Institute of Computer Technology
B. Tech Computer Science and Engineering
Subject: DS (2CSE302)

PRACTICAL-16

AIM: - Implement the real-life scenario using binary tree.

Cisco Systems, Inc. is an American multinational technology, which sells networking hardware, software, telecommunications equipment, and other high-technology services and products. Roshni is working at Cisco, Ahmedabad and she wants to capture all orders of telecommunications equipment in the form of a binary tree as each order is linked to the previous one in a parent-child relationship. Here, each node is having the constraint that it has either two children or zero. Kindly perform the below operation using C language:

a) **Create the binary tree of the given list of order-Id (define max-size as 7) 20, 15, 30, 25, 19, 31, 45**

b) **Print root node (level-0), level-1, and level-2 node.**

c) **Perform the below binary tree traversal operations:**

   i. **Preorder traversal**
   ii. **Inorder traversal**
   iii. **Postorder traversal**

Input:

20 15 30 25 19 31 45

Output:

Root element of binary tree is: 20
Level-1 element of binary tree is: 15 30
Level-2 element of binary tree is: 25 19 31 45

Preorder traversal of binary tree is: 20 15 25 19 30 31 45
Inorder traversal of binary tree is: 25 15 19 20 31 30 45
Postorder traversal of binary tree is: 25 19 15 31 45 30 20

SOLUTION

```
#include <stdio.h>
#include <malloc.h>
struct node {
   int yash;
   struct node *leftNode;
   struct node *rightNode;
```

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```
};
struct node *newNode(int value){
   struct node *node=(struct node*)malloc(sizeof(struct node));
   node->yash=value;
   node->leftNode=NULL;
   node->rightNode=NULL;
   return node;
}
void printCurrentLevel(struct node *root ,int lvl){
   if(root==NULL){
      return;
   }
   if(lvl==0){
      printf(" %d ",root->yash);
   }
   if(lvl>0){
      printCurrentLevel(root->leftNode,lvl-1);
      printCurrentLevel(root->rightNode,lvl-1);
   }
}

void PreOrder(struct node *ptr)
{
        if(ptr!=NULL)
        {
                printf(" %d ",ptr->yash);
                PreOrder(ptr->leftNode);
                PreOrder(ptr->rightNode);
        }
}

void InOrder(struct node *ptr)
{
        if(ptr!=NULL)
        {
                InOrder(ptr->leftNode);
                printf(" %d ",ptr->yash);
                InOrder(ptr->rightNode);
        }
}

void PostOrder(struct node *ptr)
{
        if(ptr!=NULL)
```

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```
        {
                PostOrder(ptr->leftNode);
                PostOrder(ptr->rightNode);
                printf(" %d ",ptr->yash);
        }
}

int Insert()
{
        int rawdata=0;
        scanf("%d",&rawdata);
        return rawdata;
}
int main(){
        printf("\n-----| I N P U T |-----\n");
   struct node *root= newNode(Insert());
   root->leftNode=newNode(Insert());
   root->rightNode=newNode(Insert());
   root->leftNode->leftNode=newNode(Insert());
   root->leftNode->rightNode=newNode(Insert());
   root->rightNode->leftNode=newNode(Insert());
        root->rightNode->rightNode=newNode(Insert());

        printf("\n\n----------| O U T P U T |----------\n");
   printf("Root element of binary tree is:\t\t");
   printCurrentLevel(root,0);
   printf("\nLevel-1 element of binary tree is:\t");
   printCurrentLevel(root,1);
   printf("\nLevel-2 element of binary tree is:\t");
   printCurrentLevel(root,2);
        printf("\n\nPreorder traversal of binary tree is:\t");
        PreOrder(root);
        printf("\nInorder traversal of binary tree is:\t");
        InOrder(root);
        printf("\nPostorder traversal of binary tree is:\t");
        PostOrder(root);
        printf("\n");
}
```

