

p1.c - Code::Blocks 20.03

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Start here x p1.c x

```
1 #include<stdio.h>
2 struct Tree
3 {
4     int data;
5     struct Tree *left,*right;
6 }*root;
7
8 struct Tree *search(struct Tree *r,int d)
9 {
10    struct Tree *parent;
11    while(r!=NULL)
12    {
13        if(r->data==d)
14            return NULL;
15        else if(r->data>d)
16        {
17            parent=r;
18            r=r->left;
19        }
20    else
```

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```
16  {
17      parent=r;
18      r=r->left;
19  }
20  else
21  {
22      parent=r;
23      r=r->right;
24  }
25 }
26 return parent;
27 }

28

29 void add()
30 {
31     struct Tree *t,*prev;
32     t=(struct Tree *)malloc(sizeof(struct Tree));
33     printf("\nEnter data ");
34     scanf("%d",&t->data);
35     if(root==NULL)
```

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```
31 struct Tree *t,*prev;
32 t=(struct Tree *)malloc(sizeof(struct Tree));
33 printf("\nEnter data ");
34 scanf("%d",&t->data);
35 if(root==NULL)
36 {
37     root=t;
38     t->left=t->right=NULL;
39 }
40 else
41 {
42     prev=search(root,t->data);
43     if(prev==NULL)
44     {
45         printf("\nDuplicate value not allowed");
46         return;
47     }
48     else if(prev->data>t->data)
49         prev->left=t;
50     else
```

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```
46     return;
47 }
48 else if(prev->data>t->data)
49     prev->left=t;
50 else
51     prev->right=t;
52 t->left=t->right=NULL;
53 }
54 }
55 void inorder(struct Tree *r)
56 {
57     if(r==NULL)
58         return;
59     inorder(r->left);
60     printf("%d -> ",r->data);
61     inorder(r->right);
62 }
63 void postorder(struct Tree *r)
64 {
65     if(r==NULL)
```

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```
58     return;
59     inorder(r->left);
60     printf("%d -> ",r->data);
61     inorder(r->right);
62 }
63 void postorder(struct Tree *r)
64 {
65     if(r==NULL)
66         return;
67     postorder(r->left);
68     postorder(r->right);
69     printf("%d ->",r->data);
70 }
71 void preorder(struct Tree *r)
72 {
73     if(r==NULL)
74         return;
75     printf("%d -> ",r->data);
76     preorder(r->left);
77     preorder(r->right);
```

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```
76     preorder(r->left);
77     preorder(r->right);
78 }
79 struct Tree *del(struct Tree *r,int d)
80 {
81     struct Tree *prev,*r1,*r2;
82     if(r->data==d)
83     {
84         if(r->left==r->right)
85         {
86             free(r);
87             return NULL;
88         }
89         if(r->right==NULL)
90         {
91             prev=r->left;
92             free(r);
93             return prev;
94         }
95         else if(r->left==NULL)
```

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```
85     {
86         free(r);
87         return NULL;
88     }
89     if(r->right==NULL)
90     {
91         prev=r->left;
92         free(r);
93         return prev;
94     }
95     else if(r->left==NULL)
96     {
97         prev=r->right;
98         free(r);
99         return prev;
100    }
101    else
102    {
103        r1=r2=r->right;
104        while(r1->left!=NULL)
```

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```
100     }
101 else
102 {
103     r1=r2=r->right;
104     while(r1->left!=NULL)
105         r1=r1->left;
106     r1->left=r->left;
107     free(r);
108     return r2;
109
110 }
111 }
112 else if(r->data>d)
113 {
114     r->left=del(r->left,d);
115 }
116 else
117 {
118     r->right=del(r->right,d);
119 }
```

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```
112     else if(r->data>d)
113     {
114         r->left=del(r->left,d);
115     }
116     else
117     {
118         r->right=del(r->right,d);
119     }
120 }
121 void main()
122 {
123     root=NULL;
124     int c;
125     do
126     {
127         printf("\n1. Add a node ");
128         printf("\n2. Traverse - Inorder");
129         printf("\n3. Traverse - Post Order");
130         printf("\n4. Traverse - Pre Order");
131         printf("\n5. Delete a node");
```

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```
127     printf("\n1. Add a node ");
128     printf("\n2. Traverse - Inorder");
129     printf("\n3. Traverse - Post Order");
130     printf("\n4. Traverse - Pre Order");
131     printf("\n5. Delete a node");
132     printf("\n6. Exit");
133     printf("\nEnter a choice (1-6) ");
134     scanf("%d",&c);
135     if(c==1)
136         add();
137     else if(c==2)
138         inorder(root);
139     else if(c==3)
140         postorder(root);
141     else if(c==4)
142         preorder(root);
143     else if(c==5)
144     {
145         int d;
146         printf("\nEnter data ");
```

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```
134     scanf("%d",&c);
135     if(c==1)
136         add();
137     else if(c==2)
138         inorder(root);
139     else if(c==3)
140         postorder(root);
141     else if(c==4)
142         preorder(root);
143     else if(c==5)
144     {
145         int d;
146         printf("\nEnter data ");
147         scanf("%d",&d);
148         root=del(root,d);
149     }
150 }while(c!=6);
151
152 }
153
```

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