NEW

2018

BCA

2nd Semester Examination

DATA STRUCTURE

PAPER—1202

Full Marks : 100

Time : 3 Hours

The figures in right-hand the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Answer Q. No. *1* and any *four* from the rest.

1. Answer any *five* questions.　　　　5×2

   (a) Differenciate between linear and non-linear data structure. Give one example of each type.

   (b) What is AVL tree. Give one example.

(c) Define priority queue.

(d) What do you mean by big-Oh notation in respect to performance analysis of algorithm.

(e) Write the equivalent prefix expression of the following arithmetic expression :

$$\{(a * b) - d\} / e$$

(f) Write the names of two different techniques to represent an undirected graph.

(g) When does collision occur in hashing ?

(h) What is Double Ended Queue ?

2. Name one sorting technique that are recursive in nature and using this techinque sort the following list. Clearly show the algorithmic steps.

$$⑮ ⑤ ⑲ ⑨ ② ⑧ ① ⑥ ⑬ ⑪$$

Compute the complexity of your algorithm.   15

3. (a) Write an algorithm to evaluate a postfix expression. Trace the same algorithm with stack contents for the following expression :

$ABC + *CBA - + *$ with $A = 1$, $B = 3$, $C = 5$.

NEW

2018

BCA

2nd Semester Examination

DATA STRUCTURE

PAPER—1202

Full Marks : 100

Time : 3 Hours

The figures in right-hand the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Answer Q. No. *1* and any *four* from the rest.

1. Answer any *five* questions.   5×2

   (a) Differenciate between linear and non-linear data structure. Give one example of each type.

   (b) What is AVL tree. Give one example.

(c) Define priority queue.

(d) What do you mean by big-Oh notation in respect to performance analysis of algorithm.

(e) Write the equivalent prefix expression of the following arithmetic expression :

$$\{(a * b) - d\} / e$$

(f) Write the names of two different techniques to represent an undirected graph.

(g) When does collision occur in hashing ?

(h) What is Double Ended Queue ?

2. Name one sorting technique that are recursive in nature and using this techinque sort the following list. Clearly show the algorithmic steps.

$$\textcircled{15} \ \textcircled{5} \ \textcircled{19} \ \textcircled{9} \ \textcircled{2} \ \textcircled{8} \ \textcircled{1} \ \textcircled{6} \ \textcircled{13} \ \textcircled{11}$$

Compute the complexity of your algorithm. **15**

3. (a) Write an algorithm to evaluate a postfix expression. Trace the same algorithm with stack contents for the following expression :

$ABC + *CBA - + * $ with $A = 1, B = 3, C = 5$.

(b) What is sparse matrix ? How can be store sparse matrix in computer memory ?   10+(2+3)

4. (a) What do you mean by a complete binary tree ?

(b) Explain the need of a height-balance tree ?

(c) Write the recursive algorithm for post-order traversal of a binary tree.

(d) Write an algorithm to delete a node from a binary search tree.   2+4+4+5

5. (a) Explain the adjacency matrix representation of a graph with an example.

(b) Explain the BFS algorithm for graph traversal with an example.

(c) What do you mean by B-tree ?   5+6+4

6. (a) How can we represent a polynomial ?

(b) Show the implementation of a queue using stack(s).

(c) When do we call a binary tree as AVL tree ?

(d) Give an example of AVL tree of height three.   4+6+3+2

(Turn Over)

7. (a) Define Stack. How is it different from Queue ?

   (b) What is a Priority Queue ?

   (c) Write an algorithm to concatenate two singhy linked lists.

   (2+3)+3+7

8. Write short notes (any *three*) : 3×5

   (a) Degree.

   (b) Circular linked list.

   (c) One Technique for collision handling.

   (d) B^+ tree.

[Internal Assessment—30 Marks]

————

(b) What is sparse matrix ? How can be store sparse matrix in computer memory ?   10+(2+3)

4. (a) What do you mean by a complete binary tree ?

(b) Explain the need of a height-balance tree ?

(c) Write the recursive algorithm for post-order traversal of a binary tree.

(d) Write an algorithm to delete a node from a binary search tree.   2+4+4+5

5. (a) Explain the adjacency matrix representation of a graph with an example.

(b) Explain the BFS algorithm for graph traversal with an example.

(c) What do you mean by B-tree ?   5+6+4

6. (a) How can we represent a polynomial ?

(b) Show the implementation of a queue using stack(s).

(c) When do we call a binary tree as AVL tree ?

(d) Give an example of AVL tree of height three.   4+6+3+2

7. (a) Define Stack. How is it different from Queue ?

   (b) What is a Priority Queue ?

   (c) Write an algorithm to concatenate two singhy linked lists.

   (2+3)+3+7

8. Write short notes (any *three*) :   3×5

   (a) Degree.

   (b) Circular linked list.

   (c) One Technique for collision handling.

   (d) B$^+$ tree.

[Internal Assessment—30 Marks]

———