/* Here is source code of the C Program to count the number of non-leaf nodes of a given tree. The C program is successfully compiled and run on both Windows and Linux Operating system. */

```
#include <stdio.h>
#include <stdlib.h>

struct tree_node
{
    int value;
    struct tree_node *r,*l;
} *root = NULL, *temp = NULL;

void create();
void insert();
void add(struct tree_node *t);
void inorder(struct tree_node *t);

int count = 0;
```

```
void main( )
{
      int ch;
      printf("\nOPERATIONS ---");
      printf("\n1] Insert ");
      printf("\n2] Display");
      printf("\n3] Exit ");
```

```
  while (1)
  {
        printf("\nEnter your choice : ");
        scanf("%d", &ch);
        switch (ch)
        {
        case 1:
        insert( );
        break;
        case 2:
        inorder(root);
              printf("\nNum of non leaf nodes:%d", count);
              break;
        case 3:
        exit(0);
        default :
              printf("Wrong choice, enter correct choice : ");
        break;
    }
}
```

```
} // end main

/* To create a new node with the data from the user */
void create( )
{
    int data;

    printf("Enter the data of node : ");
    scanf("%d", &data);
    temp = (struct tree_node* ) malloc(1*(sizeof(struct tree_node)));
    temp->value = data;
    temp->l = temp->r = NULL;
}
```

```
/* To check for root node and then create it */
void insert( )
{
    create();

    if (root == NULL)
        root = temp;
    else
        add(root);
}
```

```
/* Search appropriate position to insert a new node */
void add(struct tree_node *t)
{
    if ((temp->value > t->value) && (t->right != NULL))
/* value more than root node value insert at right */
        add(t->right);
    else if ((temp->value > t->value) && (t->right == NULL))
        t->right = temp;
    else if ((temp->value < t->value) && (t->left != NULL))        /* value less than
root node value insert at left */
        add(t->left);
    else if ((temp->value < t->value) && (t->left == NULL))
        t->left = temp;
}
```

```
/*To display and count number of non-leaf nodes */
void inorder(struct tree_node *t)
{
    if (t->left != NULL)
        inorder(t->left);
    if ((t->left != NULL) ||  (t->right != NULL))
    {
        count++; /* To count number of non-leaf nodes*/
        printf("%d ->",t->value);
    }
    if (t->right != NULL)
        inorder(t->right);
}
```