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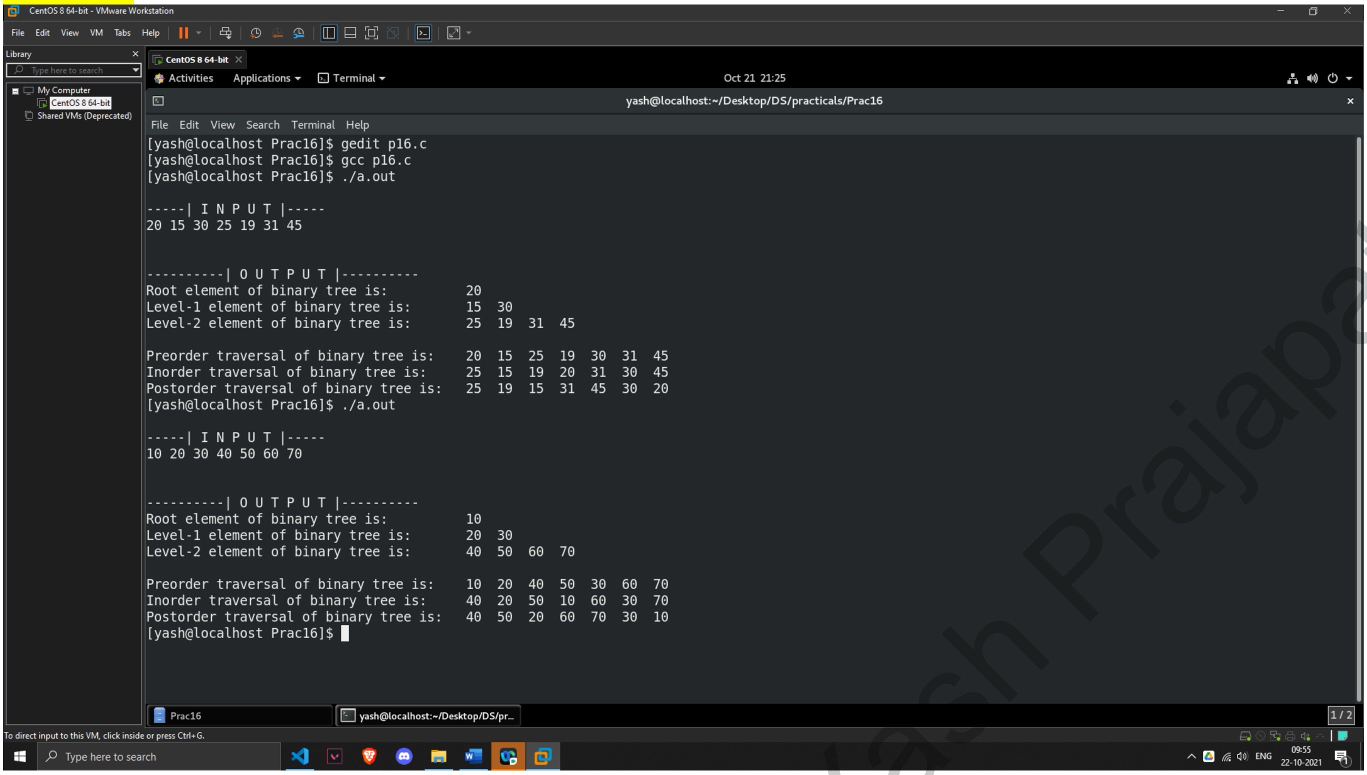
OUTPUT


CentOS 8 64-bit - VMware Workstation
File Edit View VM Tabs Help
Library
My Computer
CentOS 8 64-bit
Shared VMs (Deprecated)
Activities
Applications
Terminal
Oct 21 21:25
yash@localhost:~/Desktop/DS/practicals/Prac16
File Edit View Search Terminal Help
Prac16
yash@localhost:~/Desktop/DS/pr...
1 / 2
To direct input to this VM, click inside or press Ctrl+G.
Type here to search
ENG
09:55
22-10-2021

```
[yash@localhost Prac16]$ gedit p16.c
[yash@localhost Prac16]$ gcc p16.c
[yash@localhost Prac16]$ ./a.out

-----| I N P U T |-----
20 15 30 25 19 31 45


----------| O U T P U T |----------
Root element of binary tree is:         20
Level-1 element of binary tree is:      15  30
Level-2 element of binary tree is:      25  19  31  45

Preorder traversal of binary tree is:   20  15  25  19  30  31  45
Inorder traversal of binary tree is:    25  15  19  20  31  30  45
Postorder traversal of binary tree is:  25  19  15  31  45  30  20
[yash@localhost Prac16]$ ./a.out

-----| I N P U T |-----
10 20 30 40 50 60 70


----------| O U T P U T |----------
Root element of binary tree is:         10
Level-1 element of binary tree is:      20  30
Level-2 element of binary tree is:      40  50  60  70

Preorder traversal of binary tree is:   10  20  40  50  30  60  70
Inorder traversal of binary tree is:    40  20  50  10  60  30  70
Postorder traversal of binary tree is:  40  50  20  60  70  30  10
[yash@localhost Prac16]$ 
```

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