LAB MANUAL

Programming in C and C++ Lab

(3rd and 4th semesters)

PREPARED BY

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DEPARTMENT OF MATHEMATICS

Lab Objective

- At the end of the course students should be familiar with the main features of C and C++ languages.
- Be able to write C and C++ programs to solve a well specified problem.
- Understand C and C++ programs written by someone else.
- Be able to debug and test C and C++ programs;
- Understand how to read C and C++ doc library documentation and reuse library code.
- To make the students understand the features of object oriented principles and familiarize them with virtual functions, templates and exception handling.
- To make the students to develop applications using C and C++.

LAB COURSE DESCRIPTION

1. Course Code : 7BCEAP2
2. Course Title : Programming in C and C++
3. Core / Allied : Allied
4. Semester : III, IV
5. No. of hours per week : 2
6. List of Programs : Separate Sheet has been Attached for C and C++.
7. Examination : University Practical Examination will be conducted at the end of the IV semester.
8. Evaluation Procedure :

S. No.	EVALUATION DESCRIPTION	TOTAL MARKS
1.	Marks allotted for day – to – day lab work	5
2.	Marks allotted for Record Note Book	5
3.	Marks awarded for Viva - voce	5
4.	Marks awarded for Lab Internal Examination Examination will be conducted for 20 Marks C Program – 10 Marks C++ Program – 10 Marks	5
5.	Total Internal Marks	20
6.	University Practical Examination	30
7.	Total Marks Awarded For the Course	50

Lab Outcome

- Students will be able to apply the computer programming techniques to solve practical problems.
- Students will be able to understand the concepts and implementation of constructors and destructors.
- Students will be able to develop software applications using programming language C and object oriented programming language in C++
- Student can be able to understand and use the basic programming constructs of C and C++
- Students are able to learn C and C++ data types, functions and pointers, memory allocation/de – allocations.
- Students are able to apply object oriented programming concepts to software problems in C++.

LIST OF C – PROGRAMS

Exp. No.	Program
1.	Write a program in C to convert upper case into lower case.
2.	Write a program in C to find whether the given number is odd or even.
3.	Write a program in C to check whether the given year is leap or not.
4.	Write a program in C to calculate the area of the circle.
5.	Write a program in C to whether the given number is perfect or not.
6.	Write a program in C to find whether the given number is prime or not.
7.	Write a program in C to find whether the given string is palindrome or not.
8.	Write a program in C to sort the numbers in ascending and descending order.
9.	Write a program in C to find ${}^{N}C_{r}$ value.
10.	Write a program in C to count the occurrence of positives, negatives and zeroes in the list of numbers.
11.	Write a program in C to calculate simple and compound interest.
12.	Write a program in C to calculate the commission rate for the following data:

Amount of sales	Commission
10,000	5%
10,000 – 15,000	8%
More than 15,000	10%

13.	Write a program in C to construct the Pyramid of numbers.

14. Write a program in C to check whether the given number is Armstrong or not.
15. Write a program in C to count the number words and characters in a given text.
16. Write a program in C to reverse the given string.
17. Write a program in C to prepare the student mark list.

LIST OF C++ – PROGRAMS

Exp. No.	Program
1.	Write a program in C++ to find the sum of the digits of the given number.
2.	Write a program in C++ to list the terms of Fibonacci series.
3.	Write a program in C++ to find the largest value of two numbers.
4.	Write a program in C++ to calculate variance and standard deviation of N numbers.
5.	Write a program in C++ to add complex numbers.
6.	Write a program in C++ to reverse the digits of the given number.
7.	Write a program in C++ to calculate the volume of sphere, cone and cylinder using inline function.
8.	Write a program in C++ to prepare the pay bill of employees.
9.	Write a program in C++ to perform the matrix addition, subtraction.
10.	Write a program in C++ to perform the matrix multiplication.
11.	Write a program in C++ to prepare the student mark list.
12.	Write a program in C++ to find whether the given number is odd or even.
13.	Write a program in C++ to sort the numbers in ascending order.
14.	Write a program in C++ to sort the given strings.

Installing procedure of Turbo C

Here is a simple tutorial on How to install Turbo C compiler in Windows

1. First of all, a fact should be known that Windows 7 don't directly support any DOS based applications to run into it. So, first of all, you need to install a third party application called DosBox 0.74.

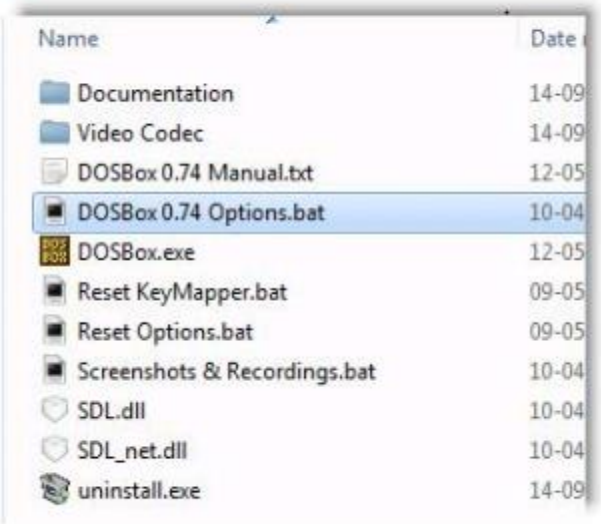
2. This application basically provides the essential environment for Turbo C or any DOS related application to execute in it.

3. Now, install DosBox as usual.

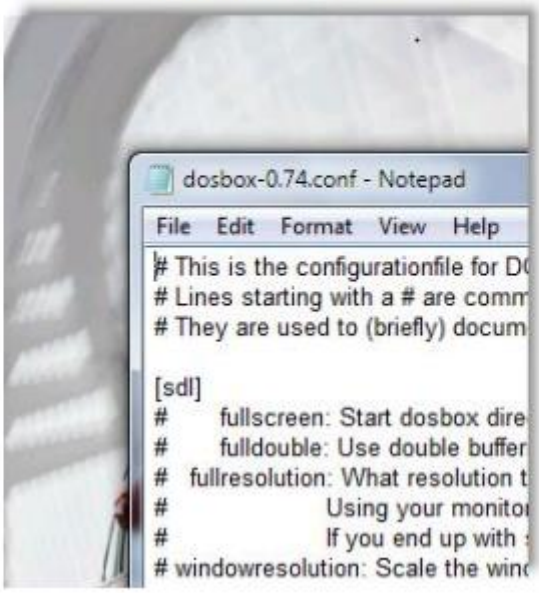
4. Extract TC.zip file into ***C:\Turbo*** folder.

5. Now go to the directory where the program DosBox 0.74 is installed.

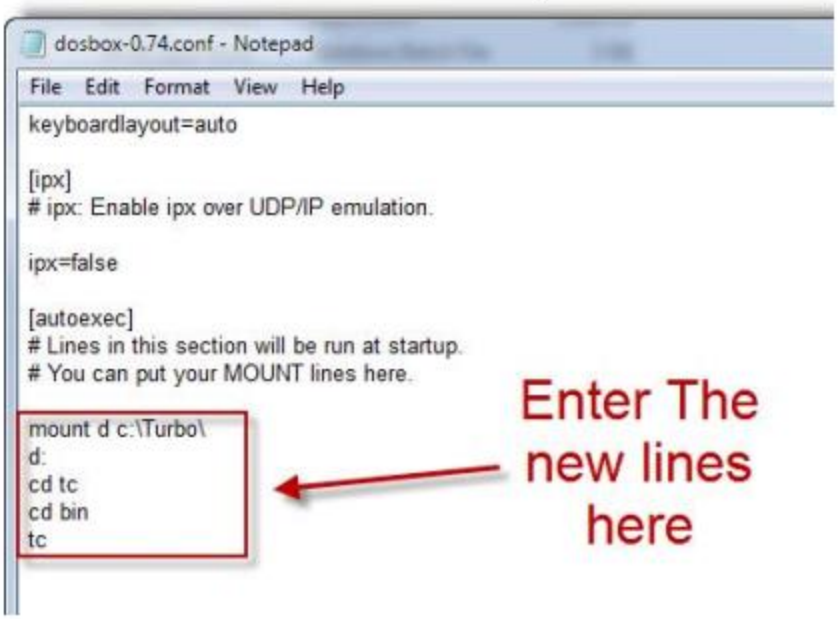
6. Open the file named ***DOSBox 0.74 Options.bat.*** It will look like below image.



7. *DosBox 0.74 options.bat* will look like this



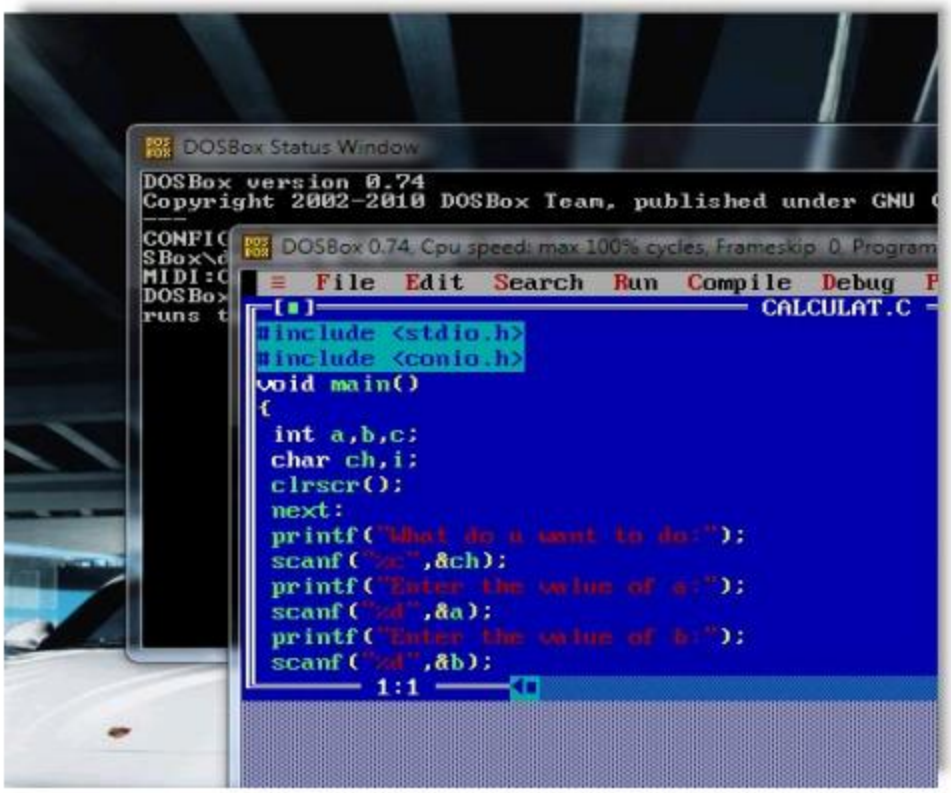
Now navigate till the end of the file and insert the lines shown in the image below.



