The COMPILER DESIGN Handbook

Compiler Design Lab
CSE332
(PC-A)

The FLASH

Written by

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The Compiler Design Handbook

From the course
Compiler Design Lab CSE332
PC-A

Written by The FLASH

The Compiler Design Handbook

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Contents

Counting length of a string
And
reverse with an extra message

Sample:

Input	Output
Daffodil	Length : 8 Reverse : Length : 8 Reverse : Hello Daffodil, lidoffaD is your reverse

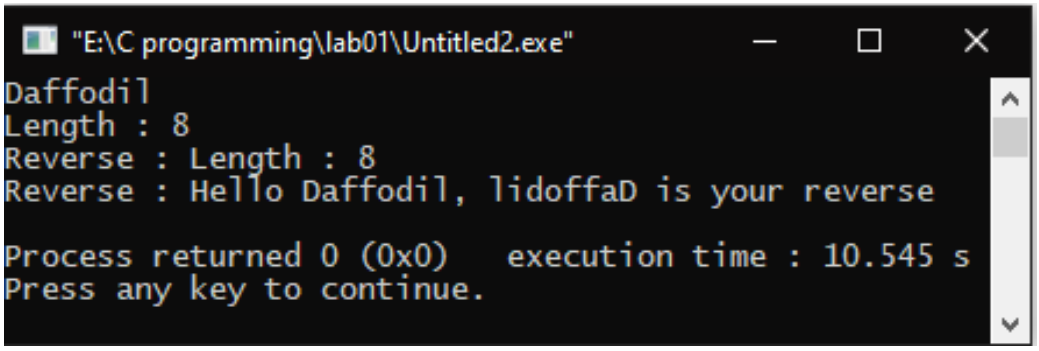
Necessary code:

```
#include<stdio.h>
#include<string.h>
int main()
{
    int i;
    char a[100000];
    gets(a);
    for(i=0 ; a[i] ; i++);

    printf("Length : %d\n",i);
    printf("Reverse : Length : %d\n",i);
    printf("Reverse : Hello Daffodil, %s is your reverse\n",strrev(a));

    return 0;
}
```

Output:



Count character without white space

Sample:

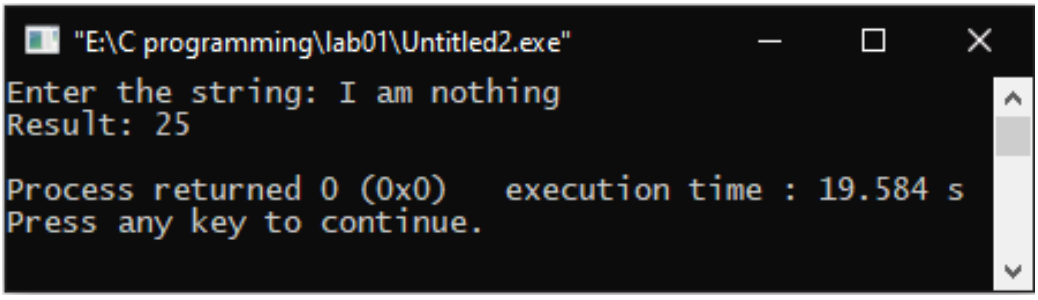
Input	Output
Enter the string: I am nothing	Result: 25

Necessary code:

```
#include<stdio.h>
#include<string.h>
int main()
{
    int i, ct=0;
    char a[100000];
    gets(a);
    for(i=0 ; a[i] ; i++)
    {
        if(a[i]!=' ')
            ct++;
    }
    printf("Result: %d\n",ct);

    return 0;
}
```

Output:



Count space in a string

Sample:

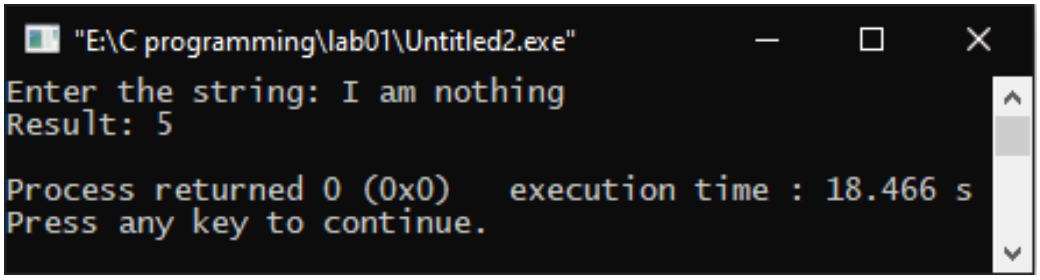
Input	Output
Enter the string: I am nothing	Result: 5

Necessary code:

```
#include<stdio.h>
#include<string.h>
int main()
{
    int i, ct=0;
    char a[100000];
    gets(a);
    for(i=0 ; a[i] ; i++)
    {
        if(a[i]==' ')
            ct++;
    }
    printf("Result: %d\n",ct);

    return 0;
}
```

Output:



