EXPERIMENT NO.6.1

BINARY SEARCH TREE:

```
#include<iostream>
#define max 250

using namespace std;
class tree
{
        int a[max];

        public:

        void init(){
                int i;
                for(i=0;i<max;i++)
                        a[i]=0;
        }
        void menu(){
               int ch,num;
                 init();
        do{
                        cout<<"\n******MENU******"<<endl
                        <<"1.Insert"<<endl
                          <<"2.PreOrder"<<endl
                    <<"3.InOrder"<<endl
                    <<"4.PostOrder"<<endl
                    <<"5.Search"<<endl
                      <<"6.Exit"<<endl
                        <<"Enter Your Choice :";
                    cin>>ch;

               switch(ch){
                        case 1:Insert();
                                break;
                           case 2:      cout<<"PreOrder : ";
                                        PreOrder(0);
                                   break;
                           case 3:      cout<<"InOrder : ";
                                        InOrder(0);
                           break;
                           case 4:      cout<<"PostOrder : ";
                                        PostOrder(0);
                                break;
                      case 5: cout<<"Enter a Number to Search :";
```

```
                                cin>>num;
                                search(0,num);
                        break;
                case 6:
                        break;
                  default:cout<<"Wrong Option \n";
        }
         }while(ch!=6);
           display();
}

void PreOrder(int i){
         if(a[i]!=0){
                cout<<"  ~~  "<<a[i];
                PreOrder(2*i+1);
                PreOrder(2*i+2);
         }
}

void search(int i,int num){
         if(a[i]!=0){
                if(a[i]==num){
                        cout<<"Element Found at "<<i<<" position. "<<endl;
                        return;
                }
                search(2*i+1,num);
                search(2*i+2,num);
         }
}

void InOrder(int i){
         if(a[i]!=0){
                InOrder(2*i+1);
                cout<<"  ~~  "<<a[i];
                InOrder(2*i+2);
         }
}

void PostOrder(int i){
         if(a[i]!=0){
                PostOrder(2*i+1);
                PostOrder(2*i+2);
                cout<<"  ~~  "<<a[i];
         }
}

void display(){
```

```
		int i;
		cout<<"\n\t\t\tValue :"<<endl;
		for(i=0;i<max;i++)
			if(a[i]!=0)
				cout<<"\t\t\t "<< i <<"---->"<<a[i]<<endl;
	}

	void Insert(){
		int num,i,k;

		cout<<"\nEnter a number :";
		cin>>num;
		for(i=0;i<max; ){
			if(a[i]==0){
				a[i]=num;
				cout<<"\t\t\t Number "<<num <<" Inserted at "<<i<<" Position.
"<<endl;
				return;
			}
			else{
				if(num<a[i]){
					i=2*i+1;
					continue;
				}
				else if(num>a[i]){
					i=2*i+2;
					continue;
				}
				else{
					cout<<"\t\t\t Number Already Exist."<<endl;
					return;
				}
			}
		}
	}

};


int main()
{
	t.menu();
}
```

OUTPUT:

******MENU******

```
1.Insert
2.PreOrder
3.InOrder
4.PostOrder
5.Search
6.Exit
Enter Your Choice :1

Enter a number :10
                        Number 10 Inserted at 0 Position.

******MENU******
1.Insert
2.PreOrder
3.InOrder
4.PostOrder
5.Search
6.Exit
Enter Your Choice :1

Enter a number :20
                        Number 20 Inserted at 2 Position.

******MENU******
1.Insert
2.PreOrder
3.InOrder
4.PostOrder
5.Search
6.Exit
Enter Your Choice :1

Enter a number :30
                        Number 30 Inserted at 6 Position.

******MENU******
1.Insert
2.PreOrder
3.InOrder
4.PostOrder
5.Search
6.Exit
Enter Your Choice :2
PreOrder :   ~~  10  ~~  20  ~~  30
******MENU******
1.Insert
2.PreOrder
```

```
3.InOrder
4.PostOrder
5.Search
6.Exit
Enter Your Choice :3
InOrder :   ~~  10  ~~  20  ~~  30
******MENU******
1.Insert
2.PreOrder
3.InOrder
4.PostOrder
5.Search
6.Exit
Enter Your Choice :4
PostOrder :   ~~  30  ~~  20  ~~  10
******MENU******
1.Insert
2.PreOrder
3.InOrder
4.PostOrder
5.Search
6.Exit
Enter Your Choice :5
Enter a Number to Search :30
Element Found at 6 position.
```