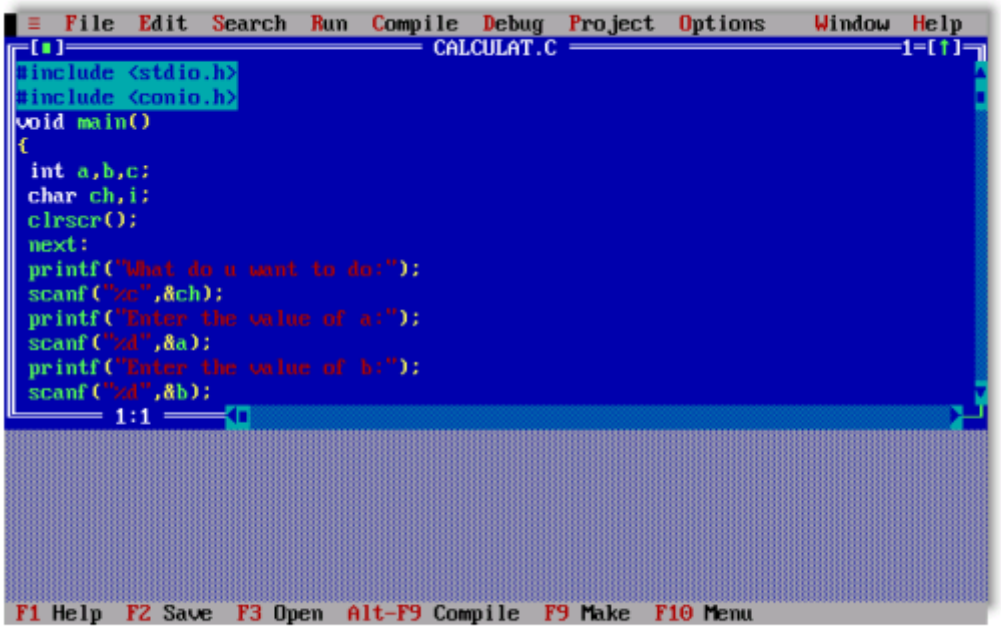
8. If you can't see the lines in the image, here are the same lines.

mount d c:\Turbo
d:
cd tc
cd bin
tc

After editing is done, save the file and then open the DosBox it will open like this.



If you want to have a full screen feel, press **Alt+Enter** to see the window in full screen.



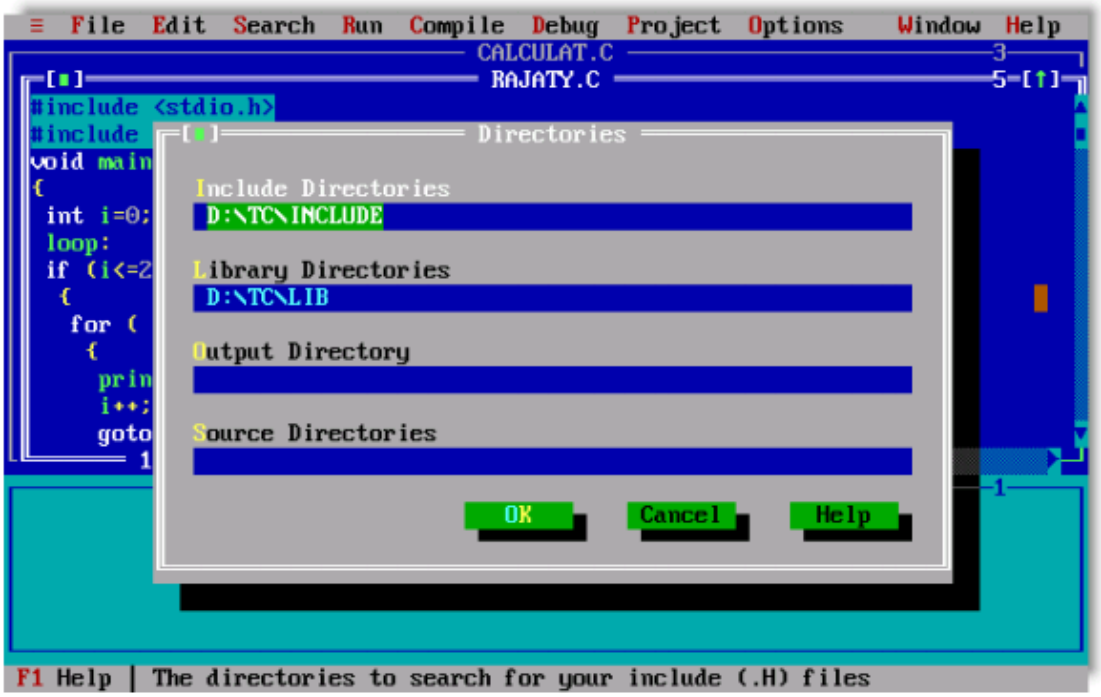
10. Now, in Turbo C editor, goto **Options** > **Directories..**

11. Now put the following values in the fields mentioned below.

Include Directories : **D:\TC\INCLUDE**

Library Directories : **D:\TC\LIB**

The following image will give you a clear idea.



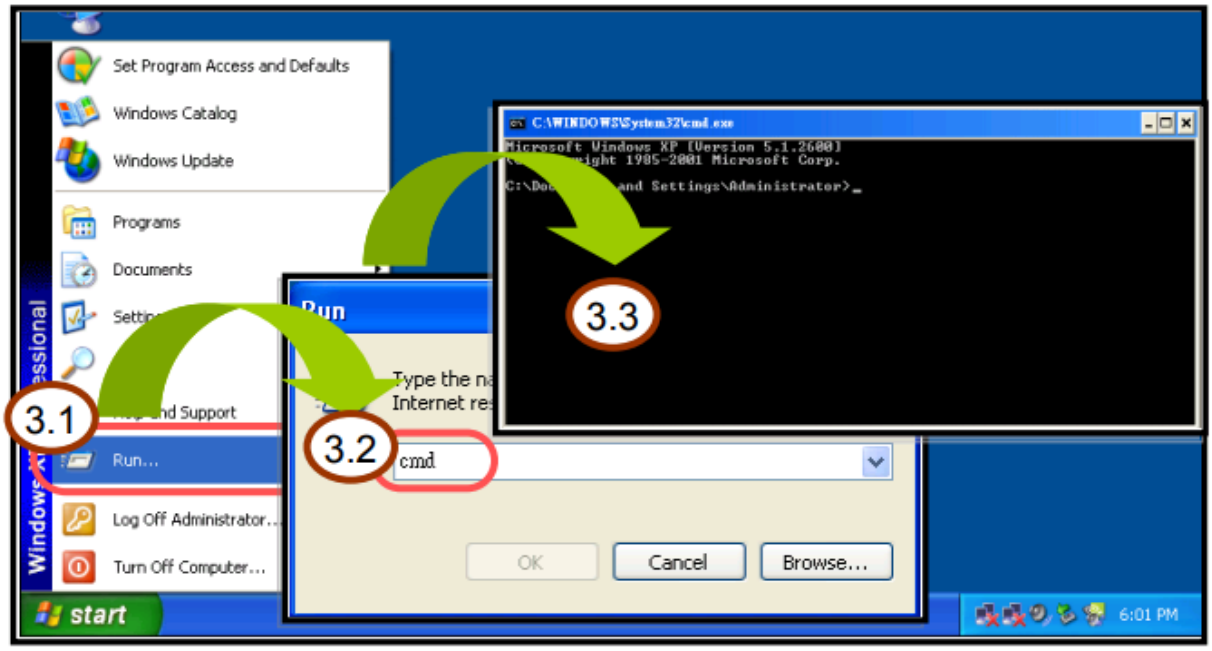
12. Enjoy C Programming on Windows 7.

Install Turbo C++ version 1.01

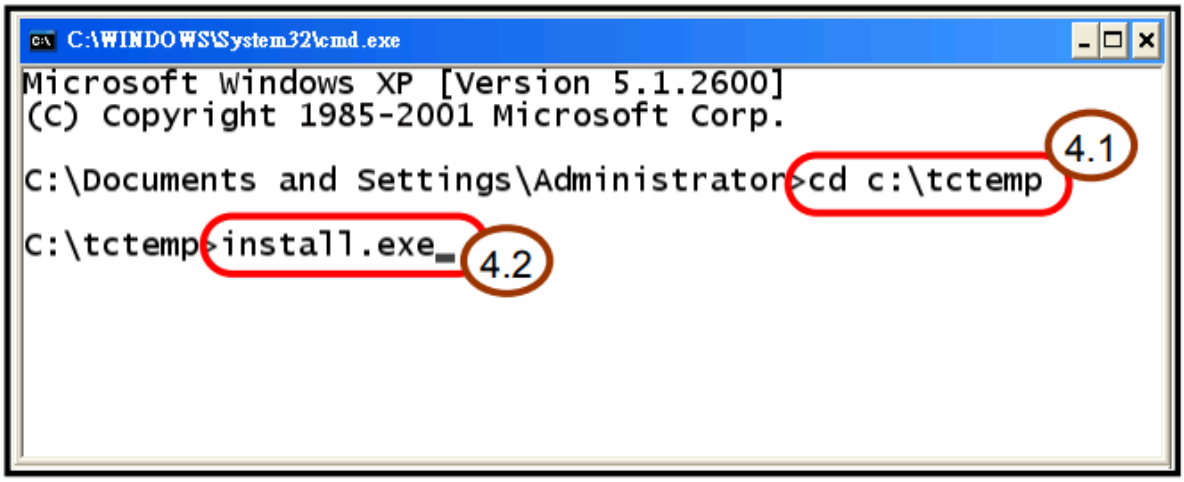
Step 1: Go to where you downloaded the file, and double click on the self-extracting file (tcpp101.zip) in Windows to extract it. This will open a WinZip Self-Extractor window (you do **NOT** need WinZip installed on your machine). By default, this will extract the files to the **C:\tctemp** directory. You may designate a different location.

Step 2: Once the files have been extracted, exit the WinZip Self-Extractor window.