Count vowel, consonant and digit

Sample:

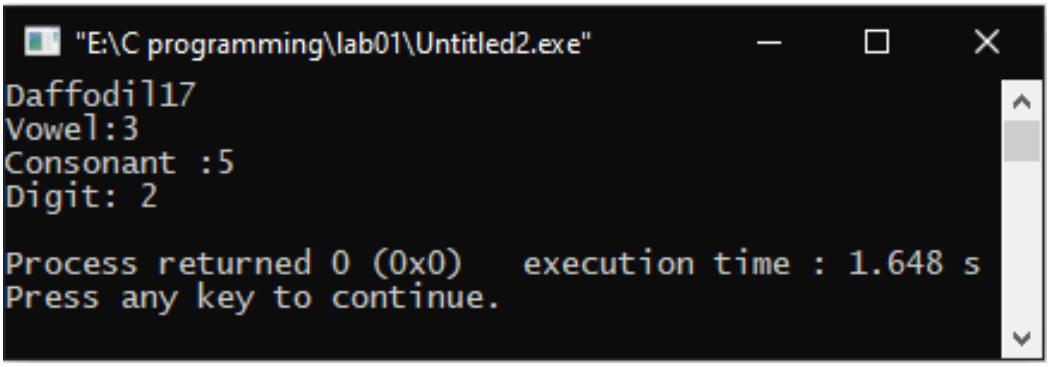
Input	Output
Daffodil17	Vowel:3 Consonant :5 Digit: 2

Necessary code:

```
#include<stdio.h>
#include<string.h>
int main()
{
   int i, v=0, c=0, d=0;
   char a[100000];
   gets(a);
   for(i=0 ; a[i] ; i++)
   {
      if(a[i] =='a' || a[i]=='e' || a[i]=='i' || a[i]=='o' || a[i]=='u' ||
a[i] =='A' || a[i]=='E' || a[i]=='I' || a[i]=='O' || a[i]=='U' )
            v++;
      else if(a[i]>='0' && a[i]<='9')
         d++;
      else
         c++;
   }
   printf("Vowel:%d\nConsonant :%d\nDigit: %d\n",v,c,d);

   return 0;
}
```

Output:



Taking multiple line input in cmd
And
Count the line

Sample:

Input	Output
Hello BD How old are you Good luck	Number of Line: 3

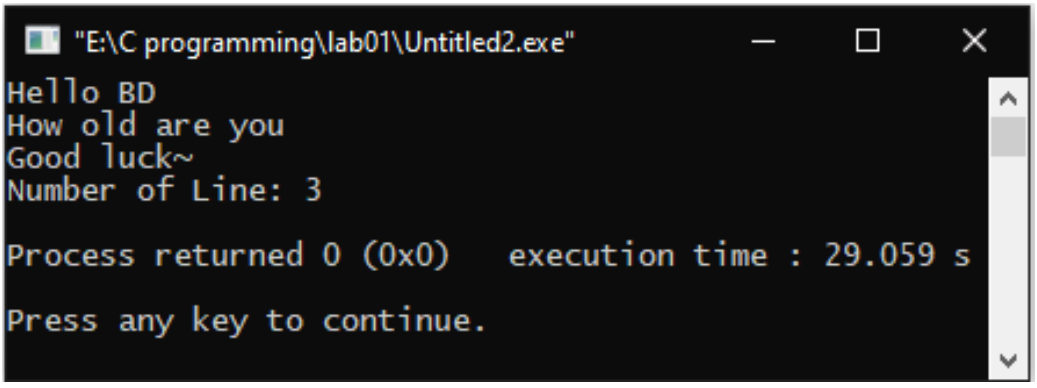
Necessary code:

```
#include <stdio.h>
#include <string.h>
int main ()
{
    char c, a[100], b[100];
    int j=0, len, i;
    scanf(" %[^~]",a);
    for(i=0 ; a[i] ; i++)
    {
        if(a[i]=='\n')
            j++;
    }
    if(a[i-1]!='\n')
        j++;

    printf("Number of Line: %d\n",j);

    return 0;
}
```

Output:



Remove special character

Sample:

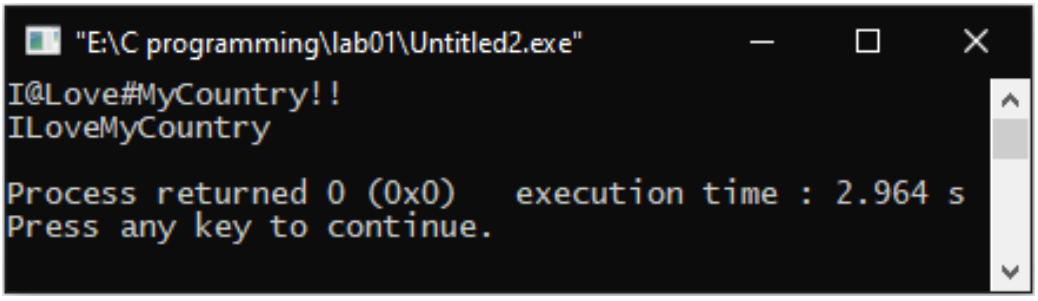
Input	Output
I@Love#MyCountry!!	ILoveMyCountry

