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2022-2026-CSE-B

Aim:

S.No: 21

Write a recursive C program for traversing a binary tree in preorder, inorder and postorder.

Source Code:

binaryTree.c

```
#include<stdio.h>
#include<stdlib.h>
struct node
{
   int data;
   struct node *left;
   struct node *right;
};
struct node *root=NULL;
   void inorder(struct node *temp)
      if(temp)
      {
         inorder(temp->left);
         printf("%d->",temp->data);
         inorder(temp->right);
      }
   }
   void preorder(struct node *temp)
      if(temp)
         printf("%d->",temp->data);
         preorder(temp->left);
         preorder(temp->right);
      }
   void postorder(struct node *temp)
      if(temp)
         postorder(temp->left);
         postorder(temp->right);
         printf("%d->",temp->data);
      }
   void create()
      root=NULL;
      insert();
   struct node *createnode()
      struct node *r;
```

```
r=(struct node*)malloc(sizeof(struct node));
   return r;
}
void insert()
   struct node *temp,*r;
   r=createnode();
   printf("Enter the data: ");
   scanf("%d",&r->data);
   r->left=NULL;
   r->right=NULL;
   if(root==NULL)
      root=r;
   }
   else
   {
      temp=root;
      while(temp!=NULL)
         if(temp->data>r->data)
            if(temp->left==NULL)
               temp->left=r;
               temp=temp->left;
            temp=temp->left;
         }
         else
         {
            if(temp->right==NULL)
            {
               temp->right=r;
               temp=temp->right;
            }
            temp=temp->right;
         }
      }
   }
int main()
root=NULL;
int x,choice;
do{
   printf("0.create\n1.insert\n2.preorder\n3.postorder\n4.inorder\n5.exit\n");
   printf("Enter your choice: ");
   scanf("%d",&choice);
   switch (choice)
      case 0:
         create();
         break;
```

```
case 1:
            insert();
            break;
         }
         case 2:
            printf("Display tree in Preorder ");
            preorder(root);
            printf("\n");
            break;
         }
         case 3:
            printf("Display tree in Postorder ");
            postorder(root);
            printf("\n");
            break;
         }
         case 4:
            printf("Display tree in Inorder ");
            inorder(root);
            printf("\n");
            break;
         }
         case 5:
            exit(0);
         }
         default:printf("Enter valid input\n");
      }
   }while(choice!=5);
   return 0;
}
```

Execution Results - All test cases have succeeded!

	Test Case - 1	
User Output		
0.create 0		
1.insert 0		
2.preorder 0		
3.postorder 0		
4.inorder 0		-
5.exit 0		
Enter your choice: 0		
Enter the data: 25		

0.create 1 1.insert 1 2.preorder 1 3.postorder 1 4.inorder 1 5.exit 1 Enter your choice: 1 Enter the data: 245 0.create 0 1.insert 0 2.preorder 0 3.postorder 0 4.inorder 0 5.exit 0 Enter your choice: 0 Enter the data: 345 0.create 1 1.insert 1 2.preorder 1 3.postorder 1 4.inorder 1 5.exit 1 Enter your choice: 1 Enter the data: 36 0.create 1 1.insert 1 2.preorder 1 3.postorder 1 4.inorder 1 5.exit 1 Enter your choice: 1 Enter the data: 589 0.create 2 1.insert 2 2.preorder 2 3.postorder 2 4.inorder 2 5.exit 2 Enter your choice: 2 Display tree in Preorder 345->36->589-> 3 0.create 3 1.insert 3 2.preorder 3 3.postorder 3 4.inorder 3 5.exit 3 Enter your choice: 3 Display tree in Postorder 36->589->345->4 0.create 4 1.insert 4 2.preorder 4

3.postorder 4
4.inorder 4
5.exit 4
Enter your choice: 4
Display tree in Inorder 36->345->589-> 5
0.create 5
1.insert 5
2.preorder 5
3.postorder 5
4.inorder 5
5.exit 5
Enter your choice: 5

User Output 0.create 0 1.insert 0 2.preorder 0 3.postorder 0 4.inorder 0 5.exit 0 Enter your choice: 0 Enter the data: 21 0.create 0 1.insert 0 2.preorder 0 3.postorder 0 4.inorder 0 5.exit 0 Enter your choice: 0 Enter the data: 325 0.create 1 1.insert 1 2.preorder 1 4.inorder 1 5.exit 1 Enter your choice: 1 Enter the data: 586 0.create 0 1.insert 0 2.preorder 0 3.postorder 0 4.inorder 1 5.exit 1 Enter your choice: 1 Enter the data: 586 0.create 0 1.insert 0 2.preorder 0 3.postorder 0 4.inorder 0 5.exit 0 Enter the data: 586 0.create 0 1.insert 0 2.preorder 0 5.exit 0 Enter the data: 26 0.create 1 1.insert 1 2.preorder 0 5.exit 0 Enter the data: 26 0.create 1 1.insert 1 2.preorder 1	Test Case - 2	
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0.create 1 1.insert 1		
1.insert 1		
2.preorder 1		
	.preorder 1	

```
3.postorder 1
4.inorder 1
5.exit 1
Enter your choice: 1
Enter the data: 478
0.create 1
1.insert 1
2.preorder 1
3.postorder 1
4.inorder 1
5.exit 1
Enter your choice: 1
Enter the data: 213
0.create 1
1.insert 1
2.preorder 1
3.postorder 1
4.inorder 1
5.exit 1
Enter your choice: 1
Enter the data: 36
0.create 1
1.insert 1
2.preorder 1
3.postorder 1
4.inorder 1
5.exit 1
Enter your choice: 1
Enter the data: 21
0.create 1
1.insert 1
2.preorder 1
3.postorder 1
4.inorder 1
5.exit 1
Enter your choice: 1
Enter the data: 2245
0.create 2
1.insert 2
2.preorder 2
3.postorder 2
4.inorder 2
5.exit 2
Enter your choice: 2
Display tree in Preorder 26->21->478->213->36->2245-> 3
0.create 3
1.insert 3
2.preorder 3
3.postorder 3
4.inorder 3
5.exit 3
```

mt. m	
nter your choice: 3	
isplay tree in Postorder 21->36->213->2245->478->26-> 4	
.create 4	
.insert 4	
.preorder 4	
.postorder 4	
.inorder 4	
.exit 4	
nter your choice: 4	
isplay tree in Inorder 21->26->36->213->478->2245->5	
create 5	
.insert 5	
.preorder 5	
.postorder 5	
.inorder 5	
.exit 5	
nter your choice: 5	