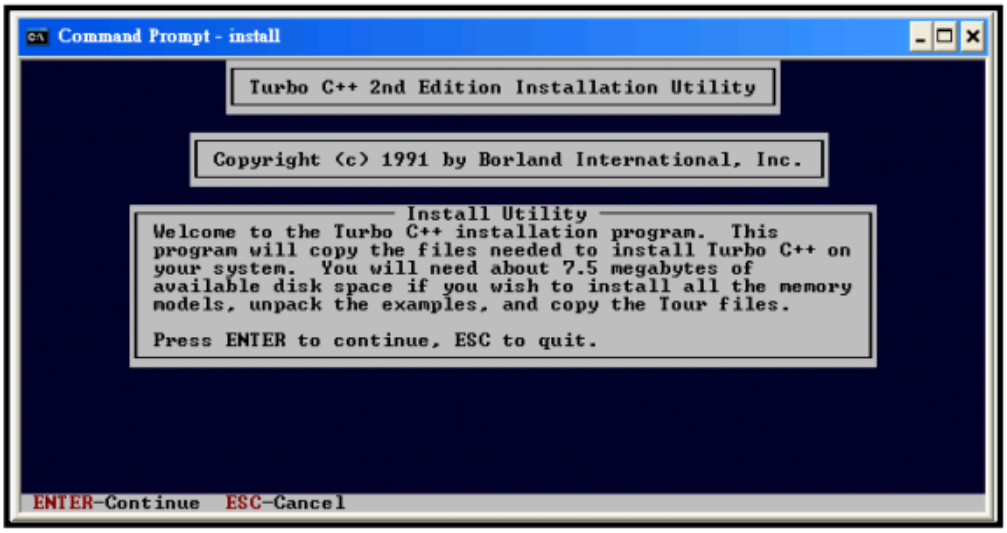
Step 3: Open an MS-DOS command prompt window.



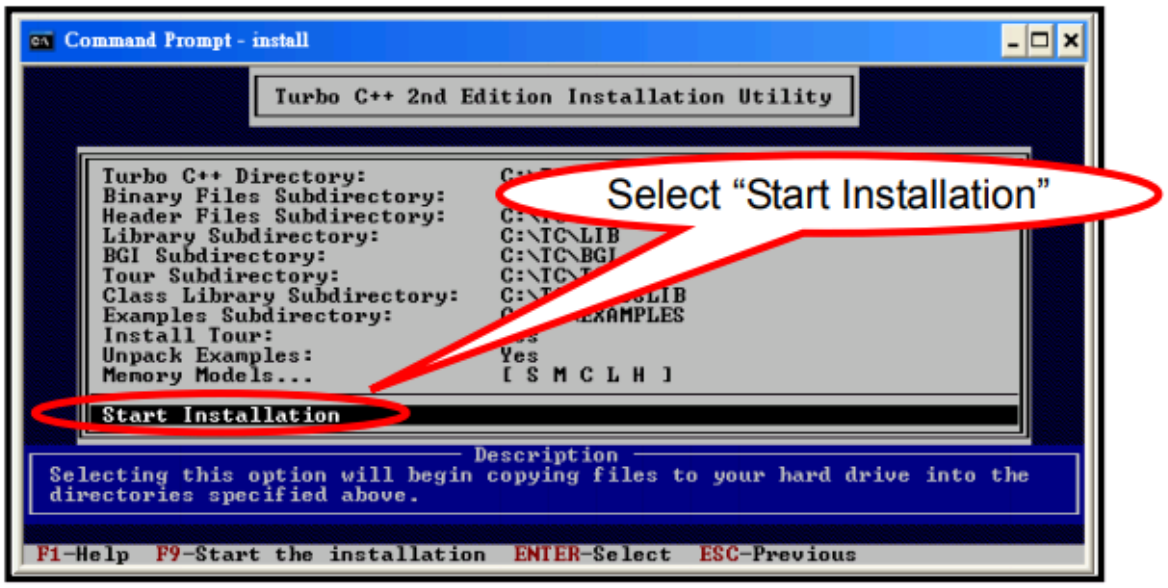
Step 4: Change the directory to the **c:\tctemp** (or wherever you put the unzipped files folder), and execute the **INSTALL.EXE** file.



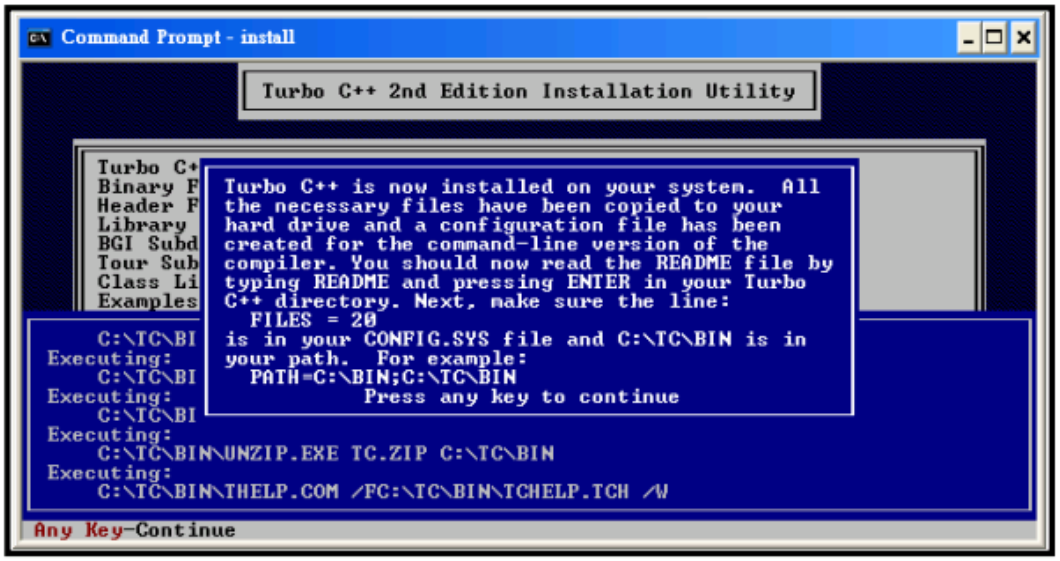
Step 5: The following instructions will guide you through the installation process.



Step 5.1: Press <**ENTER**> to start the installation
Step 5.2: Select the **drive** where the unzipped file is located. The default is "A", so you should enter **"C"**, then press <**ENTER**>.
Step 5.3: Press <**ENTER**> again. This will install the software from the directory \tctemp.
Step 5.4: Press <**ENTER**> again. This allows Turbo C to be installed on the Hard Drive.
Step 5.5: Use the Up/Down arrow keys (Press the up arrow once) to select Start Installation, and then press <**ENTER**> again.



Step 5.6: At this point, the Turbo C++ version 1.01 compiler is installed in C:\TC, which is where the tcc.exe executable is also located.



C - Programs

1. Write a program in C to convert upper case into lower case.

Aim

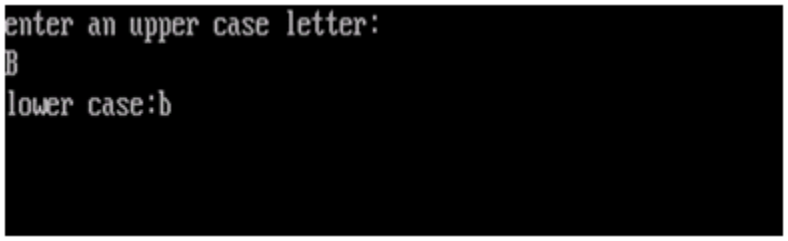
To write a program in C to convert upper case into lower case.

Program code

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
main()
{
int c;
clrscr();
printf("enter an upper case letter:\n");
c=getchar();
printf("lower case:");
putchar(c+32);
getch();
}
```

Input / Output

Sample 1



Result

The program is executed and the output has been verified.

2. Write a program in C to find whether the given number is odd or even.

Aim

To write a program in C to find whether the given number is odd or even.

Program code

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
main()
{
int n;
clrscr();
printf("Enter the number:\n");
scanf("%d",&n);
if(n%2==0)
printf("The number %d is even",n);
else
printf("The number %d is odd",n);
getch();
}
```

Input / Output

Sample 1

Sample 2

Result

The program is executed and the output has been verified.

3. Write a program in C to check whether the given year is leap or not.

Aim

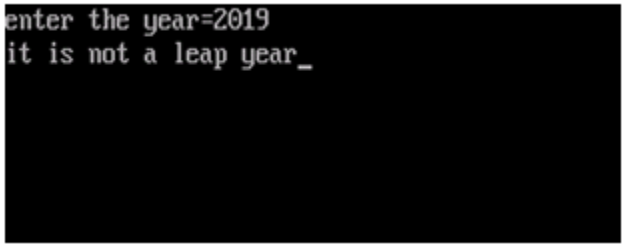
To write a program in C to check whether the given year is leap or not.

Program code

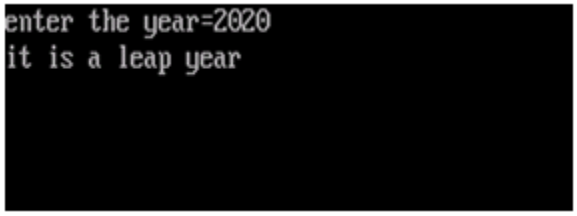
```
#include<stdio.h>
#include<conio.h>
#include<math.h>
main()
{
int n;
clrscr();
printf("enter the year=");
scanf("%d",&n);
if(n%4==0)
printf("it is a leap year");
else
printf("it is not a leap year");
getch();
}
```

Input / Output

Sample 1



Sample 2



Result

The program is executed and the output has been verified.

4. Write a program in C to calculate the area of the circle.

Aim

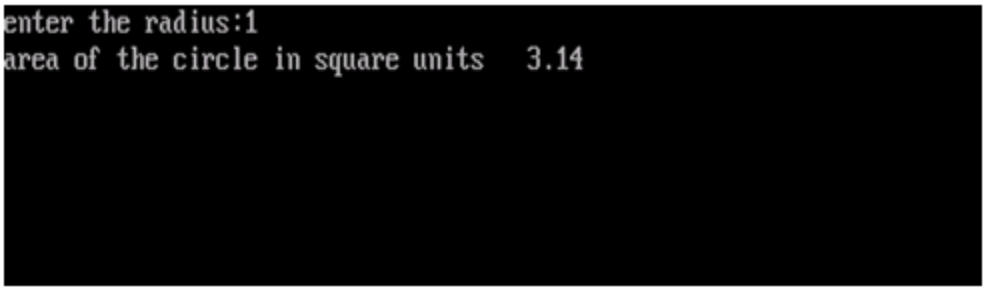
To write a program in C to calculate the area of the circle.