Necessary code:

```
#include<stdio.h>
#include<string.h>
int main()
{
   int i, ct=0, j=0;
   char a[100000], b[100000];
   gets(a);
   for(i=0 ; a[i] ; i++)
   {
      if((a[i]>='a' && a[i]<='z') || (a[i]>='A' && a[i]<='Z') || (a[i]>='0'
&& a[i]<='9'))
         b[j++]=a[i];
   }
   b[j]='\0';
   printf("%s\n",b);

   return 0;
}
```

Output:



Remove white space

Sample:

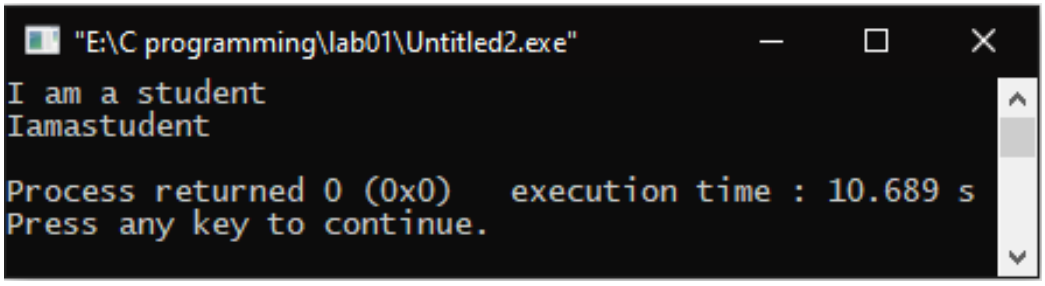
Input	Output
I am a student	Iamastudent

Necessary code:

```
#include<stdio.h>
#include<string.h>
int main()
{
    int i, ct=0, j=0;
    char a[100000], b[100000];
    gets(a);
    for(i=0 ; a[i] ; i++)
    {
        if(a[i]==' ')
        {
            continue;
        }
        b[j++]=a[i];
    }
    b[j]='\0';
    printf("%s\n",b);

    return 0;
}
```

Output:



Find and count the articles

Sample:

Input	Output
A cat bites an ant. The dog helped that ant.	Article: a, an, the A – 1 An – 1 The – 1

Necessary code:

```
#include<stdio.h>
#include<string.h>
int main()
{
   int i, x=0, aN=0, the=0;;
   char a[100];
   gets(a);
   for(i=0 ; a[i]!='\0'+1 ; i++)
   {
      if((a[i]<65 || a[i]>90) && (a[i]<97 || a[i]>122))
      {
         if(a[i-1]=='e' && a[i-2]=='h' && (a[i-3]=='T' || a[i-
3]=='t')&&(a[i-4]<65 || a[i-4]>90||i-3==0) && (a[i-4]<97 || a[i-
4]>122||i-3==0))
            the++;

         else if(a[i-1]=='n' && (a[i-2]=='a' || a[i-2]=='A')&&(a[i-3]<65
|| a[i-3]>90||i-2==0) && (a[i-3]<97 || a[i-3]>122||i-2==0))
            aN++;

         else if((a[i-1]=='a' || a[i-1]=='A')&&(a[i-2]<65 || a[i-
2]>90||i-1==0) && (a[i-2]<97 || a[i-2]>122||i-1==0))
            x++;
      }
   }
   printf("A - %d\nAn - %d\nThe - %d\n",x,aN,the);
   return 0;
}
```

Output:

```
"E:\C programming\lab01\Untitled2.exe"
A cat bites an ant. The dog helped that ant.
A - 1
An - 1
The - 1

Process returned 0 (0x0)   execution time : 16.038 s
Press any key to continue.
```

Inter 3 character and show next 3 character

Sample:

Input	Output
abc xyz	def abc

Necessary code:

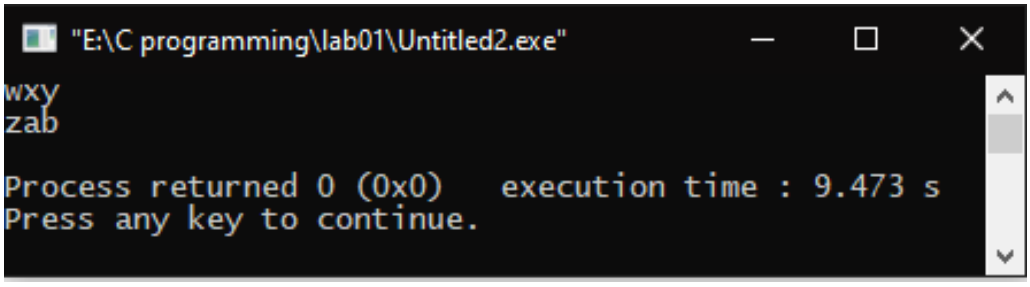
```
#include<stdio.h>
int main()
{
    char a[100];
    int i=0,j=0;
    gets(a);
    for(i=0 ; a[i]; i++)
    {
        if(a[i]>='A' && a[i]<='Z' && a[i]>87)
            printf("%c",a[i]-23);

        else if(a[i]>='a' && a[i]<='z' && a[i]>119)
            printf("%c",a[i]-23);

        else
            printf("%c",a[i]+3);
    }

    printf("\n");
    return 0;
}
```

