

SECOND SEMESTER B.Sc. DEGREE EXAMINATION, MAY 2014

(U.G.—CCSS)

Core Course

Computer Science

CS 2B 03—DATA FILE STRUCTURES

(2012 Admission onwards)

Three Hours

Maximum : 30 Weightage

I. Answer all *twelve* questions :

- 1 _____ is an example for a non-linear data structure.
 - (a) Stacks.
 - (b) Arrays.
 - (c) Trees.
 - (d) Linked list.
- 2 The operation of finding the location of the record with a given key value is termed as _____.
 - (a) Sorting.
 - (b) Searching.
 - (c) Traversing.
 - (d) Merging.
- 3 Data elements should be sorted before performing :
 - (a) Linear search.
 - (b) Binary search.
 - (c) Indexing.
 - (d) Hashing.
- 4 The number of elements of an array $a[1 : n]$ could be determined by :
 - (a) $(n + 1 + 1)$.
 - (b) $(n - 1 - 1)$.
 - (c) $(n - 1 + 1)$.
 - (d) $(n - 1 + 2)$.
- 5 The prefix form of the expression $(A * B - C)$ is _____.
 - (a) $ABC*-$.
 - (b) $*-ABC$.
 - (c) $*AB-C$.
 - (d) $-*ABC$.

Turn over

- 6 In a queue the elements are removed from _____.
- (a) Rear. (b) Top.
(c) Front. (d) End.
- 7 The ability of a function to call itself is known as _____.
- 8 In a linked list, the linear order of nodes is implemented by means of _____.
- 9 In row major order representation of a two dimensional array A, the address of $(i, j)^{\text{th}}$ element is calculated as _____.
- 10 A linked list with two links each pointing to the predecessor and successor of a node is known as _____.
- 11 A binary tree which is dominated solely by the left child nodes or right child nodes is called _____.
- 12 A complete graph with n vertices will have _____ number of edges.
($12 \times \frac{1}{4} = 3$ weight)

II. Answer all *nine* questions :

- 13 Define Data Structure.
- 14 List various operations supported by a one dimensional array.
- 15 Define a sparse matrix.
- 16 How do you represent a stack in C ?
- 17 Define a dequeue.
- 18 What is the complexity of Quick Sort algorithm ?
- 19 What are the different ways of representing a graph in computers memory ?
- 20 Define a complete binary tree.
- 21 Name any *two* popular hash functions used for hashing.
($9 \times 1 = 9$ weight)

III. Answer any *five* questions :

- 22 Briefly discuss about the classification of various data structures available in C.
- 23 Describe how the limitations of a queue are handled in a circular queue ?
- 24 Explain how PUSH and POP operations are performed on a STACK ?

- 25 Write an algorithm to implement Binary search.
- 26 Write function to add a new node at the specified location of a singly linked list.
- 27 Write a non-recursive algorithm to implement pre-order traversal in binary tree.
- 28 Explain with example, the Kruskal's algorithm to find the minimum cost spanning tree.
(5 × 2 = 10 weightage)

32. Answer any two questions :

- 29 Write an algorithm to evaluate an arithmetic expression using Stack and show how the expression $3 \times (5 - 3)$ will be evaluated.
- 30 Write a program in C to add two sparse matrices.
- 31 Write short notes on :
- (a) Dijkstra's algorithm to find the shortest path from a specified vertex to another specified vertex of a Graph.
- (b) AVL trees.

(2 × 4 = 8 weightage)