/* A2:Write a program to design Lexical Analyzer in C/C++ Language (to recognize any five keywords, identifiers, numbers, operators and punctuations) */

```
#include<bits/stdc++.h>
using namespace std;
string keywords[]={"int","float","if","else","while","for"};
string operators[]={"<",">","<=",">=","==","=","+","-","++","--
"};
char punctuation[]={'(',')',',',';','{','}','[',']'};
vector<string> k,o,c,i;
vector<string> p;

/*
      This function checks whether the given word is a keyword in
the list of keywords present.
      If it is a keyword, it is added into the vector 'k'.
*/
void search_for_keywords(string a ,int flag)
{
      if(a.size()==0)return;
      int size=sizeof(keywords)/sizeof(keywords[0]);
      for(int i=0;i<size;i++)
      {
            if(a==keywords[i])
            {
                  k.push_back(a);
                  return;
            }
      }
if(!flag)  i.push_back(a);
}

/*
      This function checks if the given character is present in
the given array of punctuation marks.
      If it is present, it is added into the vector 'p'.
*/
bool search_for_punctuation(char a )
{
      //cout<<a;
      int size=sizeof(punctuation)/sizeof(punctuation[0]);
      for(int i=0;i<size;i++)
      {
            //cout<<punctuation[i];
            if(a==punctuation[i])
            {
                  //cout<<a;
                  string temp=" ";
                  temp[0]=a;
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```
                //cout<<temp;
                p.push_back(temp);
                return true;
            }
        }
        return false;
}

/*
        This function is to create the tokens of integers and
floatingpoint integers.
*/
void search_for_constants(string a )
{
        if(a.size()>0)   c.push_back(a);
}

/*
        This function prints the list/vector of strings and the
number of strings which is provided as the input.
*/
void print(vector<string>a )
{
        cout<<"\n";//cout<<"-------------------------------------
-\n";
        for(int i=0;i<a.size();i++)
        {
            cout<<a[i]<<"  ";
        }
        cout<<"\nTotal="<<a.size()<<"\n";
        cout<<"---------------------------\n";
}

/*
        This function checks if the given input is a part of the
list of operators defined.
        If it is a part of the list, it is added into the vector of
operators 'o'.
*/
void search_for_operators(string line,int& i)
{
        // This is to check the operators which are composed of two
characters like '++', '+='.
        string temp=line.substr(i,2);
        //cout<<temp<<endl;
        int size=sizeof(operators)/sizeof(operators[0]);
        for(int j=0;j<size;j++)
        {
            //cout<<punctuation[i];
            if(temp==operators[j])
            {
                o.push_back(temp);i=i+1;
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```
                return;
            }
        }

        // This is to check the operators which are composed of
only one character like '+', '-'.
        temp=line.substr(i,1);
        //cout<<temp<<endl;
        for(int j=0;j<size;j++)
        {
            //cout<<punctuation[i];
            if(temp==operators[j])
            {
                o.push_back(temp);
                return;
            }
        }

}
int main()
{
        cout<<"Enter number of lines of input:";
        int n;
        cin>>n;n++;
        while(n--)
        {

        char arr[100];
        cin.getline(arr,100,'\n');
        string line=arr;
        //cout<<line<<line.length();
        int i;
        string cur="";
        string cur_num="";
        int flag=0,flag2=0;
        int no_of_dots=0;
        for(i=0;i<line.length();i++)
        {
            char now=line[i];
            if((now>='a'&&now<='z')||(now>='A'&&now<='Z'))
            {
            // Check for keywords and identifiers starts.

        if(now=='e'&&flag==0&&no_of_dots>0){cur_num+=now;continue;}
            if(cur_num.size()>0){flag2=1;}
            flag=1;
            cur+=line[i];
            }
            else if(now==' '){
                // Found a delimiter, hence checking the stored
input till now for keywords and constants.
                if(flag)search_for_keywords(cur,flag2);
```

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```
                else if(!flag2)  search_for_constants(cur_num);
                cur="";flag=0;cur_num="";no_of_dots=0;
            }
            else if(now>='0'&&now<='9'||now=='.')