Output:



Show the initial

Sample:

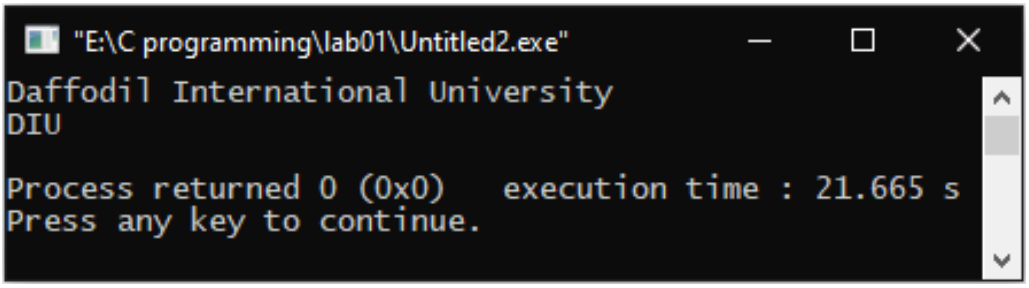
Input	Output
Daffodil International University	Initial of Input : DIU

Necessary code:

```
#include<stdio.h>
int main()
{
    char a[100];
    int i=0,j=0;
    gets(a);
    printf("%c",a[0]);
    for(i=1 ; a[i]; i++)
        if(a[i]==' ')
            printf("%c",a[i+1]);

    printf("\n");
    return 0;
}
```

Output:



Syntax table
(letter, digits, symbol, arithmetic/logical op….)

Sample:

Input	Output
Hello#123%Wo!=rld+45==Go	Letter: HelloWorldGo Digit: 12345 Symbol: #% Arithmetic Operator: + Logical Operator: !===

Necessary code:

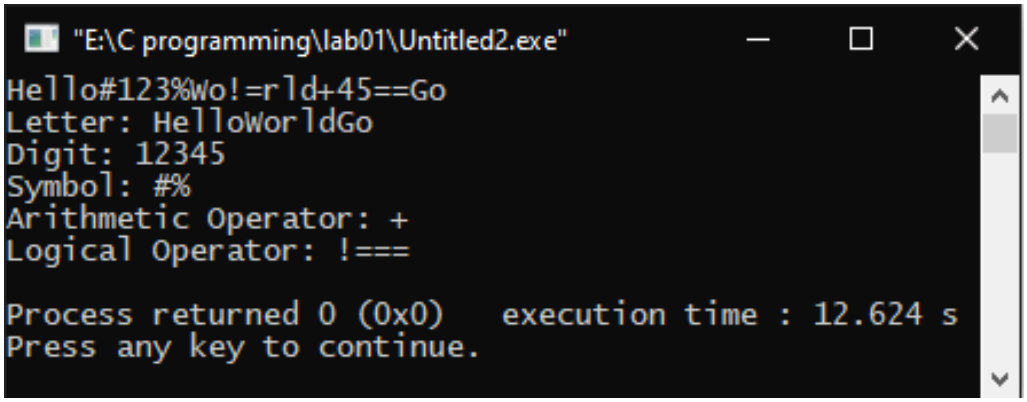
```
#include<stdio.h>
int main()
{
    char str[100],di[100],le[100],pu[100],aop[100],lop[100];
    int i=0,j=0,k=0,l=0,a=0,x=0;
    gets(str);
    while(str[a]!='\0')
    {
        if(str[a]>='0'&&str[a]<='9')
        {
            di[i++]=str[a];
        }
        else if((str[a]>='A'&&str[a]<='Z')||(str[a]>='a'&&str[a]<='z'))
        {
            le[j++] =str[a];
        }
        else if(str[a]=='+'||str[a]=='-'||str[a]=='*'||str[a]=='/')
        {
            aop[k++]=str[a];
        }
        else if(str[a]=='='||str[a]=='&'||str[a]=='|'||str[a]=='!')
        {
            lop[x++]=str[a];
        }
```

```
else
      {
         pu[l++]=str[a];
      }
      a++;
   }
   lop[x]='\0';
   di[i]='\0';
   le[j]='\0';
   aop[k]='\0';
   pu[l]='\0';

printf("Letter: %s\n",le);
   printf("Digit: %s\n",di);
   printf("Symbol: %s\n",pu);
   printf("Arithmetic Operator: %s\n",aop);
   printf("Logical Operator: %s\n",lop);

   return 0;
}
```

Output:



Tokenization

Sample:

