

Data Structures II CSE (A,B,C,D)

Model Paper SET 1

Part-A

Short Answers

- 1 a) What is abstract data type? What are all not concerned in an ADT?
- b) What is the advantage of linked list over arrays?
- c) Define and explain the concept of stack?
- d) What is dictionary ? Explain the method of representing dictionary?
- e) What is skip list?
- f) Define height of binary tree?
- g) How many trees are possible with 3 nodes?
- h) Distinguish between tree and graph?
- i) What are two types of sorting methods?
- j) What is the use of string matching algorithm? Also mention the names of some string matching algorithms?

Part- B

Long Answers

- 2) a) Write a pseudocode for creation of linked list
- b) Write functions and explain for push and pop operations of a stack?

OR

- 3) a) Give postfix notation for the following infix expression $A * (B + C / D + E) - F * (G / H + I)$.
- b) Explain about the operations of queue with an example?

- 4) a) Explain insertion of a node in skip list with some suitable example?

b) Explain various hashing methods in detail?

OR

5) What do you understand by collision in hashing ? Represent the following keys in memory using linear probing with or without replacement .
(24,13,16,15,19,20,22,14,17,26,84,96)?

6) a) Explain the terms — i) Leaves ii) Degree of node iii) Degree of tree iv) level of tree v) height of tree.?

b) Explain tree traversals with an example ?

OR

7) a) Create binary search tree for the following elements
(23,32,24,36,15,12,39,2,19)

b) Write a C function for searching a node from a binary tree?

8) a) Explain in detail about graph ADT?

b) What is graph ? Explain various representations of graphs?

OR

9) Explain depth first search method with suitable example?

10) a) What are the features of heap sort ?

b) Explain the concept of merge sort in detail?

OR

11) a) Explain Naive string matching algorithm with example?

b) Find the Boyer —Moore string matching algorithm for the given pattern against the text?

Model Paper SET 2

- 1.a) What is linked list? Write advantages of doubly linked list over singly linked list.
- b) What is recursion? Give the properties of a recursive definition of an algorithm.
- c) What is a stack? List the applications of stack.
- d) Show the detailed contents of stack to evaluate the given postfix expression.
 {1 2 3 + * 3 2 1 - + *}
- e) Define a graph. List different graph traversal techniques.
- f) What are binary search trees? Explain with example.
- g) What is hashing?
- h) What is sorting? What is searching?
 - i) Define AVL tree? Give example.
 - j) What is external sorting ?.

2.a) Write about stack using array with an example.

- b) Write a C program to implement insertion to the immediate left of the K^{th} node in singly linked list.

OR

3. Given an ordered linked list whose node is represented by key as information and next as link field. Write a C program to implement deleting number of nodes (consecutive) whose key values are greater than or equal to K_{\min} and less than K_{\max} .
- 4.a) Write a C program to implement multiple stacks using single array.
b) Convert the infix expression $a / b - c + d * e - a * c$ into postfix expression and

trace that postfix expression for given data $a = 6, b = 3, c = 1, d = 2, e = 4$. [5+5]

OR

- 6.a) Explain three cases for deletion of a node from binary search tree
- b) Implement Depth First Search (DFS) algorithm.

OR

- 7.a) Define a Max Heap. Construct a max heap for the following:
{12, 15, 9, 8, 10, 18, 7, 20, 25}
 - b) What is a graph? Explain various representations of graphs.
- 8.a) Write an algorithm for Heap sort.
 - b) Explain the merge sort on the following elements:
{10,5,7,6,1,4,8,3,2,9}

OR

- 9. What is collision? Explain different collision resolution techniques with examples.
- 10.a)

Build an AVL tree with the following values:

{15, 20, 24, 10, 13, 7, 30, 36, 25, 42, 29}

- b) Write Knuth-Morris-Pratt pattern matching algorithm.

OR

- 11. Write short notes on:
 - a) Red-Black trees
 - b) splay trees
 - c) b-trees.

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Data Structures

Model Paper SET 3

Part-A

Short Answers

- 1 a) List the application of stacks.
- b) Define queue full condition

- c) Define path in a tree.
- d) What is the degree of a graph?
- e) Differentiate stack and queue.
- f) List advantages of circular linked list over single linked list.
- g) Define heap.
- h) List and explain types of graphs.
- i) List advantages of linked list over arrays.
- j) What is the use of string matching algorithm? Also mention the names of some string matching algorithms?

Part- B Long Answers

2) a) Define data structure. Discuss different types of data structure their implementations applications.

b) Write an algorithm for basic operations of stack.

