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Total Number of Pages : 01

M.TECH

AR-19

M.TECH 1<sup>ST</sup> SEMESTER EXAMINATIONS NOV/DEC 2019

CSE, MPCCS1020

ADVANCED DATA STRUCTURES

Time: 3 Hours

Max Marks : 70

The figures in the right hand margin indicate marks.

PART-A

(10 X 2=20 MARKS)

1. Answer the following questions.

- a) What is a stack? Explain their applications.
- b) Describe the representation of a linked list in memory.
- c) Compute the maximum height of an AVL tree with p nodes?
- d) Mention deferent representation of a graph.
- e) What is a spanning tree?
- f) What is a Red-Black tree?
- g) Describe sorting process on a tape.
- h) What is a skip list?
- i) How sets are different from dictionary?
- j) What is external sorting?

PART-B

(5 X 10=50 MARKS)

Answer any five questions from the following.

- 2. a. Analyze the  $\Theta$  - notation for the function given as :  $f(n) = 5n^3 + n^2 + 3n + 2$  [5]
- b. Construct the AVL tree for the following; [5]  
34, 67, 23, 15, 45, 37, 28, 9, 13.
- 3. a. Explain Radix sorting with an example? [5]
- b. What is skip lists? Discuss with examples [5]
- 4. a. Explain different memory allocation and garbage collection methods in data structure [5]
- b. A file of 6000 records is to be sorted. It is stored on a tape and the block length is 500. The main memory. Can sort up to a 1000 records at a time. We have in addition 4 search tapes T1 -T4. Find out the time taken by the sorting method on the tapes. [5]
- 5. a. Show the result of inserting 13,11,4,16,19,12,5,7,3,8 into an initially empty 2-3 tree? Show the result after each insertion? Also show the result after deletion of the root? [5]
- b. Design an algorithm to insert a node in a single linked list [5]
- 6. a. Analyze the  $\Theta$  - notation for the function given as  $f(n) = 5n^3 + n^2 + 3n + 2$  [5]
- b. Describe the time complexity of the following program: [5]  
int i ,n;  
for (i=0;i<n;i++)  
print(i);
- 7. a. Explain Bucket sort with an example? [5]
- b. Describe the insertion process in a 2-3 tree [5]
- 8. Write a short note on [5 X 2 =10]
- a. Huffman Code
- b. Knuth-Morris-Pratt Algorithm