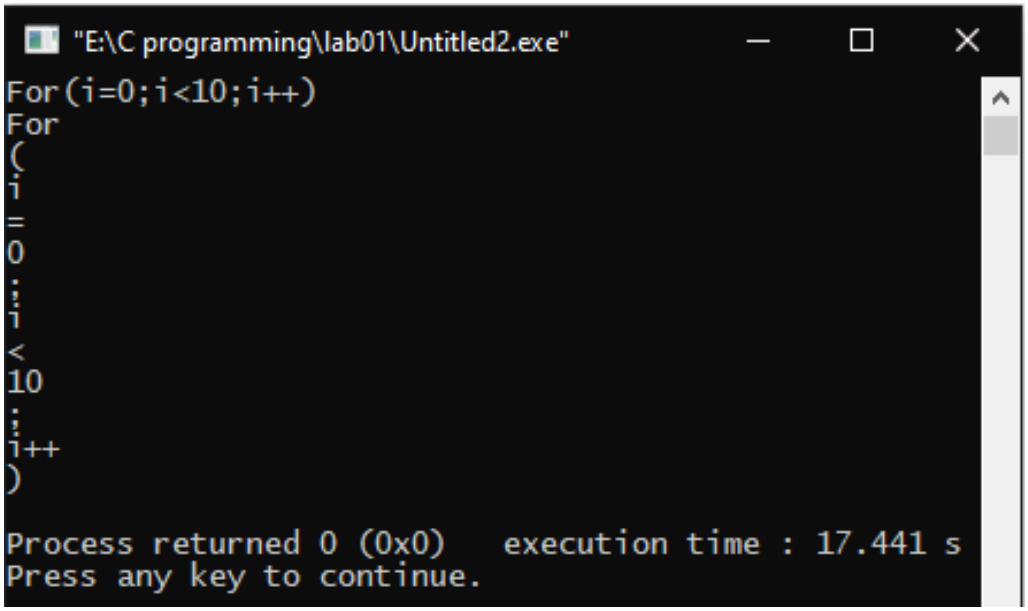
Input	Output
For(i=0;i<10;i++)	For (i = 0 ; i 10 ; i++)

Necessary code:

```
#include<stdio.h>
int main()
{
    char a[100];
    int i=0;
    gets(a);
    for(i=0 ; a[i]; i++)
    {
        if(a[i]==' ')
        {
            continue;
        }
        else if(((a[i]>='a' && a[i]<='z') || (a[i]>='A' && a[i]<='Z')) &&
(a[i+1]=='+' ||a[i+1]=='-') && (a[i+2]=='+' ||a[i+2]=='-'))
        {
            printf("%c%c%c",a[i],a[i+1],a[i+2]);
            i+=2;
        }
 else if(((a[i+2]>='a' && a[i+2]<='z') || (a[i+2]>='A' && a[i+2]<='Z'))
&& (a[i]=='+' ||a[i]=='-') && (a[i+1]=='+' ||a[i+1]=='-'))
        {
            printf("%c%c%c",a[i],a[i+1],a[i+2]);
            i+=2;
        }
```

```
else if((a[i]>='a' && a[i]<='z') || (a[i]>='A' && a[i]<='Z'))
        {
            while((a[i]>='a' && a[i]<='z') || (a[i]>='A' && a[i]<='Z'))
            {
                printf("%c",a[i]);
                i++;
            }
            i--;
        }
 else if((a[i]>='0' && a[i]<='9'))
        {
            while((a[i]>='0' && a[i]<='9'))
            {
                printf("%c",a[i]);
                i++;
            }
            i--;
        }
        else
        {
            printf("%c",a[i]);
        }
        printf("\n");
    }
    return 0;
}
```

Output:



Single Line Comment Detection

Sample:

Input	Output
Good luck Bangladesh //it's a comment. Duck Duck Go..	Comment: it's a comment.

Necessary code:

```
#include <stdio.h>
#include <string.h>
int main ()
{
    char c, a[100], b[100];
    int j=0, len, k;
    scanf(" %[^~]",a);
    len = strlen(a);
    for(k=0 ; k<=len-1 ; k++)
    {
        if(a[k]=='/' && a[k+1]=='/')
        {
            k+=2;
            while(k<=len-1)
            {
                if( a[k]=='\n')
                    break;
                b[j++]=a[k++];
            }
        }
    }
    b[j]='\0';
    printf("\nComment:%s\n",b);

    return 0;
}
```

Output:

```
"E:\C programming\lab01\Untitled2.exe"
Good luck Bangladesh //it's a comment
Duck Duck Go..~

Comment:it's a comment

Process returned 0 (0x0)   execution time : 41.646 s
Press any key to continue.
```

Multiple Line Comment Detection

Sample:

Input	Output
Hello world How old are you? /* the world can't talk. stop joking*/ something..something…	Comment: the world can't talk. stop joking