Program code

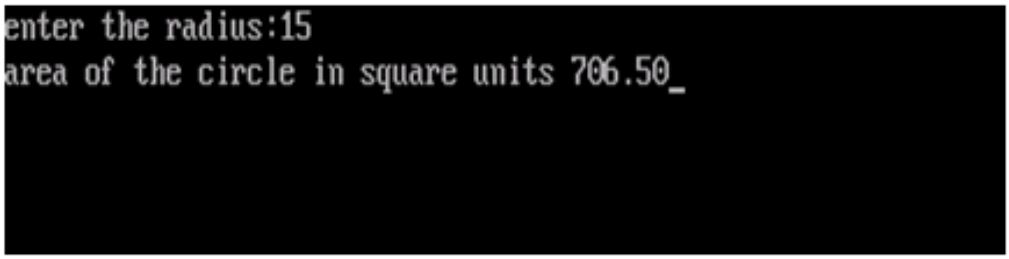
```
#include<stdio.h>
#include<conio.h>
main()
{
float radius,area;
clrscr();
printf("enter the radius:");
scanf("%f",&radius);
area=3.14*radius*radius;
printf("area of the circle in square units %6.2f",area);
getch();
}
```

Input / Output

Sample 1



Sample 2



Result

The program is executed and the output has been verified.

5. Write a program in C to check whether the given number is perfect or not.

Aim

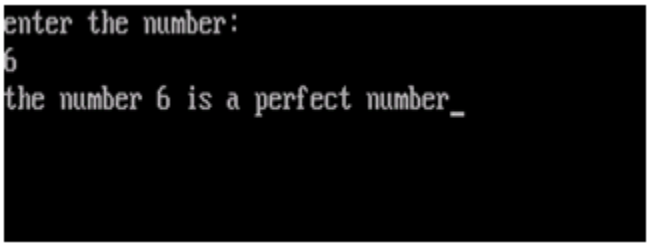
To write a program in C to check whether the given number is perfect or not.

Program code

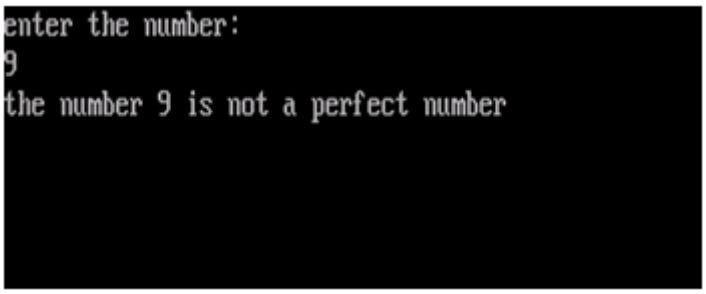
```
#include<stdio.h>
#include<conio.h>
main()
{
int n,r,i;
int p=0;
clrscr();
printf("enter the number:\n");
scanf("%d",&n);
for(i=1;i<n;i++)
{
if(n%i==0)
p=p+i;
}
if(p==n)
printf("the number %d is a perfect number",n);
else
printf("the number %d is not a perfect number",n);
getch();
}
```

Input / Output

Sample 1



Sample 2



Result

The program is executed and the output has been verified.

6. Write a program in C to find whether the given number is prime or not.

Aim

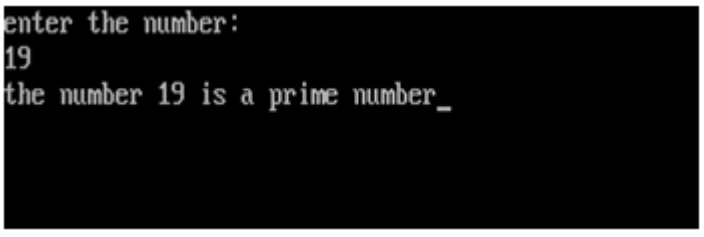
To write a program in C to find whether the given number is prime or not.

Program code

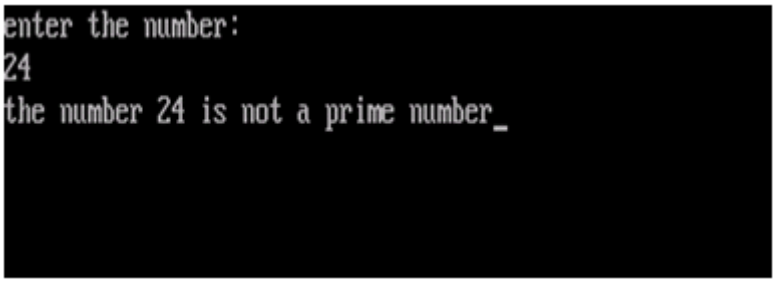
```
#include<stdio.h>
#include<conio.h>
main()
{
int n,c=0,i,r;
clrscr();
printf("enter the number:\n");
scanf("%d",&n);
for(i=1;i<=n;i++)
{
r=n%i;
if(r==0)
c=c+1;
}
if(c==2)
printf("the number %d is a prime number",n);
else
printf("the number %d is not a prime number",n);
getch();
}
```

Input / Output

Sample 1



Sample 2



Result

The program is executed and the output has been verified.

7. Write a program in C to find whether the given string is palindrome or not.

Aim

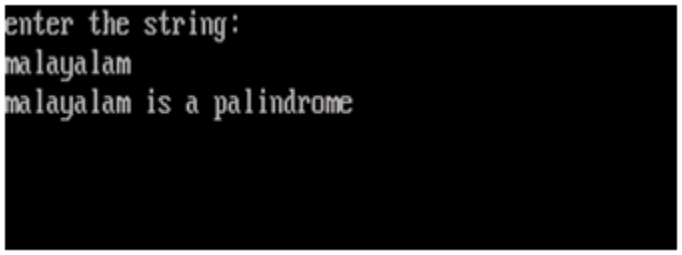
To write a program in C to find whether the given string is palindrome or not.

Program code

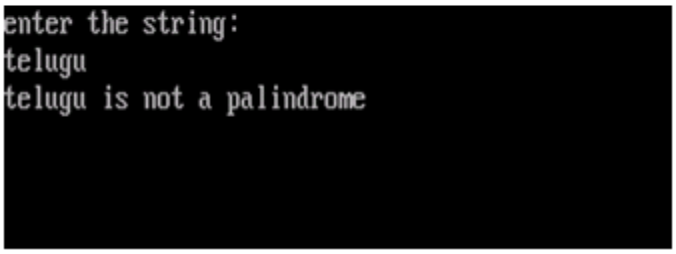
```
#include<stdio.h>
#include<conio.h>
#include<string.h>
main()
{
char name1[20],name2[20];
clrscr();
printf("enter the string:\n");
scanf("%s",&name1);
strcpy(name2,name1);
strrev(name2);
if(strcmp(name1,name2)==0)
printf("%s is a palindrome",name1);
else
printf("%s is not a palindrome",name1);
getch();
}
```

Input / Output

Sample 1



Sample 2



Result

The program is executed and the output has been verified.

8. Write a program in C to sort the numbers in ascending and descending order.

Aim

To write a program in C to sort the numbers in ascending and descending order.

Program code

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
main()
{
int n,data[10],i,j,temp;
clrscr();
printf("how many numbers?\n");
scanf("%d",&n);
printf("enter the numbers that are to be sorted\n");
for(i=1;i<=n;i++)
scanf("%d",&data[i]);
for(i=1;i<n;i++)
{
for(j=i+1;j<=n;j++)
{
if(data[i]>data[j])
{
temp=data[i];
data[i]=data[j];
data[j]=temp;
}
}
}
```

```
printf("ascending order:\n");
for(i=1;i<=n;i++)
printf("%d\n",data[i]);
printf("descending order:\n");
for(i=n;i>=1;i--)
printf("%d\n",data[i]);
getch();
}
```

Input / Output

Sample 1

```
how many numbers?
10
enter the numbers that are to be sorted
965
23
46
12
1
6
257
5
49
53
ascending order:
1       5       6       12      23      46      49      53      257     965
descending order:
965     257     53      49      46      23      12      6       5       1
```

Result

The program is executed and the output has been verified.

9. Write a program in C to find $^{N}C_{r}$ value.

Aim

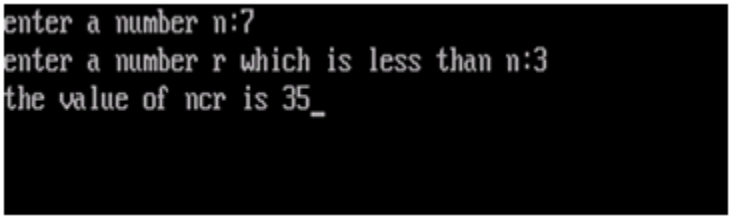
To write a program in C to find $^{N}C_{r}$ value.

Program code

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
long fact(int)
main()
{
int n,r;
long int ncr;
clrscr();
printf("enter the value of n:");
scanf("%d",&n);
printf("enter the value of r less than n:");
scanf("%d",&r);
ncr=fact(n)/(fact(r)*fact(n-r));
printf("the value of ncr is %d,"ncr);
getch();
}
long fact(int n)
{
long int f=1,i;
for(i=1;i<=1;i++)
{
f*=i;
}
return(f);
}
```

Input / Output

Sample 1



Result

The program is executed and the output has been verified.

10. Write a program in C to count the occurrence of positives, negatives and zeroes in the list of numbers.

Aim

To write a program in C to count the occurrence of positives, negatives and zeroes in the list of numbers.

