CHAPTER-1

1. What is data structure? Write about different types of data structure operations.

2. What is an algorithm? Write about algorithmic complexity

Chapter-2

1. Describe the following function with example: a. Floor and Ceiling Function. b. Reminder function. c. Integer and Absolute Value function. d. Factorial function. e. Exponents and Logarithm.

2. Write an algorithm to find the solution of Quadratic equation.

3. Write an algorithm to find the largest elements in Array.

4. What do you mean by complexity of an algorithm?

5. What do you mean by variable? Write the different types of variable.

6. What do you mean by constants?

7. Find: page #33 2.1, 2.2 & #39 No: 2.15-2.18.

8. Suppose ​P(n) = a​0​ + a​1​n + a​2​n​2 ​+ ….. + a​m​n​m​:​ That is suppose degree P(n) = m prove that , P(n) = ​O​ (n​m​) 3. Find the solution of ​page #33, Ex. 2.1,2.2, Page # 38, Ex. 2.10 Page #39 Ex. 2.15,2.16,2.17

CHAPTER-3

4. What is string and substring

5. Describe the following string operation with example: a) Indexing, string concatenation, string length, string copy, insertion, deletion and replacement.

6. A text T and a pattern P are in memory. Write an algorithm to deletes every occurrence of P in T

7. A text T and a pattern P and Q are in memory. Write an algorithm to replace every occurrence of P in T by Q

8. P and T are strings with lengths R and S, respectively, and are stored as arrays with one character per element. Write an algorithm finds the INDEX of P in T

9. Page #59-61 ex.3.8 to 3.13

Chapter-4

1. Define the linear array with example.

2. An Automobile company uses an array AUTO to record the number of automobiles sold each year from ​1932​ through ​1984​.Suppose AUTO appears in memory that is Base(AUTO)=200 ​and ​w = 4 ​words per memory cell for AUTO find the LOC(AUTO[1965]).

3. Write the algorithm of Insert and Delete an ITEM from linear Array with example.

4. Suppose the following numbers are stored in an array A: ​32, 51, 27, 85, 66, 23, 13, 57​. Sort that number to apply bubble sort.

5. What is linear Search? Write an algorithm of linear search with example. 6. What is Binary Search? Write an algorithm of Binary search with example.

7. From the following data find the ITEM = ​40 ​by using Binary search algorithm. Data: ​11, 22, 30, 33, 40, 44, 55, 60, 66, 77, 80, 88, 99.

8. From the following data find the ITEM = ​85​ by using Binary search algorithm. Data: ​11, 22, 30, 33, 40, 44, 55, 60, 66, 77, 80, 88, 99.

9. Addition, Subtraction and multiplication of two different matrix.

10. Define record with example.

11. Sort the following by using bubble sort algorithm: ​“PEOPLE”

12. Prove the following identity, which is used in the analysis of various sorting and searching algorithm: ​1 + 2 + 3 + ……. + n = n( n2+1)

13. Page #98 ex. 4.1, Page #109 ex. 4.21, 4.22

Chapter-5

1. Describe link list with example.

2. Explain about traversing of link list and write algorithm of traversing link list.

3. Briefly describe about memory allocation and Garbage collection.

4. Write procedure of inserting into link list with algorithm.

5. Write the procedure of deleting from link list with algorithm.

6. Briefly describe about header link list and two- way link list.

Chapter-6  
1. Define Stack with the terminology  
2. Briefly describe array representation of Stacks  
3. Write the algorithm of how to INSERT and DELETE an ITEM from Stacks  
4. Consider the following stack of characters, where STACK is allocated N = 8 memory  
cells; STACK: A, C, D, F, K, ….., ….., ….. Describe the STACK as the following  
operations take place:  
a) POP(STAC K, ITEM)  
b) POP(STAC K, ITEM)  
c) PUSH(STACK, L)  
d) PUSH(STACK, P)  
e) POP(STAC K, ITEM)  
f) PUSH(STACK, R)  
g) PUSH(STACK, S)  
h) POP(STAC K, ITEM)  
5. Translate the following infix expression into equivalent Postfix and Prefix expression  
I. ( A + B ) / ( C – D )  
II. 5 \* ( 6 + 2 ) – 12 / 4  
III. ( ( x + y ) | 2 ) + ( ( x – 4 ) / 3 )  
IV. (A - 😎\* (D / E)  
V. (A + B | D) / (E - F) + G  
VI. A \* (B + D) / E – F \* (G + H / K)  
6. Write an algorithm how to evaluate a postfix expression  
7. By applying the evaluation algorithm evaluate following postfix expression  
P: 5, 6, 2, +, \*, 12, 4, /, -  
8. By applying algorithm transfer the infix expression into equivalent postfix expression  
P: A + ( B \* C - ( D / E | F ) \* G ) \* H  
9. Sort the following data by applying Quicksort algorithm  
DATA: 44, 33, 11. 55, 77, 90, 40, 60, 99, 22, 88, 66  
10. What do you mean by recursive procedure? Find the value of 4! By the recursive  
procedure  
11. Find the Fibonacci number of f​  
2​, f​3,​ f​4,​ f​5,​ f​6,​ f​7,​ f​8,​ f​9, Where ​ f​0 = 0 ​and f​1 = 1.  
12. Write the procedure of Ackermann function. By using Ackermann function find the value  
of A(1,3), A(1,4) and A(1,5)  
13. Write the procedure for TOWER of HANOI. Write the schematic diagram of  
TOWER(4, A, B, C) by using Tower of Hanoi procedure  
14. Page # 197 Ex. 6.2, 6.3, 6.4. Page # 198 Ex.6.7, Page # 199 Ex. 6.8, 6.9, 6.10 Page # 200  
Ex. 6.11,6.12 Page # 202 Ex. 6.14, 6.16 and page 210-211 all exercise.1. What is recursion? Calculate 4! Using recursive definition.  
2. What is Fibonacci sequence? Write the Fibonacci sequence from 0 to 100.  
3. What is queue, Dequeue and priority queue?  
4. Suppose a Queue has 5(five) memory cell, where initially RONT=0, REAR=0. Now  
I) Insert A,B,C  
II) Delet B  
III) Insert D and E  
IV) Delete B and C  
V) Insert F  
VI) Delete D  
VII) Insert G and H  
VIII) Delete E  
IX) Delete F  
X) Insert K  
XI) Delete G and H  
XII) Delete K