Necessary code:

```
#include <stdio.h>
#include <string.h>
int main ()
{
    char c, a[100], b[100];
    int j=0, len, k;
    scanf(" %[^~]",a);
    len = strlen(a);
    for(k=0 ; k<=len-1 ; k++)
    {
        if(a[k]=='/' && a[k+1]=='*')
        {
            k+=2;
            while(a[k]!='*' && a[k+1]!='/')
            {
                b[j++]=a[k++];
            }
        }
    }
    b[j]='\0';
    printf("%s\n",b);

    return 0;
}
```

Output:

```
"E:\C programming\lab01\Untitled2.exe"
Hello world
How old are you? /*the world
can't talk
stop joking*/
something..something..~
Comment: the world
can't talk
stop joking

Process returned 0 (0x0)   execution time : 70.211 s
Press any key to continue.
```

Find the max frequency of a word in a string

Sample:

Input	Output
Duck Duck go.	Output: Duck

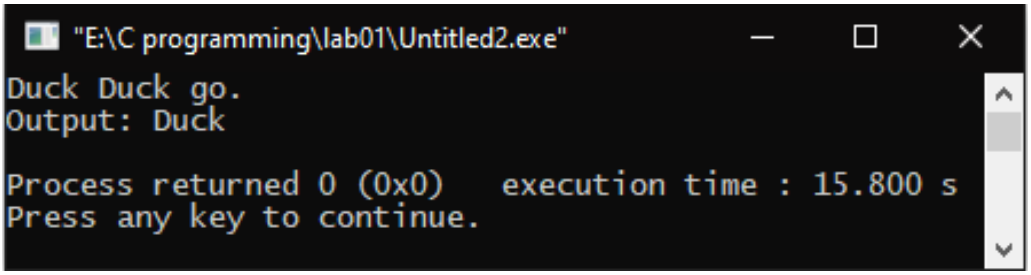
Necessary code:

```
#include<stdio.h>
#include<string.h>
int main()
{
    char a[100], b[100][100];
    int i, j=0, x, ct1=0, k=0, ct2=0, ct=0;
    gets(a);
    x=strlen(a);
    for(i=0 ; i<x ; i++)
    {
        if(a[i]!=' ')
        {
            ct1++;
            while(a[i]!=' ' && a[i]!='\0')
            {
                b[j][k]=a[i];
                k++;
                i++;
            }
        }
        j++;
        k=0;
    }
    for(i=0 ; i<ct1 ; i++)
    {
        for(j=0 ; j<ct1 ; j++)
        {
            if(strcmp(b[i],b[j])==0)
            {
                ct2++;
            }
        }
```

```
 if(ct2>ct)
        {
            x=i;
            ct=ct2;
        }
ct2=0;
   }
   printf("Output: %s\n",b[x]);

   return 0;
}
```

Output:



Count and show
the max frequency of a word in a string

Sample:

Input	Output
Who work work	Word: work Freq : 2

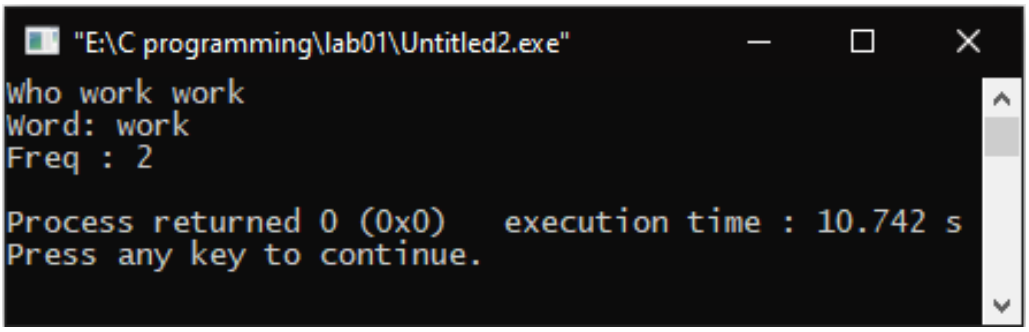
Necessary code:

```
#include<stdio.h>
#include<string.h>
int main()
{
    char b[100][100];
    int i, j=1, x, ct1=0, k=0, ct2=0, ct=0;
    gets(b[0]);
    x=strlen(b[0]);
    for(i=0 ; i<x ; i++)
    {
        if(b[0][i]!=' ')
        {
            ct1++;
            while(b[0][i]!=' ' && b[0][i]!='\0')
            {
                b[j][k++]=b[0][i++];
            }
        }
        j++;
        k=0;
    }
    for(i=1 ; i<=ct1 ; i++)
    {
        for(j=1 ; j<=ct1 ; j++)
        {
            if(strcmp(b[i],b[j])==0)
            {
                ct2++;
            }
        }
```

```
 if(ct2>ct)
        {
            x=i;
            ct=ct2;
        }
ct2=0;
   }
   printf("Word: %s\nFreq : %d\n",b[x],ct);

   return 0;
}
```

Output:



