation.
3. Write the steps to delete an arbitrary node b from F-Heap.
4. Mention the properties of deap structure.
5. Specify the characteristics of a AVL tree.
6. How do you calculate the total cost of a binary search tree?
7. List the variants of convex hull problem.
8. Let n = 4, $(p_1, p_2, p_3, p_4) = (100,10,15,27)$ and $(d_1, d_2, d_3, d_4) = (2,1,2,1)$. List feasible solutions to sequence the jobs.
9. Distinguish preemptive and non preemptive scheduling.
10. What is m-colorability decision problem?

PART - B (5 x 14 = 70 Marks)

11. (a) Write a code to insert and delete a node from circular doubly link list. Illustrate with an example. (14)

Or

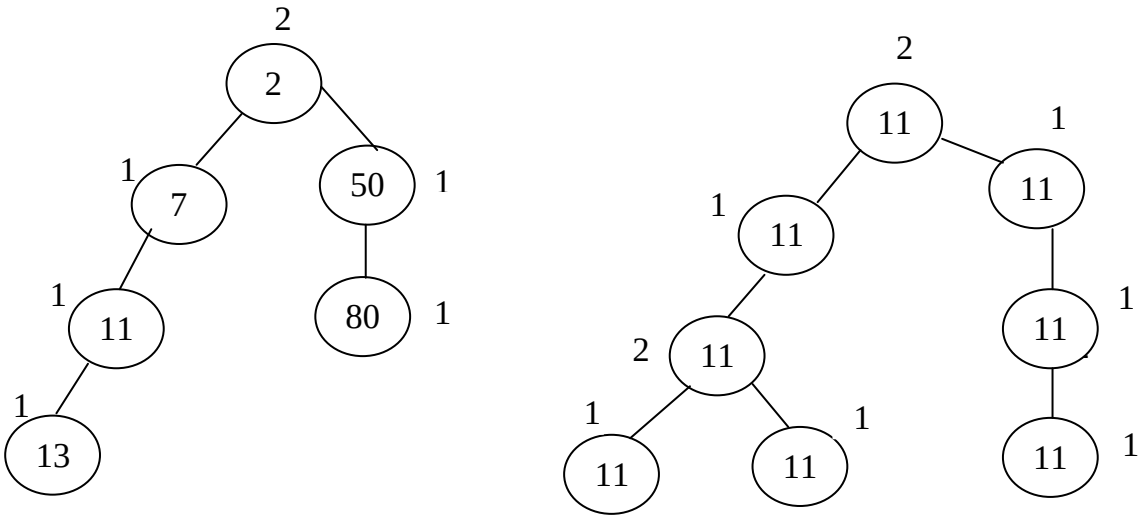
(b) (i) State the relation among P, NP and NPC. (7)

(ii) Write a non deterministic sorting algorithm to sort the list of numbers. (7)

12. (a) Write a C++ template definition for FibonacciNode and FibonacciHeap. (14)

Or

(b) Merge the two minleftlist and generate a minleftlist tree. (14)



13. (a) Write an algorithm to split an AVL tree into two AVL tree such that all identifiers in one tree are <=x and all those in the other are >x. (14)

Or

(b) (i) Write a pseudo code to insert node z into a red-black tree T. Assume the key value already have filled into the tree T. (7)

(ii) Show the resultant red-black tree after successively insert the keys 41, 38, 31, 12, 19, 8 into an initial empty red-black tree. (7)