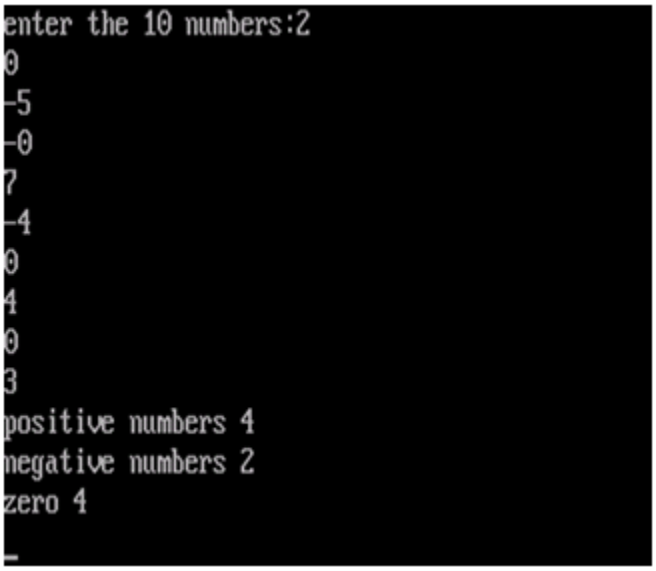
Program code

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
main()
{
int countp=0,countn=0,countz=0,arr[10],i;
clrscr();
printf("enter the 10 numbers:");
for(i=0;i<10;i++)
{
scanf("%d",&arr[i]);
}
for(i=0;i<10;i++)
{
if(arr[i]<0)
{
countn++;
}
else if (arr[i]==0)
{
countz++;
}
else
{
countp++;
}
```

```
}
printf("positive numbers %d\n",countp);
printf("negative numbers %d\n",countn);
printf("zero %d\n",countz);
getch();
}
```

Input / Output

Sample 1



Result

The program is executed and the output has been verified.

11. Write a program in C to calculate simple and compound interest.

Aim

To write a program in C to calculate simple and compound interest.

Program code

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
main()
{
float p,q,r,si,ci;
int n;
clrscr();
printf("enter the value of principal,rate,time:\n");
scanf("%f%f%f",&p,&r,&q);
si=(p*r*q)/100;
printf("simple intrest si=%9.2f",si);
ci=p*pow((1+r/100),q)-p;
printf("\ncompound intrest ci=%9.2f\n",ci);
getch();
}
```

Input / Output

Sample 1

```
enter the value of principal,rate,time:
6000
5
4
simple intrest si=  1200.00
compound intrest ci=  1293.04
```

Result

The program is executed and the output has been verified.

12. Write a program in C to calculate the commission rate for the following data:

Amount of sales	Commission
10,000	5%
10,000 – 15,000	8%
More than 15,000	10%

Aim

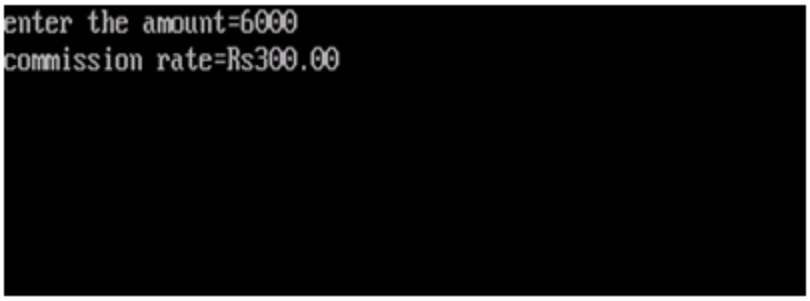
To write a program in C to calculate the commission rate for the given data.

Program code

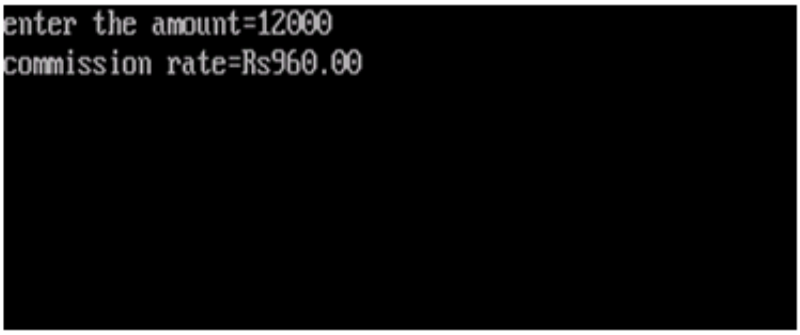
```
#include<stdio.h>
#include<conio.h>
main()
{
long int n;
float s;
clrscr();
printf("enter the amount=");
scanf("%ld",&n);
if(n<=10000)
s=n*5/100;
else if(n>10000&&n<=15000)
s=n*8/100;
else if(n>15000)
s=n*10/100;
printf("commission rate=Rs%6.2f",s);
getch();
}
```

Input / Output

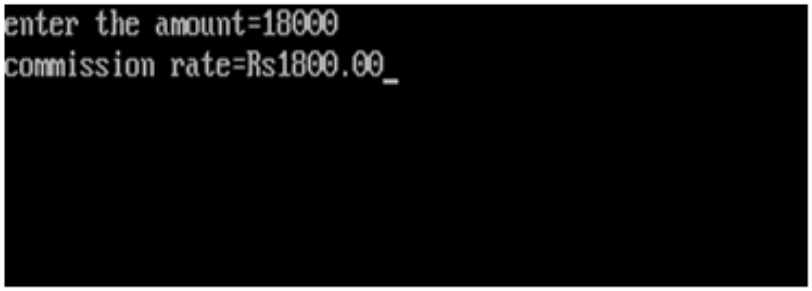
Sample 1



Sample 2



Sample 3



Result

The program is executed and the output has been verified.

13. Write a program in C to construct the Pyramid of numbers.

Aim

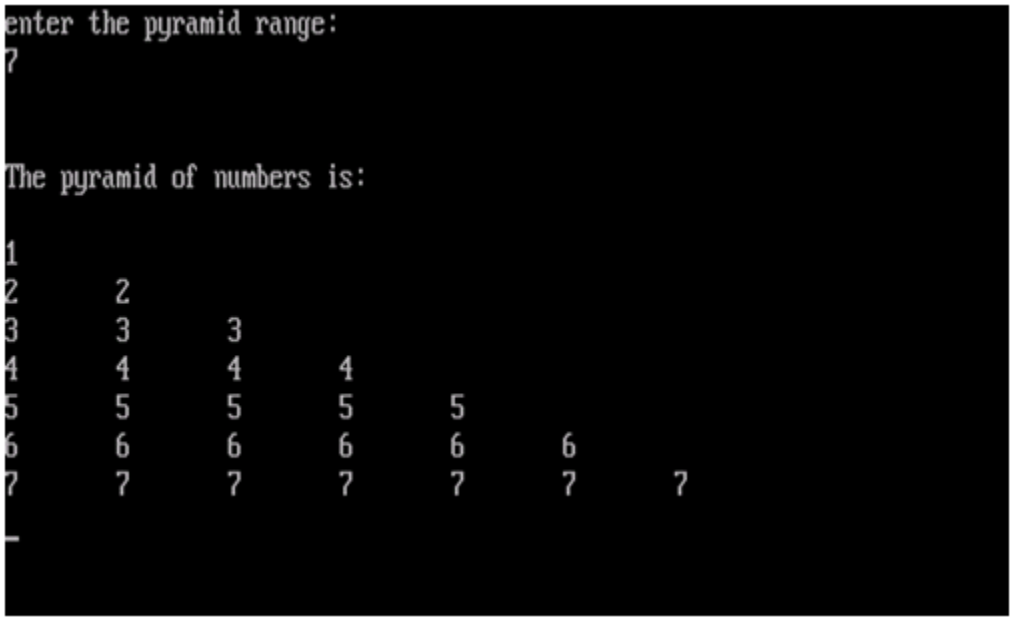
To write a program in C to construct the Pyramid of numbers.

Program code

```
#include<stdio.h>
#include<conio.h>
main()
{
int i,j,n;
clrscr();
printf("enter the pyramid range:\n");
scanf("%d",&n);
printf("\n\n the pyramid of numbers is:\n\n");
for(i=1;i<=n;i++)
{
for(j=1;j<=i;j++)
printf("%d\t",i);
printf("\n");
}
getch();
}
```

Input / Output

Sample 1



Result

The program is executed and the output has been verified.

14. Write a program in C to check whether the given number is Armstrong or not.

Aim

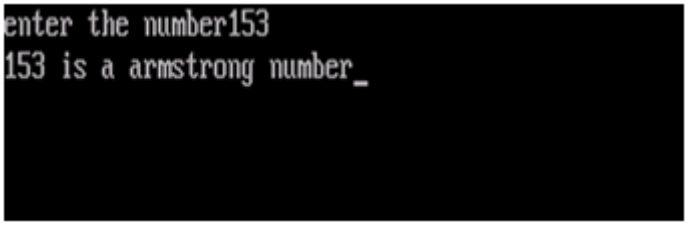
To write a program in C to check whether the given number is Armstrong or not.

Program code

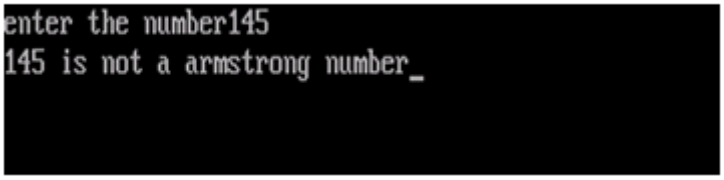
```
#include<stdio.h>
#include<conio.h>
main()
{
int n,rem,sum=0, n1;
clrscr();
printf("enter the number");
scanf("%d",&n);
n1=n;
while(n>0)
{
rem=n%10;
sum=sum+rem*rem*rem;
n=n/10;
}
if(n1==sum)
printf("%d is a armstrong number",n1);
else
printf("%d is not a armstrong number",n1);
getch();
}
```

Input / Output

Sample 1



Sample 2



Result

The program is executed and the output has been verified.

15. Write a program in C to count the words and characters in the given text.

Aim

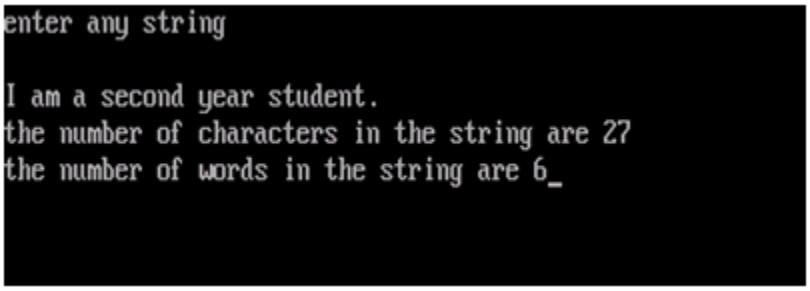
To write a program in C to count the words and characters in the given text.

Program

```
#include<stdio.h>
#include<conio.h>
#include<string.h>
void main()
{
char str[100];
int i=0,l=0,f=1;
clrscr();
puts("enter any string\n");
gets(str);
for(i=0;str[i]!='\0';i++)
{
l=l+1;
}
printf("the number of characters in the string are %d\n",l);
for(i=0;i<l-1;i++)
{
if(str[i]==' ')
{
f=f+1;
}
}
printf("the number of words in the string are %d",f);
getch();
}
```

Input / Output

Sample 1



Result

The program is executed and the output has been verified.

