Name:manikantareddy

Reg no:11715810

Assignment no:2

1)What do you mean by a Data structure?

Ans: Data structure is a format for storing data in a structured manner.

**Ex:** data like photos, videos are stored in gallery with the help of a data structure

2) What are some of the applications DS?

Ans:

* 1. For representing a city region telephone network.
  2. To implement back functionality in the internet web browser.
  3. To store dynamically growing data which is accessed very frequently, based upon a key value.
  4. To implement the undo function in a text editor.
  5. To store information about the directories and files in a system.

3) What are the advantages of a Linked list over an array?

Ans: we need to store large amount of data in an array. But, the memory to store that data is not available contiguously. In this case we cannot use array. Hence, we go for a linked list. Since each node is connected using link, it is not necessary that memory has to be contiguous.

4) Write the syntax in C to create a node in the singly linked list.

Ans:

#include <stdio.h>

#include <stdlib.h>

struct **node**{

int data;

struct **node** \*next;

};

5) What is the use of a doubly-linked list when compared to that of a singly

linked list?

Ans: doubly linked listallows element two way traversal. On other hand doubly linked list can be used to implement stacks as well as heaps and binary trees. Singly linked listis preferred when we need to save memory and searching is not required as pointer of single index is stored.

6) What is the difference between an Array and Stack?

Ans:

1. Size of the stack keeps on changing as we insert and delete the element
2. Stack can store elements of different data type
3. Size of the array is fixed at the time of declaration itself
4. Array stores elements of similar data type

7) What are the minimum number of Queues needed to implement the priority

Ans: Two queues are needed. One queue is used to store the data elements, and another is used for storing priorities

8) What are the different types of traversal techniques in a tree?

Ans: In-order, Pre-order, Post-order.

9) Why it is said that searching a node in a binary search tree is efficient than that of

a simple binary tree?

Ans: When searching any node in binary search tree, the value of the target node is compared with the parent node and accordingly either left sub tree or right sub tree is searched. So, one has to compare only particular branches. Thus searching becomes efficient.

10) What are the applications of Graph DS?

Ans:

11) Can we apply Binary search algorithm to a sorted Linked list?

Ans: no, we cannot apply the binary search algorithm to a sorted linked list because finding the index of the middle element is difficult.

12) When can you tell that a Memory Leak will occur?

**Ans:** A memory leak occurs when a program does not free a block of memory allocated dynamically.

13) How will you check if a given Binary Tree is a Binary Search Tree or not?

Ans:

* All nodes in the left subtree of a node have values less than the node’s value
* All nodes in the right subtree of a node have values greater than the node’s value
* Both left and right subtrees are also binary search trees

14) Which data structure is ideal to perform recursion operation and why?

Ans: Stack is the most ideal for recursion operation. This is mainly because of its LIFO property, it remembers the elements & their positions, so it exactly knows which one to return when a function is called.

15) What are some of the most important applications of a Stack?

Ans: Some of the important applications are given below.

* Balanced parenthesis checker
* Redundant braces
* Infix and postfix using stack
* Infix to prefix

16) Convert the below given expression to its equivalent Prefix And Postfix notations.

Ans:AB + C \* DE FG + ^

17)Sorting a stack using a temporary stack

Ans:In this approach, a stack is sorted using another temporary stack.

* In this approach, a stack is sorted using recursion.

18)Program to reverse a queue

Ans:

Reversing a queue can be done in many ways. The most simple way of reversing a queue is by printing all the elements of the queue from the end.

19) Program to reverse first k elements of a queue

Ans

20)Program to return the nth node from the end in a linked list

Ans: By finding the length of the linked list, the Nth node from the end can be found easily.

**Method 2:** By using two pointers, the Nth node from the end can be found.

21)Reverse a linked list

Ans: Reversing a Linked List means reversing the elements of the given Linked List. In this case, let us assume that you are given the pointer to the head node of a linked list.

22)Replace each element of the array by its rank in the array

Ans: Program to replace each element by its rank in the given array is discussed here. Given an array of distinct integers, we need to replace each element of the array with its rank. The minimum value element will have the highest rank.

23) Check if a given graph is a tree or no

Ans:

* The graph is connected.
* When there are no cycles in the graph

24) Find out the Kth smallest element in an unsorted array

Ans:

* Input the graph.
* Input the source and destination nodes.
* Find the paths between the source and the destination nodes.
* Find the number of edges in all the paths and return the path having the minimum number of edges

25) How to find the shortest path between two vertices

linked list?

Ans:

* Input the graph.
* Input the source and destination nodes.
* Find the paths between the source and the destination nodes.
* Find the number of edges in all the paths and return the path having the minimum number of edges