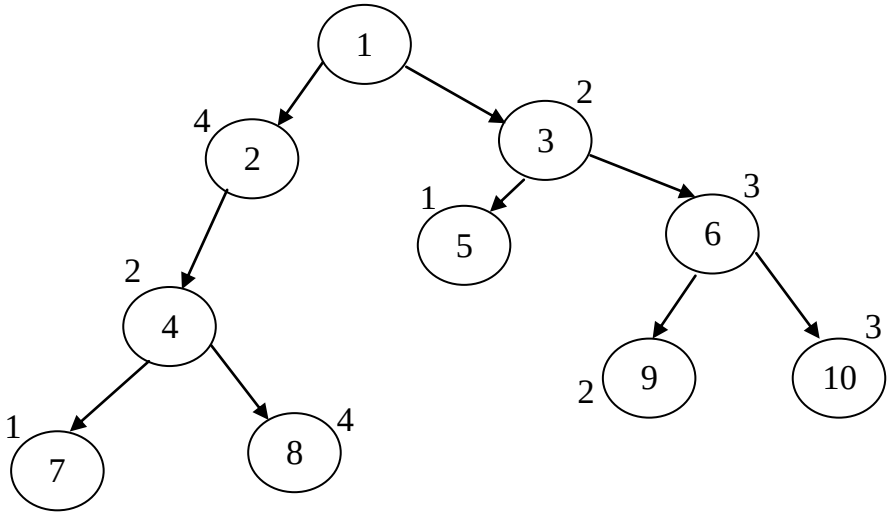
14. (a) (i) An array A consists of 13, 19, 9, 5, 12, 8, 7, 4, 21, 2, 6, 11. Sort the elements using quick sort. (10)

(ii) Calculate the computing time of product of two n*n matrices, multiplied by using Strassen's matrix multiplication. (4)

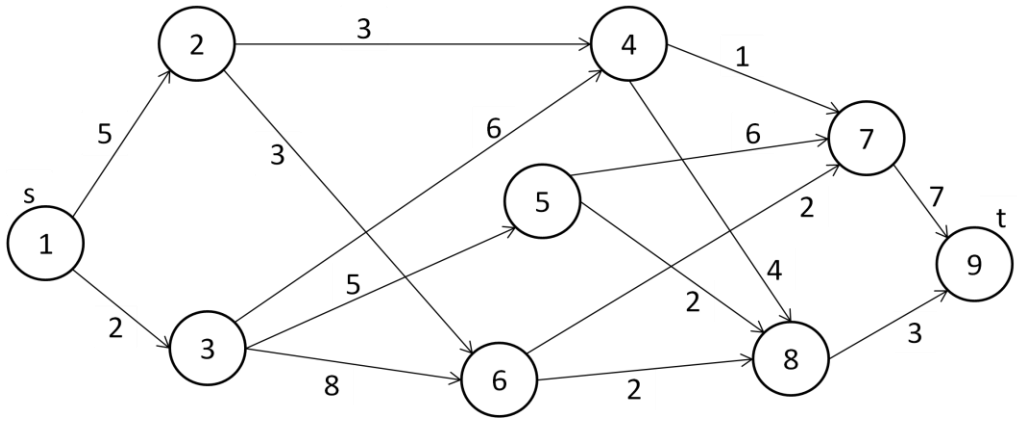
Or

(b) (i) Find an optimal placement for 13 programs on three tapes T1, T2, T3 where the length of programs are 12, 5, 8, 32, 7, 5, 18, 26, 4, 3, 11, 10 and 6. (5)

(ii) Show resultant TVSP when S = 4. (9)



15. (a) (i) Find a minimum cost path from s to t in the following multistage graph using forward approach. (10)



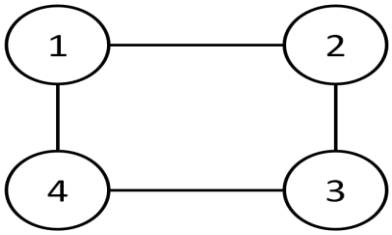
(ii) Generate the sets s^i, $0 \leq i \leq 4$, when $(w_1, w_2, w_3, w_4) = (10, 15, 6, 9)$ and $(p_1, p_2, p_3, p_4) = (2, 5, 8, 1)$. (4)

Or

(b) Illustrate how to implement a knapsack problem using back tracking. (14)

PART – C (1 X 10 = 10 Marks)

16. (a) Draw a state space tree for the following graph where m = 2. (10)



Or

(b) What is splay tree? Perform the operations on the following splay tree

(i) Insert 27, 37
(ii) Delete 29
(iii) Split 40. (10)