16. Write a program in C to reverse the given string.

Aim

To write a program in C to reverse the given string.

Program code

```
#include<stdio.h>
#include<conio.h>
main()
{
int i,j;
clrscr();
char name[10];
printf("enter the name:\n");
scanf("%s",&name);
for(i=0;name[i]!='\0';i++)
{
}
printf("the reverse of %s:",name);
for(j=i;j>=0;j- -)
printf("%c",name[j]);
getch();
}
```

Input / Output

Sample 1

Result

The program is executed and the output has been verified.

17. Write a program in C to prepare the student mark list.

Aim

To write a program in C to prepare the student mark list.

Program code

```
#include<stdio.h>
#include<conio.h>
#include<string.h>
struct stud
{
int rno;
char name[10];
int m1,m2,m3,m4,m5;
int tot;
float avg;
char res[5];
};
main()
{
struct stud s[20];
int i,n;
clrscr();
printf("enter how many student:\n");
scanf("%d",&n);
for(i=1;i<=n;i++)
{
printf("enter the register number:\n");
scanf("%d", &s[i].rno);
printf("enter the name:\n");
scanf("%s",&s[i].name);
printf(“enter the marks:\n”);
```

```
scanf("%d%d%d%d%d",&s[i].m1, &s[i].m2, &s[i].m3,
&s[i].m4,                                                    &s[i].m
5);
s[i].tot=s[i].m1+s[i].m2+s[i].m3+s[i].m4+s[i].m5;
s[i].avg=s[i].tot/5;
if(s[i].m1>=35&&s[i].m2>=35&&s[i].m3>=35&&s[i].m4>=35&&s[i].m5>=
35)
strcpy(s[i].res,"pass");
else
strcpy(s[i].res,"fail");
}
clrscr();
printf("\t\t\t student record\n");
printf("\t\t\t ***************\n");
printf("rno\t name\t m1\t m2\t m3\t m4\t m5\t tot\t avg\t res\t");
printf("**************************************************
                                    *************************\n");
for(i=1;i<=n;i++)
{
printf("%d\t%s\t%d\t%d\t%d\t%d\t%d\t",s[i].rno,s[i].name,s[i].m1,s[i].
m2,s[i].m3,s[i].m4,s[i].m5);
printf("%d\t%6.2f\t%s\n",s[i].tot,s[i].avg,s[i].res);
}
getch();
}
```

Input / Output

Sample 1

```
enter how many student:
2
enter the register number:
1001
enter the name:
abirami
enter the marks:
98
87
56
45
71
enter the register number:
1002
enter the name:
kavitha
enter the marks:
92
34
99
100
99
```

```
                    student record
                    **************
rno     name    m1      m2      m3      m4      m5      tot     avg     res
********************************************************************************
1001    abirami 98      87      56      45      71      357     71.00   pass
1002    kavitha 92      34      99      100     99      424     84.00   fail
```

Result

The program is executed and the output has been verified.

C++ - Programs

1. Write a program in C++ to find the sum of the digits of the given number.

Aim

To write a program in C++ to find the sum of the digits of the given number.

Program code

```
#include<iostream.h>
#include<conio.h>
class sumofdigits
{
public:
sumofdigits(int t);
};
sumofdigits::sumofdigits(int n1)
{
int r,sum=0;
while(n1>0)
{
r=n1%10;
sum=sum+r;
n1=n1/10;
}
cout<<"sumofdigits is:"<<sum;
}void main()
{
int n;
clrscr();
cout<<"\t\t\t sum of digits using constructor\n";
cout<<"\t\t\t*********************************\n";
cout<<"enter the number:";
cin>>n;
sumofdigits s1=sumofdigits(n);
getch();
}
```

Output

Sample 1

Result

The program is executed and the output has been verified.

2. Write a program in C++ to list the terms of Fibonacci series.

Aim

To write a program in C++ to list the terms of Fibonacci series.

Program code

```
#include<iostream.h>
#include<conio.h>
void main()
{
int i,f1,f2,f3,n;
clrscr();
f1=0;
f2=1;
cout<<"enter the value of n:"<<endl;
cin>>n;
cout<<"fibonacci series is:"<<endl;
cout<<f1<<endl;
cout<<f2<<endl;
for(i=1;i<=n-2;i++)
{
f3=f1+f2;
cout<<f3<<endl;
f1=f2;
f2=f3;
}
getch();
}
```

Output

Sample 1

Result

The program is executed and the output has been verified.

3. Write a program in C++ to find the largest value of two numbers.

Aim

To write a program in C++ to find the largest value of two numbers.

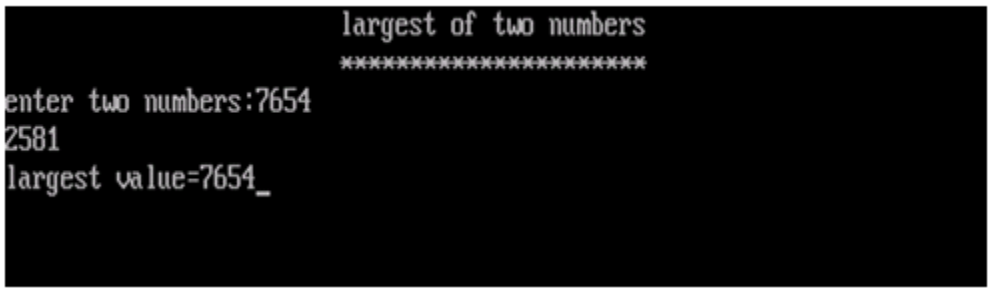
Program code

```
#include<iostream.h>
#include<conio.h>
#include<math.h>
class set
{
int m,n;
public:
void input();
void display();
int largest();
};
int set::largest()
{
if(m>=n)
return(m);
else
return(n);
}
void set::input()
{
cout<<"enter two numbers:";
cin>>m>>n;
}
void set::display()
{
cout<<"largest value="<<largest();
}
int main()
```

```
{
set A;
clrscr();
cout<<"\t\t\t"<<"largest of two numbers"<<endl;
cout<<"\t\t\t"<<"**********************"<<endl;
A.input();
A.display();
getch();
return 0;
}
```

Output

Sample 1



Sample 2

Result

The program is executed and the output has been verified.

4. Write a program in C++ to calculate variance and standard deviation of N numbers.

Aim

To write a program in C++ to calculate variance and standard deviation of N numbers.

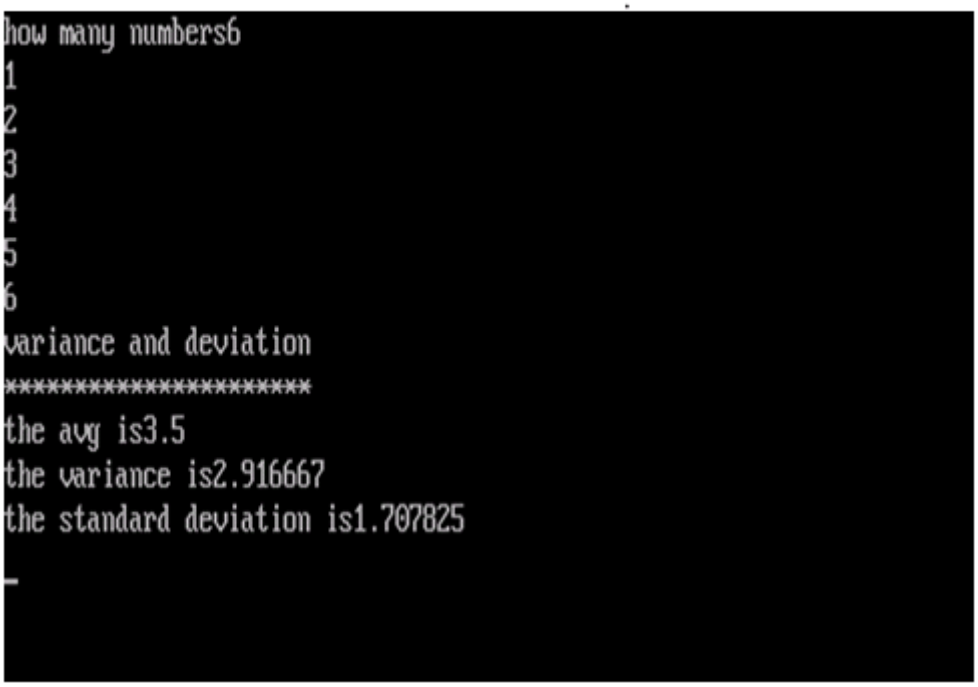
Program code

```
#include<iostream.h>
#include<conio.h>
#include<math.h>
void main()
{
int n,i;
clrscr();
float x[10];
float avg,vari,sd,sum=0,sum1=0;
cout<<"how many numbers";
cin>>n;
for(i=0;i<n;i++)
{
cin>>x[i];
}
for(i=0;i<n;i++)
{
sum=sum+x[i];
}
avg=sum/(float)n;
for(i=0;i<n;i++)
{
sum1=sum1+pow((x[i]-avg),2);
}
vari=sum1/(float)n;
sd=sqrt(vari);
cout<<"variance and deviation"<<endl;
cout<<"**********************"<<endl;
```

```
cout<<"the avg is"<<avg<<endl;
cout<<"the variance is"<<vari<<endl;
cout<<"the standard deviation is"<<sd<<endl;
getch();
}
```

Output

Sample 1



Result

The program is executed and the output has been verified.

5. Write a program in C++ to add complex numbers.

Aim

To write a program in C++ to add complex numbers.

Program code

```
#include<iostream.h>
#include<conio.h>
#include<math.h>
class complex
{
float x;
float y;
public:
complex()
{
}
complex(float real,float image)
{
x=real;
y=image;
}
complex operator+(complex);
void display(void);
};
complex complex::operator+(complex c)
{
complex temp;
temp.x=x+c.x;
temp.y=y+c.y;
return(temp);
}
void complex::display(void)
{
```

```
cout<<x<<"+j"<<y<<"\n";
}
int main()
{
complex c1,c2,c3;
clrscr();
c1=complex(2.5,3.5);
c2=complex(1.6,2.7);
c3=c1+c2;
cout<<"c1=";c1.display();
cout<<"c2=";c2.display();
cout<<"c3=";c3.display();
getch();
return 0;
}
```

Output

Sample 1

Result

The program is executed and the output has been verified.

