ASSIGNMENT 19

```
#include<iostream>
#include<cstring>
#include<cstdlib>
#define MAX 50
#define SIZE 20
using namespace std;

struct AVLnode
{
   public:
   char cWord[SIZE],cMeaning[MAX];
   AVLnode *left,*right;
   int iB_fac,iHt;
};

class AVLtree
{

   public:
      AVLnode *root;
      AVLtree()
      {
         root=NULL;
      }
      int height(AVLnode*);
      int bf(AVLnode*);
      AVLnode* insert(AVLnode*,char[SIZE],char[MAX]);
      AVLnode* rotate_left(AVLnode*);
      AVLnode* rotate_right(AVLnode*);
```

```
    AVLnode* LL(AVLnode*);
    AVLnode* RR(AVLnode*);
    AVLnode* LR(AVLnode*);
    AVLnode* RL(AVLnode*);
    AVLnode* delet(AVLnode*,char x[SIZE]);
    void inorder(AVLnode*);
};

AVLnode *AVLtree::delet(AVLnode *curr,char x[SIZE])
{
  AVLnode *temp;
  if(curr==NULL)
    return(0);
  else
    if(strcmp(x,curr->cWord)>0)
    {
      curr->right=delet(curr->right,x);
      if(bf(curr)==2)
      if(bf(curr->left)>=0)
        curr=LL(curr);
      else
        curr=LR(curr);
    }
    else
    if(strcmp(x,curr->cWord)<0)
    {
      curr->left=delet(curr->left,x);
      if(bf(curr)==-2)
      if(bf(curr->right)<=0)
        curr=RR(curr);
      else
```

```
            curr=RL(curr);
        }
    else
    {
        if(curr->right!=NULL)
        {
            temp=curr->right;
            while(temp->left!=NULL)
            temp=temp->left;
            strcpy(curr->cWord,temp->cWord);
            curr->right=delet(curr->right,temp->cWord);
            if(bf(curr)==2)
            if(bf(curr->left)>=0)
                curr=LL(curr);
            else
                curr=LR(curr);
        }
        else
        return(curr->left);
    }
    curr->iHt=height(curr);
    return(curr);
}



AVLnode* AVLtree :: insert(AVLnode*root,char newword[SIZE],char newmeaning[MAX])
{
    if(root==NULL)
    {
        root=new AVLnode;
        root->left=root->right=NULL;
```

```
    strcpy(root->cWord,newword);
    strcpy(root->cMeaning,newmeaning);
}

else if(strcmp(root->cWord,newword)!=0)
{
    if(strcmp(root->cWord,newword)>0)
    {
        root->left=insert(root->left,newword,newmeaning);
        if(bf(root)==2)
        {
            if (strcmp(root->left->cWord,newword)>0)
                root=LL(root);
            else
                root=LR(root);
        }
    }

    else if(strcmp(root->cWord,newword)<0)
    {
        root->right=insert(root->right,newword,newmeaning);
        if(bf(root)==-2)
        {
            if(strcmp(root->right->cWord,newword)>0)
                root=RR(root);
            else
                root=RL(root);
        }
    }
}
else
```

```
        cout<<"\nRedundant AVLnode";
    root->iHt=height(root);
    return root;
}

int AVLtree :: height(AVLnode* curr)
{
    int lh,rh;
    if(curr==NULL)
        return 0;
    if(curr->right==NULL && curr->left==NULL)
        return 0;
    else
    {
        lh=lh+height(curr->left);
        rh=rh+height(curr->right);
        if(lh>rh)
            return lh+1;
        return rh+1;
    }
}

int AVLtree :: bf(AVLnode* curr)
{
    int lh,rh;
    if(curr==NULL)
        return 0;
    else
    {
        if(curr->left==NULL)
            lh=0;
```

