DATA STRUCTURE

QUESTION BANK

CHAPTER 1 PAGE NO: 7

INTRODUCTION

1. Define Data [2011]
2. Define data structure. [2007, 2009, 2010,2011, 2012, 2014,2017,2019, 2020]
3. Define Information [2011]
4. Difference between data and data structure [2013]
5. Describe the different types of data structure. [2012,2014,2019]
6. Distinguish between linear and non-linear data structure. [2011,2012, 2017]
7. Define with example:
   - ✓ Floor function
   - ✓ Ceiling function
   - ✓ Modular function [2013]
8. What are the operation performed in a linear data structure. [2012]
   Or, Mention the operation of data structure. [2008, 2009, 2010, 2011, 2013, 2017]
9. What are the subject matter of data structure [2008, 2009,2014, 2016, 2020]
10. What is algorithm [2008,2009, 2010, 2016, 2017]
11. What are the characteristics of algorithm [2016]
12. Define Static, semi static and dynamic character variable with examples. [2012]
13. Explain the complexity of algorithm. [2008, 2010,2011, 2012,2013, 2017,2019]
14. Explain the complexity of bubble sort, linear search and binary search. [2010,2012]
15. Find the complexity of linear search algorithm for (i) Best Case, (ii) Worst Case and (iii) Average Case [2011, 2017]
16. Explain the space-time tradeoff algorithm [2008, 2009, 2011, 2012,2013]
17. Describe the time complexity
18. Briefly describe the notation of the time-space trade off of algorithm [2011]
    Or, Describe big O Notation
19. Suppose $P(n)=a_0+a_1n+a_2 n^2+$ ----------$+a_m n^m$. Prove that $P(n)= O(n^m)$. [2007, 2011, 2013, 2016]
20. Describe the rate of growth [2011,2019]
21. Describe different string operations with example [2014]
22. Describe Floor and Ceiling Functions. [2014]
23. Describe Remainder Function or Modular Arithmetic [2014 , 2016]
24. Define control structure with appropriate diagram [2013]
    Or, Explain the three types of control structures in detail. [2020]
    Or Briefly describe different control structure used in algorithm. [2007, 2016, 2020]
25. Discuss various word processing operations with example. [2015]
26. What is garbage collection? [2017,2019]
27. Define heap and explain it? [2018] [2020]
28. Define Huffman algorithm? [2018]
29. Briefly explain fixed length, Variable length and linked storage? [2014][2019][2020]
30. Write an algorithm to find the roots of quadratic equation?

Or Define quadratic equation. Write an algorithm to find the solution of quadratic equation.

31. Write an algorithm that replace every occurrence of pattern? [2011]

CHAPTER 2 PAGE NO: 21
STRING PROCESSING

1) Define string. [2020][2016]
2) Describe briefly the three types of structure used for storing strings [2020][2016]
3) Discuss various string operations with example. [2011, 2017]
4) Briefly explain fixed length, Variable length and linked storage [2013]
5) Write an algorithm that deletes every occurrence of pattern P in a text T [2011]
6) A text T and patterns P and Q are in memory. Write an algorithm that replace every occurrence of P in the text T by Q. [2008,2013,2016,2020]
7) Let S='His Father is the Professor '
   Find out the result of the following operations
   - ✓ Substring (S,11,5)
   - ✓ Index (S,'ESS')
   - ✓ Delete (S,14,4)
   - ✓ Replace (S,'IS','ER')

   [2014]
8) Let W be the string. W "abcdebecaec".
   I)INSERT (W, 2,"pgrs"): (i) REPLACE(W," "rsb", "mnbc"). [2008]
9) Given, string operation DELETE ('vxtyrwq',3,3). Show the result of the operation using string operation 'SUBSRING' [2009]
10) Given, string operation INSERT ('prtyuwe',4,'yu'). Show the result of the operation using string operation 'SUBSRING' [2009]
11) Explain Variable and data type.
12) Explain first pattern matching algorithm with example. [2009,2014,2019]

CHAPTER 3 PAGE NO: 31
ARRAYS, RECORDS AND POINTERS

1. Define array [2008,2010]
2. What do you mean by linear array and two-dimensional array? [2012]
3. How linear arrays are represented in memory? [2008,2010, 2012,2013]
4. Define record
5. Difference between Array and record [2012, 2016,2019]
6. Define pointer
7. What is searching?
8. Define linear search [2008]
9. Write the algorithm of linear search in an array [2009]
10. Write the linear search algorithm for finding largest elements in the array. [2012,2019]
11. What is linear array? Write an algorithm to insert an element into a linear array. [2020]
12. Define binary search [2011]
13. Write an algorithm for binary search [2008,2009,2013]
14. What is the complexity of binary search. [2008,2011]
15. What are the limitation of binary search. [2011]

16. Write down the algorithms for Inserting and Deleting Data from a linear array.[2011]
17. Write down the algorithm to delete an item from an array. [2010]
18. Suppose the following numbers are stored in an array: A= (14, 33, 27, 35, 10). Using bubble sort algorithm, sort these numbers.
19. Suppose the following numbers are stored in an array: DATA= (5, 2, 15, 8, 33, 26, 6). Using bubble sort algorithm, sort DATA in ascending order. [2009]
20. Suppose the following numbers are stored in an array: DATA= (5,2,15,8,33,26,6). Using bubble sort algorithm ,sort DATA in ascending order. [2009]
21. Suppose the following numbers are stored in an array: DATA= (7, 18, 25, 2, 6, 12, 9). Using bubble sort algorithm, sort DATA in descending order. [2010]
22. Suppose the following numbers are stored in an array: A= (23,43,17,95,76,21,14,57). Using bubble sort algorithm ,sort these numbers step by step in ascending order. [2013]
23. Difference between linear and binary search [2007,2014,2016, 2020]
24. Write down the algorithm of bubble sort. [2010,2012,2014]
25. Find out the complexity of bubble sort algorithm [2014]
26. Apply the binary search algorithm for searching a data item 85 from the following data array:-Data: 11,22,30,44,50,55,65,70,72,82,88,90 [2014,2019]