6. Write a program in C++ to reverse the digits of the given number.

Aim

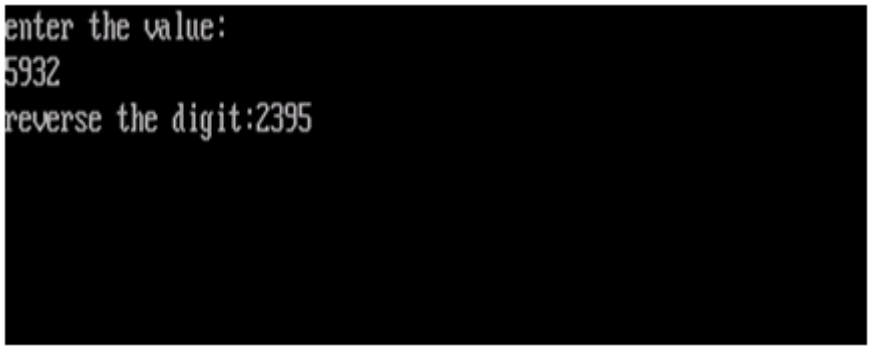
To write a program in C++ to reverse the digits of the given number.

Program code

```
#include<iostream.h>
#include<conio.h>
void main()
{
int n,r,s=0;
clrscr();
cout<<"enter the value:"<<endl;
cin>>n;
while(n>0)
{
r=n%10;
s=(s*10)+r;
n=n/10;
}
cout<<"reverse the digit:"<<s;
getch();
}
```

Output

Sample 1



Result The program is executed and the output has been verified.

7. Write a program in C++ to calculate the volume of sphere, cone and cylinder using inline function.

Aim

To write a program in C++ to calculate the volume of sphere, cone and cylinder using inline function.

Program code

```
#include<iostream.h>
#include<conio.h>
#include<math.h>
const double pi=3.14159;
inline double sphere(double r)
{
return(4.0/3.4*pi*pow(r,3));
}
inline double cylinder(double r,int h)
{
return(3.14*r*r*h);
}
inline double cone(double r,int h)
{
return(3.14*r*r*h)/3;
}
void main()
{
double radius,r,h,r1,h1,y;
clrscr();
cout<<"enter the radius of sphere:";
cin>>radius;
cout<<"\n volume of the sphere is:"<<sphere(radius);
cout<<"\n enter the radius and height of the cylinder r and n";
cin>>r>>h;
y=cylinder(r,h);
```

```
cout<<"\n the volume of the cylinder is:"<<y;
cout<<"\n enter the radius and height:";
cin>>r>>h;
cout<<"the volume of the cone is:"<<cone(r,h);
getch();
}
```

Output

Sample 1

```
enter the radius of sphere:3

 the volume of the sphere is:99.791682
 enter the radius and height of the cylinder r and n3
4

 the volume of the cylinder is:113.04
 enter the radius and height of the cone:4
5
the volume of the cone is:83.733333_
```

Result

The program is executed and the output has been verified.

8. Write a program in C++ to prepare the pay bill of employees.

Aim

To write a program in C++ to prepare the pay bill of employees.

Program code

```
#include<iostream.h>
#include<conio.h>
class emp
{
int num;
float basic,da,lic,pf,hra,np,gp;
char name[20];
public:
void getdata()
{
cout<<"enter the employee name:";
cin>>name;
cout<<"enter the employee number:";
cin>>num;
cout<<"enter the basic pay:";
cin>>basic;
}
void calc()
{
da=basic*40/100;
lic=basic*3/100;
pf=basic*25/100;
hra=basic*5/100;
gp=basic+hra+da;
np=gp-(lic+pf);
}
void display()
```

```
{
cout<<endl<<num<<"\t"<<name<<"\t"<<basic<<"\t"<<hra<<"\t"<<da<
<"\t"<<pf<<"\t"<<gp<<"\t"<<lic<<"\t"<<np;
}
};
void main()
{
clrscr();
int i,n;
emp e[100];
cout<<"enter how many employee records:"<<endl;
cin>>n;
for(i=0;i<n;i++)
{
e[i].getdata();
e[i].calc();
}
cout<<"\t\t\t employee details"<<endl;
cout<<"\t\t\t *****************"<<endl;
cout<<"empno ename\tpay\thra\tda\tpf\tgpay\tlic\tnpay\n";
cout<<"\n";
for(i=0;i<n;i++)
{
e[i].display();
}
getch();
}
```

Output

Sample 1

Result

The program is executed and the output has been verified.

9. Write a program in C++ to perform the matrix addition, subtraction.

Aim

To write a program in C++ to perform the matrix addition, subtraction.

Program code

```
#include<stdio.h>
#include<conio.h>
main()
{
int a[10][10], b[10][10], c[10][10];
int i, j, m, n;
clrscr();
printf("enter the number of rows:\n");
scanf("%d", &m);
printf("enter the number of columns:\n");
scanf("%d", &n);
printf("enter the numbers of A matrix:\n");
for(i=1;i<=m;i++)
{
for(j=1;j<=n;j++)
{
scanf("%d", &a[i][j]);
}
}
printf("enter the numbers of B matrix:\n");
for(i=1;i<=m;i++)
{
for(j=1;j<=n;j++)
{
scanf("%d", &b[i][j]);
}
}
clrscr();
printf("\nThe first matrix is:");
for(i=1;i<=m;i++)
{
```

```
printf("\n");
for(j=1; j<=n;j++)
{
printf("%d\t", a[i][j]);
}
}
printf("\nThe second matrix is:");
for(i=1;i<=m;i++)
{
printf("\n");
for(j=1;j<=n;j++)
{
printf("%d\t", b[i][j]);
}
}
printf("\nThe added matrix is:");
for(i=1;i<=m;i++)
{
printf("\n");
for(j=1; j<=n; j++)
{
c[i][j]=a[i][j]+b[i][j];
printf("%d\t", c[i][j]);
}
}
printf("\nThe subtracted matrix is:");
for(i=1;i<=m;i++)
{
printf("\n");
for(j=1;j<=n;j++)
{
c[i][j]=a[i][j]-b[i][j];
printf("%d\t",c[i][j]);
}
}
getch();
}
```

Output

Sample 1

```
enter the number of rows:
2
enter the number of columns:
2
enter the numbers of A matrix:
1
2
3
4
enter the numbers of B matrix:
5
6
7
3_
```

```
The first matrix is:
1       2
3       4
The second matrix is:
5       6
7       3
The added matrix is:
6       8
10      7
The subtracted matrix is:
-4      -4
-4      1
```

Result

The program is executed and the output has been verified.

10.Write a program in C++ to perform the matrix multiplication.

Aim

To write a program in C++ to perform the matrix multiplication.

Program code

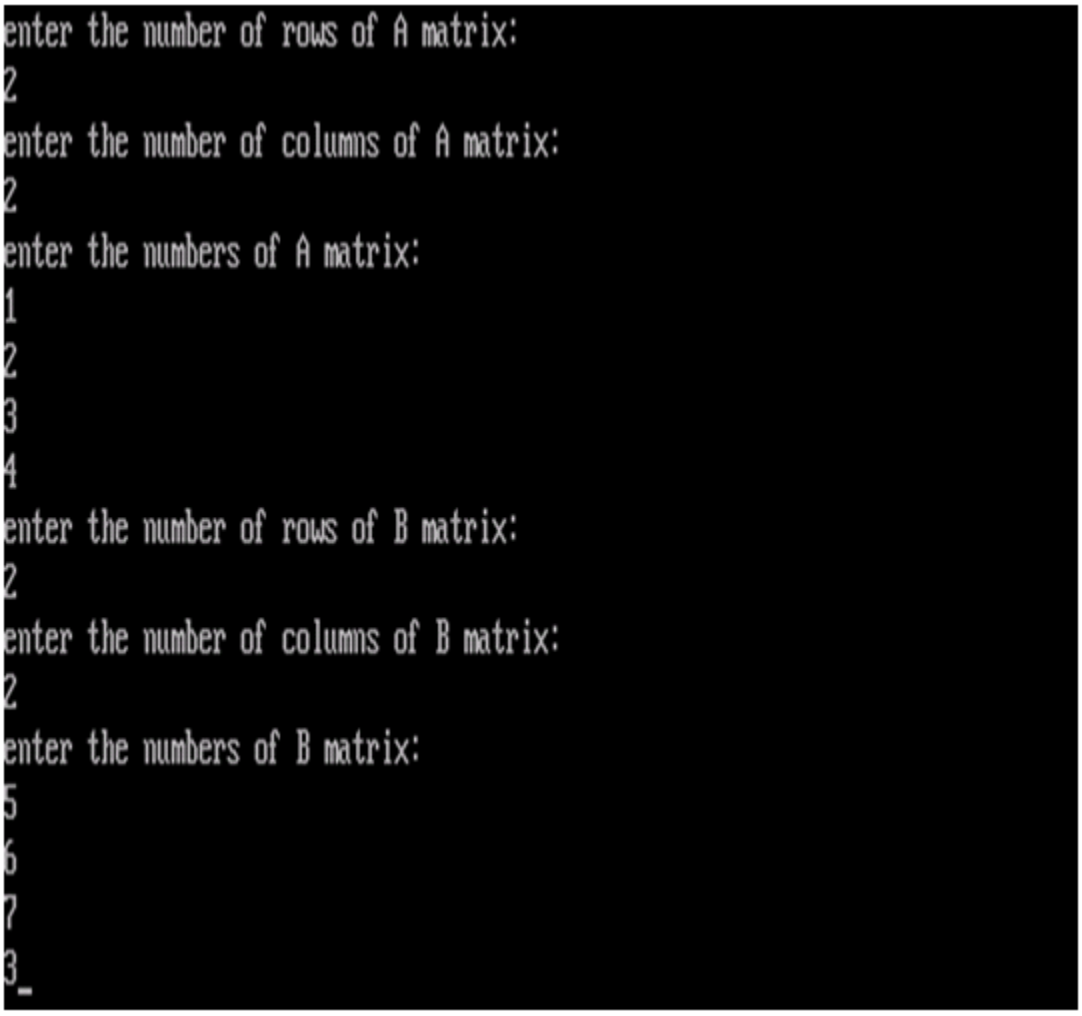
```
#include<stdio.h>
#include<conio.h>
main()
{
int a[10][10], b[10][10], c[10][10];
int i, j, m1, n1, m2,n2;
clrscr();
printf("enter the number of rows of A matrix:\n");
scanf("%d", &m1);
printf("enter the number of columns of A matrix:\n");
scanf("%d", &n1);
printf("enter the numbers of A matrix:\n");
for(i=1;i<=m1;i++)
{
for(j=1;j<=n1;j++)
{
scanf("%d", &a[i][j]);
}
}
printf("enter the number of rows of B matrix:\n");
scanf("%d", &m2);
printf("enter the number of columns of B matrix:\n");
scanf("%d",&n2);
printf("enter the numbers of B matrix:\n");
for(i=1;i<=m2;i++)
{
for(j=1;j<=n2;j++)
{
scanf("%d", &b[i][j]);
```

```
}
}
clrscr();
if(n1==m2)
{
printf("\nThe first matrix is:");
for(i=1;i<=m1;i++)
{
printf("\n");
for(j=1; j<=n1;j++)
{
printf("%d\t", a[i][j]);
}
}
printf("\nThe second matrix is:");
for(i=1;i<=m2;i++)
{
printf("\n");
for(j=1;j<=n2;j++)
{
printf("%d\t", b[i][j]);
}
}
for(i=1;i<=m1;i++)
{
for(j=1; j<=n2; j++)
{
c[i][j]=c[i][j] + (a[i][j]*b[j][i]);
}
}
printf("\nThe multiplied matrix is:");
for(i=1;i<=m1;i++)
{
printf("\n");
for(j=1;j<=n2;j++)
{
printf("%d\t",c[i][j]);
```

```
}
}
}
else
printf("The given matrix can not be multiplied");
getch();
}
```