Find the title of a paragraph

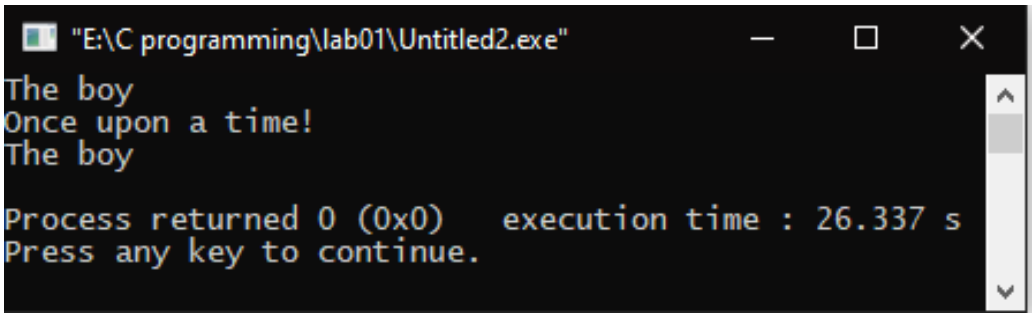
Sample:

Input	Output
The boy Once upon a time	The boy

Necessary code:

```
#include<stdio.h>
int main()
{
    int i;
    char str[100];
    scanf(" %[^!]",str);
   for(i=0;str[i]!='\0';i++)
   {
       if(str[i]=='\n')
       {
           break;
       }
       else
       {
           printf("%c",str[i]);
       }
   }
   printf("\n");
   return 0;
}
```

Output:



Store multiple strings into one string and print this

Sample:

Input	Output
Once upon a time, There was an angel In the river	Once upon a time, There was an angel In the river

Necessary code:

```
#include<stdio.h>
#include<string.h>
int main()
{
    int i,j=0,n,len=0,k=0;
    char s[100][100],a[1000][1000];
    printf("Enter number of string : ");
    scanf("%d",&n);
    for(i=0; i<n; i++)
    {
        scanf(" %[^\n]",s[i]);
    }
    for(i=0; i<n; i++)
    {
        len=strlen(s[i]);
        for(j=0; j<len; j++)
        {
            a[0][k]=s[i][j];
            k++;
        }
        if(a[0][k-1]!=' ')
            a[0][k++]=' ';
    }
    printf("%s\n",a);
    return 0;

}
```

Output:

```
"E:\C programming\lab01\Untitled2.exe"
Enter number of string : 3
Once upon a time,
There was an angel
In the river
Once upon a time, There was an angel In the river

Process returned 0 (0x0)   execution time : 12.940 s
Press any key to continue.
```

Project on Custom Compiler

The project is based on creating a personal compiler that can be maintained by an organization or a single user personally. This compiler is created by c programming language, that have customized token and functions to execute codes.

Objectives:

- Create a custom compiler that have customized tokens and functions.
- Secure productions of Software companies and other IT sectors from their competitors.
- Built in encryption system.
- Easy to learn.
- Efficient language for the programmers.

Expected outcomes:

- Software companies and other IT sectors can secure their productions.
- Custom tokens and functions are more easy and efficient then before.
- Programmers will find an efficient language for their support.
- A new programmer can easily access projects.

Project Motivation:

The project is based on creating a personal compiler that can be maintained privately by a company or a single user. We have customized our project with different features. We then use this compiler to secure a secure login. Although our goal was to identify tokens and remove them, perform custom actions.
In addition, we have removed the unused key word using this compiler. Using this compiler, also we aimed at detecting custom commands like "5 + 5" and showing the output. But due to the lack of time and the current situation in the world, we could not make up our mind to do our job properly.
But we are confident enough that our project is a bit different from the others and if we get the time and environment we need we can complete our project as we wanted.

Necessary code:

To execute this project with this given code, the files must be run consistently. Bold boxes indicate files

headerfile

```
#include<stdio.h>
#include<string.h>
#include<conio.h>
#include<math.h>
#include<stdlib.h>
#include<time.h>
#define PRINT printf
#define SCAN scanf
#define START main
#define FINISH return 0
#define LOOP while
#define INTEGER int
#define FLOAT float
#define CHAR char
#define IF if
#define SYSTEM ststem
#define DELAY delay
#define ELSE else
#define VOID void
#define DO do
#define GE getch
#define FOR for
```