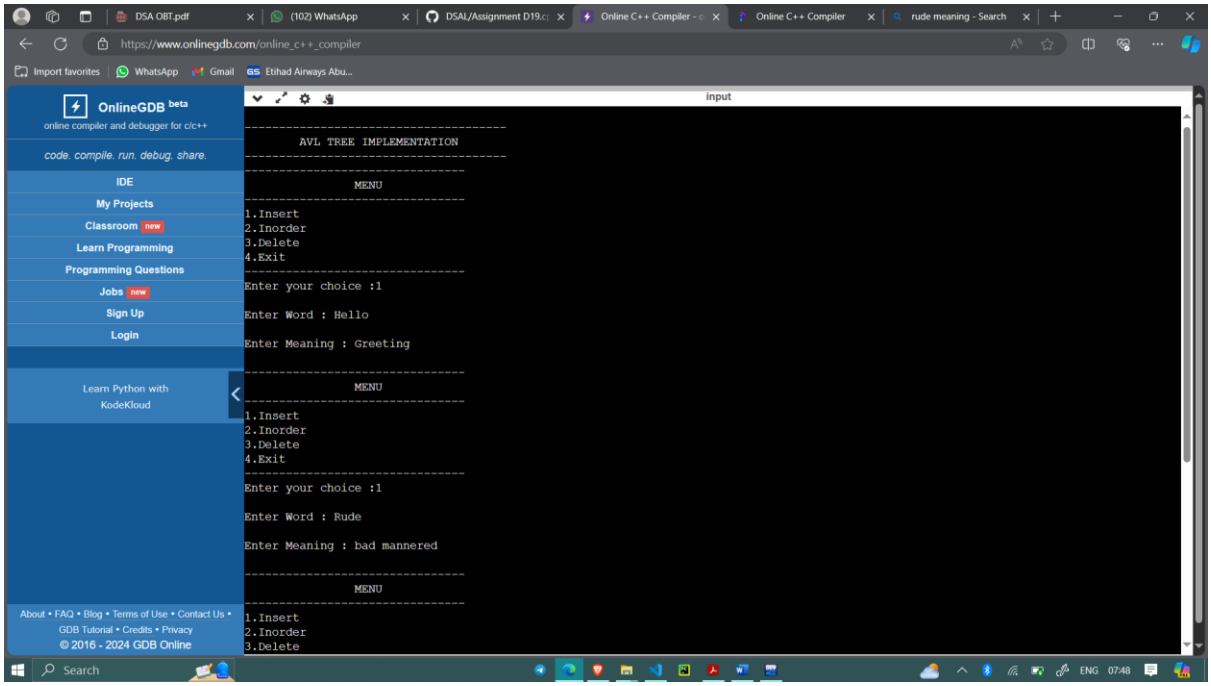
```
        else
            lh=1+curr->left->iHt;
        if(curr->right==NULL)
            rh=0;
        else
            rh=1+curr->right->iHt;
        return(lh-rh);
    }
}

AVLnode* AVLtree :: rotate_right(AVLnode* curr)
{
    AVLnode* temp;
    temp=curr->left;
    curr->left=temp->right;
    temp->left=curr;
    curr->iHt=height(curr);
    temp->iHt=height(temp);
    return temp;
}

AVLnode* AVLtree :: rotate_left(AVLnode* curr)
{
    AVLnode* temp;
    temp=curr->right;
    curr->right=temp->left;
    temp->left=curr;
    curr->iHt=height(curr);
    temp->iHt=height(temp);
    return temp;
}
```

```
AVLnode* AVLtree :: RR(AVLnode* curr)
{
   curr=rotate_left(curr);
   return curr;
}

AVLnode* AVLtree :: LL(AVLnode* curr)
{
   curr=rotate_right(curr);
   return curr;
}

AVLnode* AVLtree :: RL(AVLnode* curr)
{
   curr->right=rotate_right(curr->right);
   curr=rotate_left(curr);
   return curr;
}

AVLnode* AVLtree::LR(AVLnode* curr)
{
   curr->left=rotate_left(curr->left);
   curr=rotate_right(curr);
   return curr;
}

void AVLtree :: inorder(AVLnode* curr)
{
   if(curr!=NULL)
   {
```

```
        inorder(curr->left);
        cout<<"\n\t"<<curr->cWord<<"\t"<<curr->cMeaning;
        inorder(curr->right);
    }
}

int main()
{
    int iCh;
    AVLtree a;
    AVLnode *curr=NULL;
    char cWd[SIZE],cMean[MAX];
    cout<<"\n--------------------------------------";
    cout<<"\n\tAVL TREE IMPLEMENTATION";
    cout<<"\n--------------------------------------";
    do
    {   cout<<"\n---------------------------------";
        cout<<"\n\t\tMENU";
        cout<<"\n---------------------------------";
        cout<<"\n1.Insert\n2.Inorder\n3.Delete\n4.Exit";
        cout<<"\n---------------------------------";
        cout<<"\nEnter your choice :";
        cin>>iCh;

        switch(iCh)
        {
            case 1: cout<<"\nEnter Word : ";
                cin>>cWd;
                cout<<"\nEnter Meaning : ";
                cin.ignore();
                cin.getline(cMean,MAX);
```

```
            a.root=a.insert(a.root,cWd,cMean);
            break;

        case 2: cout<<"\n\tWORD\tMEANING";
            a.inorder(a.root);
            break;

        case 3: cout<<"\nEnter the word to be deleted : ";
                cin>>cWd;
                curr=a.delet(a.root,cWd);
                if(curr==NULL)
                   cout<<"\nWord not present!";
                else
                   cout<<"\nWord deleted Successfully!";
                curr=NULL;
                break;

        case 4: exit(0);
      }
   }while(iCh!=4);

   return 0;
}
```

OUTPUT :


DSA OBT.pdf
(102) WhatsApp
DSAL/Assignment D19.c
Online C++ Compiler - c
Online C++ Compiler
rude meaning - Search
https://www.onlinegdb.com/online_c++_compiler
Import favorites
WhatsApp
Gmail
Etihad Airways Abu...
OnlineGDB beta
online compiler and debugger for c/c++
code. compile. run. debug. share.
IDE
My Projects
Classroom new
Learn Programming
Programming Questions
Jobs new
Sign Up
Login
Learn Python with KodeKloud
About • FAQ • Blog • Terms of Use • Contact Us • GDB Tutorial • Credits • Privacy
© 2016 - 2024 GDB Online
input
AVL TREE IMPLEMENTATION
MENU
1.Insert
2.Inorder
3.Delete
4.Exit
Enter your choice :1
Enter Word : Hello
Enter Meaning : Greeting
MENU
1.Insert
2.Inorder
3.Delete
4.Exit
Enter your choice :1
Enter Word : Rude
Enter Meaning : bad mannered
MENU
1.Insert
2.Inorder
3.Delete
Search
ENG
07:48