Chapter 7

1. Define : a) Binary tree b) Complete binary tree c) Extended binary tree d) Binary Search tree e) Heap Tree (Max heap & Minheap) f) Internal node g) External node

2. By considering the following algebraic expression drew a binary tree “T”. ​E= (a-b)/((c\*d) + e)

3. Write the algorithm of Traversing binary tree “T”.

4. Drew a binary tree “T” from the following algebraic expression: ​E= [a+(b-c)]\* [(d-e)/(f+ g-h)]​ and apply the all Traversing algorithm into this binary tree “T”.

5. Suppose the following numbers are inserted in order into an empty binary search tree: 40, 60, 50, 33, 55, 11

6. Consider the following 15 numbers: ​14, 10, 17, 12, 10, 11, 20, 12, 18, 25, 20, 8, 22, 11, 23​ now drew a binary search tree “T”.

7. Build a heap H from the following list of numbers: ​44, 30, 50, 22, 60, 55, 77, 55.

8. Write the “Huffman’s” Algorithm

9. Suppose A, B, C, D, E, F, G and H are data items, and suppose they are assigned weights as follows: Data Item: A B C D E F G H Weights: 22 5 11 19 2 11 25 5 Now build a Huffman’s Tree

10. A binary tree T has 9 nodes. The inorder and preorder traversals of T yield the following sequence of nodes: Inorder: E A C K F H D B G Preorder: F A E K C D H G B Now draw the tree T.

11. Consider the algebraic expression: ​E = (2x + y)(5a - b)​3.​. ​Draw the tree T which corresponds to the expression E.

12. Draw all the possible nonsimilar trees T where: a) T is a binary tree with 3 nodes. b) T is a 2-tree with 4 external nodes.

13. Consider the binary search tree T, Which is stored in memory as in fig. Now insert the ITEM=33 into this tree T. Fig: Binary search tree.

14. Suppose the following list of letters is inserted in order into an empty binary search tree: J, R, D, G, T, E, M, H, P, A, F, Q a) Find the final tree T(binary search) b) Apply the traversing algorithm.

15. Suppose the six weights: ​4, 15, 25, 5, 8, 16 ​are given. Find a 2-tree T with the given weights and a minimum weighted path length P.\*\*\*

16. Suppose the following sequence list the nodes of a binary tree T in preorder and inorder respectively: Preorder: G, B, Q, A, C, K, F, P, D, E, R, H Inorder: Q, B, K, C, F, A, G, P, E, D, H, R Draw the diagram of the tree.

17. Draw the 2-tree corresponding to each of the following algebraic expression: E1= ( a - 3b )( 2x – y )​3​ and E2 = ( 2a + 5b )​3​( x – 7y )​4

18. Suppose the following eight(8) numbers are inserted in order into an empty binary search tree T 50, 33, 44, 22, 77, 35, 60, 40 Draw the tree T.

19. Page #260 ex. 7.2 and 7.3, Page#262 ex. 7.7 ad 7.8, Page#273 ex. 7.36

Chapter 9

1. Write the difference between Sorting and Searching.

2. Suppose an array A contains 8 elements as follows: ​77, 33, 44, 11, 88, 22, 66,​ and ​55 apply the insertion sort algorithm.

3. Suppose an array A contains 8 elements as follows: ​77, 33, 44, 11, 88, 22, 66,​ and ​55 apply the Selection sort algorithm.

4. Suppose an array A contains 8 elements as follows:

5. 66, 33, 40, 22, 55, 88, 60, 11, 80, 20, 50, 44, 77, 30​ apply the Merge sort algorithm.

6. Suppose 9 cards are punched as follows: 348, 143, 361, 423, 538, 128, 321, 543, 366 sort those cards by the Radix sort algorithm.