FUNCTION

```
#include"headerfile.h"
VOID DELAY(INTEGER number_of_seconds)
{
   INTEGER milli_seconds = 1000 * number_of_seconds;
   clock_t start_time = clock();
   LOOP(clock() < start_time + milli_seconds);
}
OP(CHAR s[])
{
   system("cls");
   PRINT("\n\n\n\n\n\n\n\n\n\n\t\t\t\t\t\t");
   INTEGER I;
   FOR(I=0 ; s[I] ; I++)
   {
      IF((s[I]>='a' && s[I]<='z') || (s[I]>='A' && s[I]<='Z') || (s[I]>='0'
&& s[I]<='9'))
      PRINT("%c",s[I]);
```

```
 ELSE IF((s[I+1]>='a' && s[I+1]<='z') || (s[I+1]>='A' && s[I+1]<='Z') || 
(s[I+1]>='0' && s[I+1]<='9') && (!(s[I]>='a' && s[I]<='z') || (s[I]>='A' 
&& s[I]<='Z') || (s[I]>='0' && s[I]<='9')))
        PRINT(" ");
    }
    PRINT("\n\n\n\n\n\n\n\n\n\n\n");
}
INTEGER PASS(CHAR s[])
{
    IF(strcmp("1234",s)==0)
    return;
ELSE
    {
        INTEGER t=2;
        LOOP(t!=0)
        {
            system("cls");
            PRINT("\n\n\n\n\n\n\n\n\n\n\t\t\t\t\tUnknown 
PASSWORD !\n");
            DELAY(1.3);
            system("cls");
            PRINT("\n\n\n\n\n\n\n\n\n\n\t\t\t\t\tEnter 
PASSWORD : ");
            int p=0;
            DO
            {
                s[p]=getch();
                if(s[p]!='\r')
                {
                    printf("*");
                }
                p++;
            }
 LOOP(s[p-1]!='\r');
            s[p-1]='\0';
            IF(strcmp("1234",s)==0)
            return 1;
            t--;
        }
 system("cls");
        PRINT("\n\n\n\n\n\n\n\n\n\n\t\t\t\t\tBetter Luck Next 
Time !\n\n\n\n\n\n\n\n\n\n");
        DELAY(1.3);
    }
}
```

```
INTEGER USER(CHAR s[])
{
   IF(strcmp("172-15-1512",s)==0)
   return 1;
ELSE
   {
      INTEGER t=2;
      LOOP(t!=0)
      {
         system("cls");
         PRINT("\n\n\n\n\n\n\n\n\n\n\n\t\t\t\t\t\tUnknown USER
ID !\n");
         DELAY(1.3);
         system("cls");
         PRINT("\n\n\n\n\n\n\n\n\n\n\n\t\t\t\t\t\tEnter User ID :
");
         SCAN(" %[^\n]",s);
         IF(strcmp("172-15-1512",s)==0)
         return 1;
         t--;
      }
      system("cls");
      PRINT("\n\n\n\n\n\n\n\n\n\n\n\t\t\t\t\t\tBetter Luck Next
Time !\n\n\n\n\n\n\n\n\n\n");
      DELAY(1.3);
   }
}
```

Project_file

```
#include"headerfile.h"
#include"FUN.h"

INTEGER START()
{
   CHAR U[100], P[100], S[100];
   INTEGER X;
   PRINT("\n\n\n\n\n\n\n\n\n\n\n\t\t\t\t\t\tWELCOME TO OUR
PROJECT\n\n\t\t\t\t\t\t_______________________");
   PRINT("\n\n\n\t\t\t\t\t\tPress any key to continue ");
   GE();
   system("cls");
```

```
 PRINT("\n\n\n\n\n\n\n\n\n\n\t\t\t\t\t\tEnter User ID : ");
   SCAN(" %[^\n]",U);
   X=USER(U);
   system("cls");
   IF(X==1)
   {
      PRINT("\n\n\n\n\n\n\n\n\n\n\t\t\t\t\t\tEnter PASSWORD
: ");
      INTEGER p=0;
      DO
      {
         P[p]=GE();
         if(P[p]!='\r')
         {
            PRINT("*");
         }
         p++;
      } LOOP(P[p-1]!='\r');
      P[p-1]='\0';
      PASS(P);
   }
   system("cls");
   PRINT("\n\n\n\n\n\n\n\n\n\n\t\t\t\t\t\tSuccessfully Log In !
");
   DELAY(1.3);
   system("cls");
   PRINT("\n\n\n\n\n\n\n\n\n\n\t\t\t\t\t\tEnter a Random
String : ");
   SCAN(" %[^\n]",S);
   OP(S);

   FINISH;
}
```

Outputs after execution:

```
WELCOME TO OUR PROJECT

____________________

Press any key to continue
```

```
Enter User ID :
```

Case 1: Wrong user ID

```
Unknown USER ID !
```

Case 2: Valid user ID

```
Enter PASSWORD : *******
```

Case 3: Wrong user ID for 3 times

```
Better Luck Next Time !
```

```
Enter PASSWORD : *******
```

Case 1: Wrong password

```
Unknown PASSWORD !
```

Case 2: Valid password

```
Successfully Log In !
```

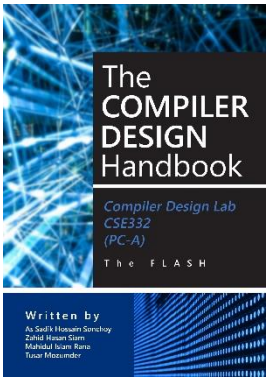
Case 3: Wrong password for 3 times

```
Better Luck Next Time !
```

```
Enter a Random String : I??? am   a,, boy---of'''24
```

```
I am a boy of 24
```

Thank You!



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