 End Sem (II) – MCA (VIII)

2017

TIME: 3 HOURS

FULL MARKS: 70

Group – A

1. State whether the following statements are **True** or **False**: 1 x 15 = 15
    a. The average-case running time of an algorithm is an upper bound on the running time for any input.
    b. Small omega notation provides as asymptotically tight bound for f (n).
    c. Lower bound is the index of the last element in an array.
    d. The size of a linked queue cannot change during run time.
    e. Postfix operation does not follow the rules of operator precedence.
    f. Binary tree of **n** nodes has exactly n-1 edges.
    g. A B+ tree stores data only in i-nodes.
    h. In a min-heap the root node has the highest key value in the heap.
    i. Dangling pointers bugs are often encountered when memory allocated to a variable is freed but there are still pointers pointing to it.
    j. A binary file is more efficient than a text file.
    k. In-degree of a node is the number of edges leaving that nodes.
    l. A directed graph that has no cycles is called a directed acyclic graph.
    m. Selection sort has a linear running time complexity.
    n. Heap sort is an efficient and a stable sorting algorithm.
    o. Linear search is performed on a sorted array.

Group – B

Answer any **five** questions of the following: 5 x 4 =20

2. How will you express the time complexity of a given algorithm?
3. How is a two dimensional array represented in the memory?
4. What do you understand by pattern matching? Give an algorithm for it.
5. What are the two ways of representing binary trees in the memory? Which one do you prefer and why?
6. Differentiate depth-first search and breadth first search traversal of a graph.
7. Explain the difference between bubble sort and quick sort with an example.
8. What do you understand by a hash function? Give the properties of a good hash function.

Group – C

Answer any **five** questions of the following: 7 x 5 = 35

9. How does a stack implemented using a linked list differ from a stack implemented using an array.
10. Write a program to print the total number of occurrences of a given item in the linked list.
11. Why threaded binary trees are called efficient binary trees? Give the merit of using a threaded binary tree.
12. Sort the elements. 77, 49, 25, 12, 9, 33, 56, 81 using bubble sort.
13. Write a program in C to search an elements using binary search technique. The elements should be entered through keyboard.
14. Write sort notes on any **two** of the following:
    a. Dynamic memory management
    b. Path matrix
    c. Abstract data type
15. Why does storing of sparse matrices need extra consideration? How are sparse matrices stored efficiently in the computer's memory?

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