            {
                //Check for number starts. Keeping count of
number of '.'s.
                if(now=='.'&&no_of_dots>0)cur_num="";
                else if(now=='.')no_of_dots++;
                if(flag)cur+=line[i];
                else cur_num+=line[i];
            }
            else{
                //cout<<now;
                // If none of the above conditions pass, this
block of code checks for all of the keywords, numbers, operators
and punctuations.
                if((now=='+'||now=='-
')&&flag==0&&cur_num.size()>0){cur_num+=now;continue;}
                if(flag)search_for_keywords(cur,flag2);
                else if(!flag2) search_for_constants(cur_num);
                cur="";flag=0;cur_num="";no_of_dots=0;
                if(!search_for_punctuation(now))
search_for_operators(line,i);
                ;//cout<<now;
            }
      }
      //If still some are not matched, search for keywords and
numbers.
      if(flag)search_for_keywords(cur,flag2);
                else if(!flag2) search_for_constants(cur_num);
                cur="";flag=0;cur_num="";}
      cout<<"\n\nKeywords:";
      print(k);cout<<"Operators:";
      print(o);cout<<"Constants:";
      print(c);cout<<"Punctation:";
      print(p);cout<<"Identifiers:";
      print(::i);
      cout<<"Total tokens
are:"<<k.size()+o.size()+c.size()+p.size()+::i.size()<<"\n";
      return 0;
}
```

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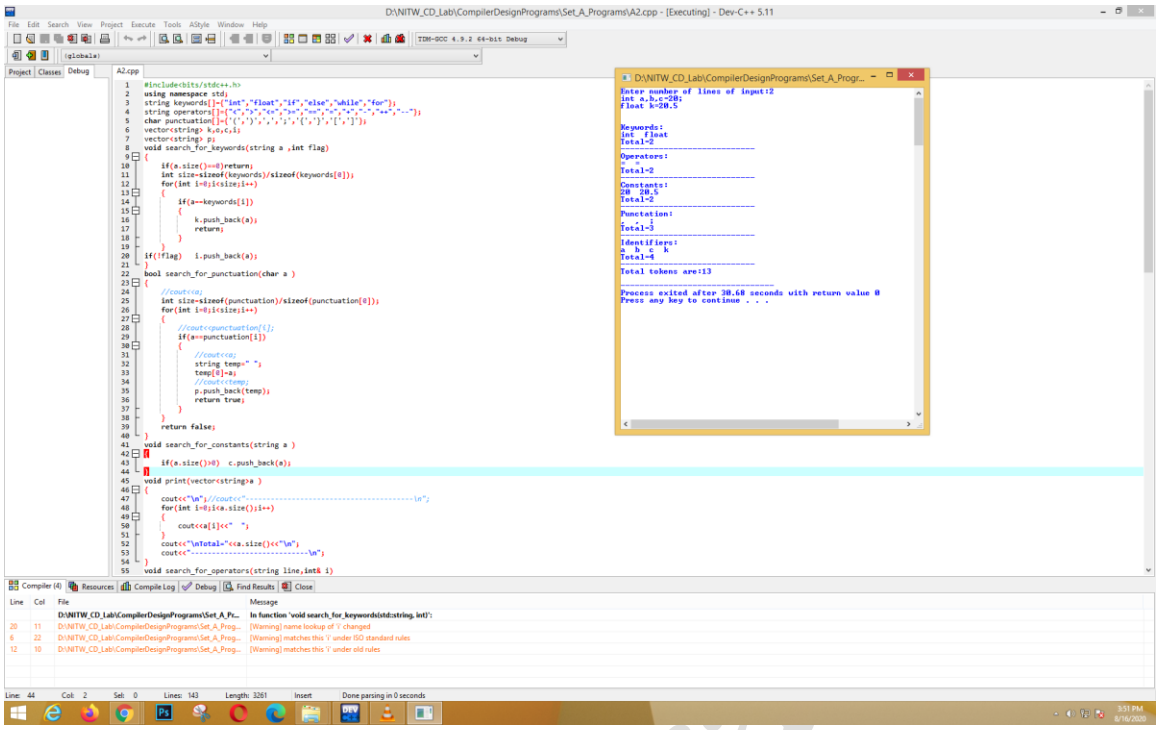
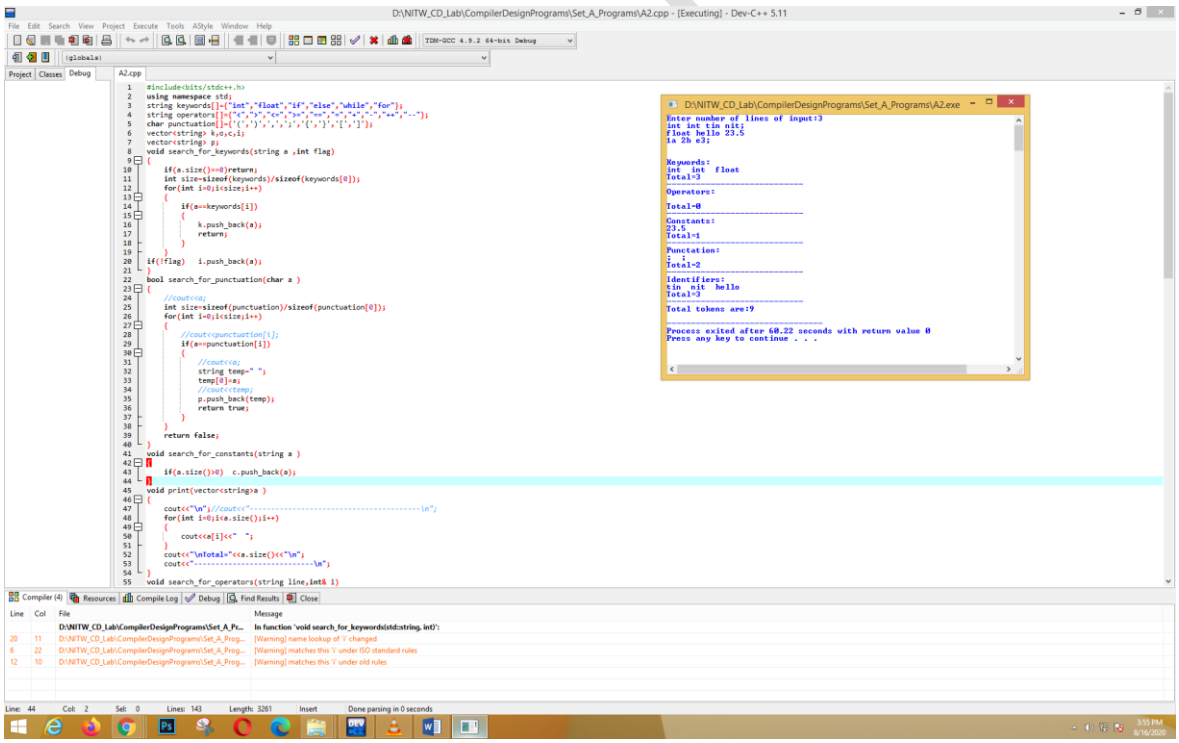

D:\NITW_CD_Lab\CompilerDesignPrograms\Set_A_Programs\A2.cpp - [Executing] - Dev-C++ 5.11
D:\NITW_CD_Lab\CompilerDesignPrograms\Set_A_Progr...
Enter number of lines of input:2
int a,b,c=20;
float k=20.5
Keywords:
int float
Total=2
Operators:
= =
Total=2
Constants:
20 20.5
Total=2
Punctation:
, , ;
Total=3
Identifiers:
a b c k
Total=4
Total tokens are:13
Process exited after 30.68 seconds with return value 0
Press any key to continue . . .


D:\NITW_CD_Lab\CompilerDesignPrograms\Set_A_Programs\A2.cpp - [Executing] - Dev-C++ 5.11
D:\NITW_CD_Lab\CompilerDesignPrograms\Set_A_Programs\A2.exe
Enter number of lines of input:3
int int tin nit;
float hello 23.5
ia 2b e3;
Keywords:
int int float
Total=3
Operators:
Total=0
Constants:
23.5
Total=1
Punctation:
; ;
Total=2
Identifiers:
tin nit hello
Total=3
Total tokens are:9
Process exited after 60.22 seconds with return value 0
Press any key to continue . . .