Output

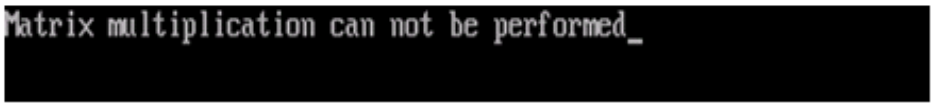
Sample 1



```
The first matrix is:
1       2
3       4
The second matrix is:
5       6
7       3
The multiplied matrix is:
19      12
43      30
```

Sample 2

```
enter the number of rows of A matrix:
2
enter the number of columns of A matrix:
3
enter the numbers of A matrix:
2
3
4
5
6
7
enter the number of rows of B matrix:
2
enter the number of columns of B matrix:
3
enter the numbers of B matrix:
1
2
3
4
5
6
```



Result

The program is executed and the output has been verified.

11. Write a program in C++ to prepare the student mark list.

Aim

To write a program in C++ to prepare the student mark list.

Program code

```
#include<iostream.h>
#include<conio.h>
#include<string.h>
void line();
class student
{
private:
int mark1,mark2,mark3,mark4,mark5,rno;
int tot;
float avg;
char name[10],result[10];
public:
void getdata()
{
cout<<"enter the rno name five marks:\n";
cin>>rno>>name>>mark1>>mark2>>mark3>>mark4>>mark5;
tot=mark1+mark2+mark3+mark4+mark5;
avg=tot/5;
}
void showresult()
{
if(mark1>=35&&mark2>=35&&mark3>=35&&mark4>=35&&mark5>=35)
strcpy(result,"pass");
else
strcpy(result,"fail");
cout<<"\n"<<name<<"\t"<<rno<<"\t"<<mark1<<"\t"<<mark2<<"\t"<<mar
k3<<"\t"<<mark4<<"\t"<<mark5<<"\t"<<tot<<"\t"<<avg<<"\t"<<result;
}
```

```
};
void line()
{
int i;
for(i=1;i<=80;i++)
cout<<char(205);
}
void main()
{
student x[10];
int n,i;
clrscr();
cout<<"enter the number of student:\n";
cin>>n;
for(i=0;i<n;i++)
{
x[i].getdata();
getch();
}
clrscr();
cout<<"\n\t\t\t students report\n";
line();
cout<<"\n name\t rno\t mark1\t mark2\t mark3\t mark4\t mark5\t tot\t
avg\t result\n";
line();
for(i=0;i<n;i++)
{
x[i].showresult();
cout<<endl;
line();
getch();
}
}
```

Output

Sample 1

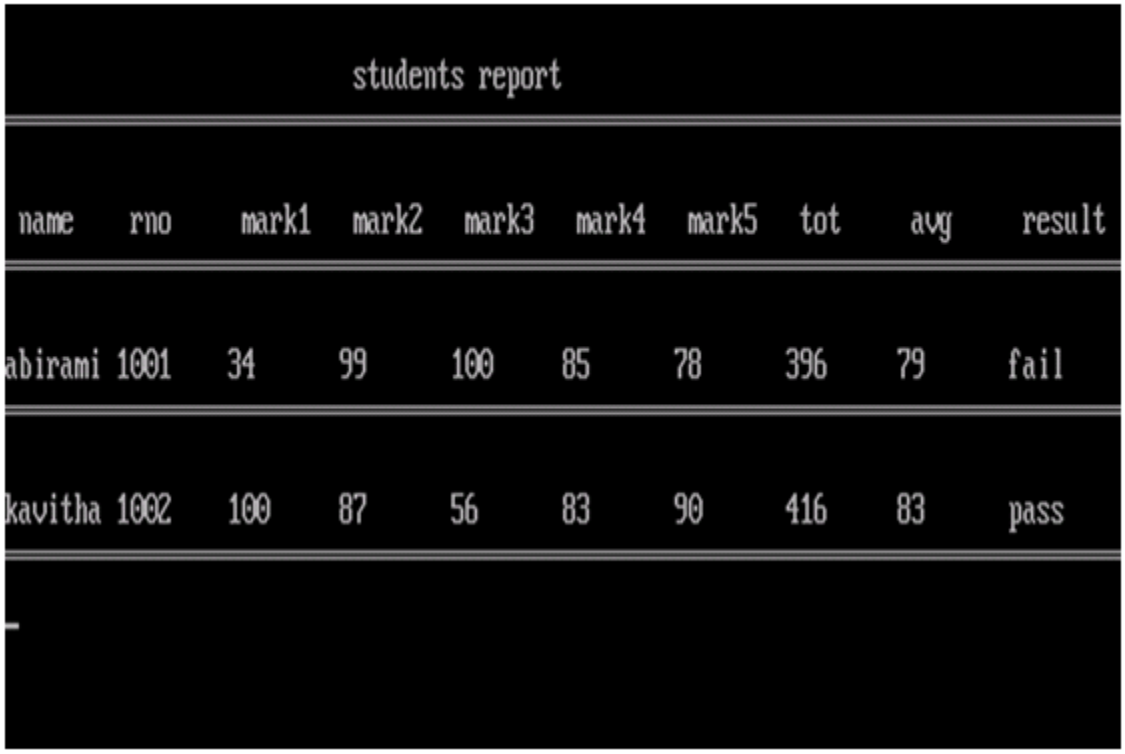
```
enter the number of student:
2
enter the rno name five marks:
1001
abirami
34
99
100
85
78
enter the rno name five marks:
1002
kavitha
100
87
56
83
90
```

```
                    students report

 name    rno     mark1   mark2   mark3   mark4   mark5   tot     avg     result

abirami 1001    34      99      100     85      78      396     79      fail

-
```



Result

The program is executed and the output has been verified.

12.Write a program in C++ to find whether the given number is odd or even.

Aim

To write a program in C++ to find whether the given number is odd or even.

Program code

```
#include<iostream.h>
#include<conio.h>
#include<math.h>
class oddeven
{
public:
int n;
void input();
void display();
};
void oddeven::input()
{
cout<<"enter the number:\n";
cin>>n;
}
void oddeven::display()
{
if(n%2==0)
cout<<"given number is even";
else
cout<<"given number is odd";
}
void main()
{
clrscr();
oddeven e;
e.input();
e.display();
```

```
getch();
}
```

Output

Sample 1

Sample 2

Result

The program is executed and the output has been verified.

13. Write a program in C++ to sort the given numbers.

Aim

To write a program in C++ to sort the given numbers.

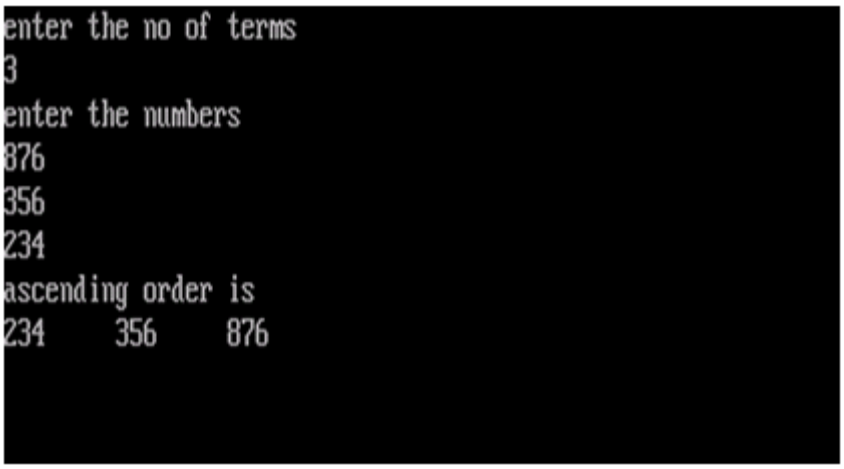
Program code

```
#include<iostream.h>
#include<conio.h>
void main()
{
clrscr();
int a[10],i,j,n,k;
cout<<"enter the no of terms"<<endl;
cin>>n;
cout<<"enter the numbers"<<endl;
for(i=0;i<n;i++)
{
cin>>a[i];
}
for(i=0;i<n;i++)
{
for(j=i+1;j<n;j++)
{
if(a[i]>a[j])
{
k=a[i];
a[i]=a[j];
a[j]=k;
}
}
}
cout<<"ascending order is"<<endl;
for(i=0;i<n;i++)
{
```

```
cout<<a[i]<<" ";
}
getch();
}
```

Output

Sample 1



Result

The program is executed and the output has been verified.

14.Write a program in C++ to sort the given strings.

Aim

To write a program in C++ to sort the given strings.

Program code

```
#include<iostream.h>
#include<conio.h>
#include<string.h>
void main()
{
int n,i,j;
char a[15][15],t[15];
clrscr();
cout<<"enter how many names:\n";
cin>>n;
cout<<"enter the strings:\n";
for(i=1;i<=n;i++)
{
cin>>a[i];
}
for(i=1;i<n;i++)
for(j=i+1;j<=n;j++)
{
if(strcmp(a[i],a[j])>0)
{
strcpy(t,a[i]);
strcpy(a[i],a[j]);
strcpy(a[j],t);
}
}
cout<<"the sorted strings are:\n";
for(i=1;i<=n;i++)
{
```

```
cout<<a[i]<<"\n";
}
getch();
}
```

Output

Sample 1

Result

The program is executed and the output has been verified.