CHAPTER 4 PAGE NO: 41
LINKED LISTS

1) What is link list? Describe the linked list representation in memory. [2007, 2009, 2011, 2014, 2016, 2019, 2020]
2) What do you mean by "Two –way linked list"? Explain with example. [2010, 2017]
3) Write down the advantages of linked list over array [2017]
4) What is header link list? Describe the difference types of header-linked list with example. [2013,2014]
5) Define with necessary figures for "grounded header list" and "circular header list" [2010]
6) Write an algorithm that search an item to sorted link list [2009, 2016,2020]
7) Write down the algorithm to insert a new ITEM in any node of linked List. [2010]
8) Write an algorithm that finds the location LOC of an Item in a linked list. [2014]
9) Write an algorithm that traverses a linked list. [2011,2013]
10) Define garbage collection. [2016, 2017,2019]
11) Describe with figure how a node is deleted from a linked list. [2011]

CHAPTER 5 PAGE NO: 49
STACKS, QUEUES, RECURSION

1. Define stack.
2. Explain the array representation of stacks. [2020]
3. Explain the stuck representation [2020]
4. Describe the Basic Operations of stack
5. Write an Algorithm for PUSH Operation
6. Write an Algorithm for Pop Operation [2009]
7. Define notation [2009]
8. Define infix, prefix and postfix notation
9. Translate each infix expression into its equivalent postfix expression [2010]
10. Define queue [2020]
11. Define priority queue [2007]
12. Basic operation of queue [2007]
13. Consider the following queue of characters, where QUEUE is a circular array which is allocated six memory cells-
    FRONT -2, REAR -4, QUEUE: _, A,C,D,_,_
    Describe the queue as the following operations take place
    (i) F is added to the queue,
    (ii) Two letters are deleted;
    (ii) K, L, M are added to the queue;
    (iv) Two letters are deleted;
    (v) R is added to the queue
14. Define recursion [2007, 2009, 2016]
15. Properties of A recursive function [2007,2010, 2011,2014]
16. Write an algorithm for Fibonacci series [2007,2014]
17. Describe Towers of Hanoi problem, [2010,2011]
18. Write a procedure to solve the Towers of Hanoi problem. [2007,2010, 2014,2019]
    Or Draw a schematic diagram of the recursive solution to tower of Hanoi problem for 4 disks. [2007,2008][2020]
19. Write an algorithm for finding the factorial numbers using recursion. [2009, 2014]
20. Describe bubble sort
21. Describe insertion sort [2009, 2010, 2012 , 2016]
22. Describe merge sort [2009]
23. Describe quick sort
24. Write an algorithm for quick sort [2008]
25. White Huffman's algorithm.
26. Define extended binary tree or 2-tree. [2008,2009]
27. Describe overflow and underflow situation in case of stack? [2012]
28. Define priority queue? [2019]
29. Write a procedure that pushes an ITEM onto a stack? [2018]
30. What are the properties of recursion? [2012,2019]
    [2010]

CHAPTER 6 PAGE NO: 60
TREES

1. Define tree [2016,2019]
2. Define a binary tree? [2007]
3. Define complete binary tree and extended binary tree. [2020]
4. Differentiate between compete and extended binary tress?
5. How can trees be represented in memory? [2013, 2016]
6. Describe binary search tree
7. Describe traversing binary trees. [2013, 2014,2019]
8. Define Spaning tree. Explain the General Properties of Spanning Tree
9. Describe a heap tree [2007]
10. Construct a heap tree T for the following number
    50, 33, 44, 22, 77. 35, 60, 40, [2007]
11. Construct a min heap tree T for the following number
    44, 30,50,22,60,55,77,55 [2009, 2010, 2013, 2016, 2020]
12. Draw a binary tree for the expression E = (a-b)/((c*d) + e).
13. Given
    Pre order: G, B, Q, A, C, K, F, P, D, E, R, H
    In order: Q,B, K, C, F, A, G, P, E, D, H, R
    Draw a tree. [2016]
14. Let E denote the following
    Algebraic expression:[a + (b-c)]* [(d -e)/(f+ g -h)] Find the preorder and post order traversal of this. [2007]
15. Preorder traversing algorithm [2016]
16. Inorder traversing algorithm
17. Differentiate between compete and extended binary tress? [2020][2010]
18. Write down the preorder traversing algorithm?
19. Construct a binary search tree for the following elements: 40, 60, 50, 33, 55, 11. [2020]

CHAPTER 7 PAGE NO: 79
GRAPHS

1) Define graph [2009,2019]
2) Explain the graph representation in memory. [2013, 2016]
3) Define A directed graph [2009]
4) Define vertex, edge, adjacency, path. [2013,2014]
5) Describe adjacency matrix [2009, 2013,2014]
6) Write Warshall's algorithm for shortest path [2007, 2009 ,2010, 2014, 2020]
   Or Write down the warshall's algorithm of finding the path matrix of a graph.
7) Write the Breadth-First search algorithm for traversing a graph. [2008,2012]
8) Write the Depth-First search algorithm for traversing a graph. [2009]
9) Explain path matrix. [2008,2019]
10) Explain the graph representation in memory. [2016]
11) Describe the different traversing technique of a graph [2014][2020]
12) Explain the linked representation of a graph. [2013]
13) What is multigraph? Explain sequential representation of a graph. [2020]