

CS – 207: Data Structures & Programming Methodologies

Paper ID-A0454

Time: 3 Hrs

Total Marks: 60

Note: Section A is compulsory. Attempt any four questions from Section B and any two questions from Section C .

Section A

2*10=20

- Q1. a) What do you mean by sparse matrix?
b) How records are maintained in memory?
c) How insertion takes place in queues?
d) What are circular link lists?
e) List benefits of recursion.
f) Why hashing is needed?
g) What are limitations of an array as a data structure?
h) How trees are represented in memory?
i) Define the term complete binary trees.
j) What are adjacency matrices?

Section B

5*4=20

- Q2. Convert the infix notation $1 + (2/3 - (4 * 5/6) / 7) / 8$ into postfix notation.
Q3. Write an algorithm to insert a node into a link list before a given node.
Q4. Write the an algorithm for
a) Finding Factorial of a number
b) Generating Fibonacci sequence up to a particular number
Q5. How Files are maintained in memory? Discuss various operations that can be performed on files.
Q6. What do you mean AVL trees? Explain the need of AVL trees.

Section C

2x10=20

- Q7. a) What is pattern matching? Write an algorithm that demonstrates pattern matching with the help of suitable code fragments.
b) What are queues and their applications? Write an algorithm to demonstrate insertion of a node in a queue.
Q8. What is depth first search? Write an algorithm with the help of a suitable example for depth first search.
Q9. What are Heaps and their advantages? Explore heapsort with an example.