OR

3) a) Explain the procedure to evaluate postfix expression. Evaluate the following postfix expression $7\ 3\ 4\ +\ -\ 2\ 4\ 5\ /\ +\ * \ 6\ /\ 7\ +\ ?$

b) Explain the operations performed on simple queue with an example.

4) a) Explain insertion of a node in dictionary with some suitable example?

b) Explain any hashing function with example?

OR

5) a) Explain collision resolution techniques

b) Apply extendible hashing technique on 24,13,6,5,9,0,2,32,98,4,55,87

6) a) Explain the terms — i) Leaves ii) Degree of node iii) Degree of tree iv) level of tree v) height of tree.?

b) Explain tree traversals with an example ?

OR

- 7) a) Create AVL for the following elements (23,32,24,36,15,12,39,2,19)
b) Write a C function for searching a node from a binary search tree?
- 8) a) Explain in detail about graph ADT?
b) Explain red-black trees?

OR

- 9) Explain DFS and BFS in graph with suitable example?

- 10) a) What are the features of heap sort ?
b) Apply merge sort on 23,32,24,36,15,12,39,2,19?

OR

- 11) a) Explain KMP algorithm with example?
b) Find the Boyer –Moore string matching algorithm for the given pattern against the text?

Data Structures

Model Paper SET 4

PART- A

- 1.a) State different types of linked lists.
- b) List the different tree traversals.
- c) What is a stack? List the applications of stack.
- d) What is queue. Explain queue operations
- e) Define a graph. List different graph traversal techniques.
- f) What are binary search trees?
- g) What is collision?
- h) What is external sorting?
- i) Define AVL tree? Give example.
- j) What is the use of pattern matching algorithms.

PART-B

- 2.a) List various operations of linked list and explain how to insert a node anywhere in the list
- b) Explain the procedure to convert infix expression to postfix expression with the following expression: $((A - (B+C) * D) / (E+F))$

OR

3. a) Explain the evaluation of prefix expression. Find the equivalent prefix of $:8\ 6\ 3\ +\ * \ 1\ 2\ 3\ -/-$.
 - b) Explain basic operations of queue. List the steps to implement queue using stack.
- 4.a) Write a C program to implement dictionary.
 - b) Explain concept of skip list.

OR

5. Explain collision resolution techniques with examples.
- 6.a) Construct a binary search tree having the following traversal sequences: Preorder traversal: A B C D E F G H I
Inorder traversal: B C A E D G H F I
- b) explain splay tree concept .

OR

7. Write tree terminology. Explain self balancing tree
8. Explain merge sort with example (at least 10 elements.)

OR

9. Explain heap sort with example.
10. Explain standard tries, suffix tries.

OR

11. explain boyer-moore algorithm.

Data Structures

Model Paper SET 5

Part-A (25 MARKS)

1. (a) List The applications of stack
- (b) Define linked list
- (c) write about dictionaries.
- (d) define Hashing Functions.
- (e) what are the properties of AVL tree.

- (f) define optimal binary search tree.
- (g) Differentiate directed graph from Undirected graph.
- (h) write short notes on efficiency of Heap sort.
- (i) List the features of Brute force Pattern matching algorithm
- (j) write a short note on compressed trie.

Part –B (50 MARKS)

2. (a) Explain in detail about linear lists.
- (b) How stack is represented using array?

OR

3. (a) Define the Abstract data type for Queue. Write a C program to implement Queue ADT using linked list.

(b) Explain about best, worst and average case complexities.

4. (a) Explain with suitable examples double hashing, rehashing and extendible hashing?
- (b) What are the applications of dictionary with duplicates and without duplicates?

OR

5. (a) What is meant by collision in hashing? Explain with illustrative examples various collision resolution techniques?

(b) Write a method in C to erase a pair in the dictionary with key the Key in a skip list representation. What is the complexity of this method?

6. (a) Construct the binary search tree for the following data.

56, 32, 11, 75, 29, 85, 46, 88, 22, 5, 38, 14, 72, 9, 66.

(b) Define and explain different AVL tree rotations?

OR

7. (a) Discuss about joining Red-Black Trees. Give example.

(b) Define splay tree and give example for all the operations.

8. (a) Explain detail about Graph and give example of BFS Graph Traversing Technique.
(b) define adjacency matrix and give example of DFS graph traversing Technique.

OR

- 9.(a) Explain with example about merge sort .Also write its algorithm and program
(b) Explain Heap sorting Technique with an example.

- 10 (a) Write and explain knuth — Morris - pratt pattern matching algorithm.
(b) Differentiate standard tries and compressed tries?

OR

- 11(a) What are tries? Discuss about various types of tries?
(b) Write and explain Brute Force algorithm.

