



## Practical Questions- Class XI

### Introduction to C++

- 1) Write a program to read two numbers and perform all the arithmetic operations.

### Control Structures

- 2) Write a program to find the minimum no of dirhams (1000, 500, 200, 100, 50, 20, 10, 1) required for the given amount.
- 3) Write a program to check whether the given date is valid or not.
- 4) Write a program that reads in 3 real numbers, a, b and c that are the coefficients of a quadratic equation  $ax^2+bx+c=0$  and identify the nature of the roots.
- 5) An electronic shop has announced the following seasonal discounts on the purchase of certain items

Purchase Amount In Rs	Discount on TV	Discount on Music System
0-25000	5%	10%
25001-50000	10%	20%
More than 50000	15%	30%

Develop a program based on the above criteria, to input amount of purchase and the type of purchase (T /M) by a customer. Compute and print the net amount to be paid by a customer.

[Hint: Discount = (Discount rate / 100) \* Amount of purchase  
Net amount = amount of purchase - discount.)]

- 6) Write a program to convert time entered in seconds into its equivalent hours, minutes and seconds. (For example: Enter time in seconds: 7000  
Equivalent time: 1 hour 56 minutes 40 seconds.
- 7) Write a program to accept electricity bill details (i.e.,) customer number, customer name, previous month meter reading and current month reading and then find no, of units consumed by the customer and amount payable to electricity department by performing following checks:  
First 100 units cost per unit is Rs. 4.00  
Next 500 units cost per unit is Rs. 5.00  
Beyond 600 units cost per unit is Rs. 6.00
- 8) Write a program in C++ for area calculation of circle, square, rectangle and triangle using switch construct.
- 9) Write a menu driven program using functions to do the following on a given number.
  - a. Reverse the number and display both the numbers.
  - b. Find the sum of digits of the number.

- c. Count the no of odd and even digits present in it.
- 10) Write a program to print all the prime numbers between 1 and n.
- 11) Write a program to generate n Fibonacci series.
- 12) Write a program to display the following series:  

$$S = 1 + x + x^2 + \dots + x^n$$
 (Read x and n from the user and display the sum of the series)  

$$S = x - \frac{x^2}{2!} + \frac{x^3}{3!} - \frac{x^4}{4!} + \dots \pm \frac{x^n}{n!}$$

- 13) Write a program to generate the following pattern for n lines:

```

      1
    1 2 1
  1 2 3 2 1
1 2 3 4 3 2 1

```

### **Arrays**

- 14) To accept a string and search for a sub-string (a group of contiguous characters). If the search is successful return the position of the substring otherwise return -1
- 15) Write a program to read a string. The program should handle the options as given below:
- Check for Palindrome
  - Search for a given substring
  - Reverse all the string
  - Frequency of alphabets in each string
  - Exit

Use functions with proper arguments for each menu options. Use global variables only if it is necessary.

- 16) Write a program to enter a list of strings and create new list that consists of those strings with their first characters removed.
- 17) Write a program to input any string and count number of uppercase, lowercase, vowels, consonants and digits.
- 18) Write a program that takes a string with multiple words and then capitalizes the first letter of each word and forms a new string out of it.
- 19) Write a program to create an array L1 with n values. Create two user defined functions even () - to create an array which store only even values from L1 and Odd () - to create an array which store only odd values from the L1.
- 20) Write a program to remove all adjacent duplicate elements from the given array.

The program should contain a function `del_adjacent_dups(int n)` to delete duplicate elements.

- 21) Write a menu driven program to read a numeric array and do the following using functions:

- (i) To get the position and insert an element.
- (ii) To delete an element from the array.
- (iii) To search for an element.
- (iv) To sort the given array.

- 22) Write a function which accept 2D array of integers and its size as arguments and displays the sum of elements which lie on diagonals.

Assuming the 2D list to be a square matrix with odd dimension ie  $3 \times 3$ ,  $4 \times 4$  etc ] Example of the list content is

5 4 3  
6 7 8  
1 2 9

Output through the function should be

Diagonal One Sum: 21  
Diagonal Two Sum: 11

- 23) Write a program to display the upper and lower triangular matrix.

- 24) Write a menu driven program to do the following using functions which accept 2-D array A, and its size m and n as arguments:

- a) Sum of all elements of matrix of size  $m \times n$
- b) To display row-wise sum of matrix of size  $m \times n$
- c) To display column-wise sum of matrix of size  $m \times n$
- d) To create transpose of matrix

- 25) Write a program that accepts an integer array and pass the array to a user defined function `shift()` to shift all odd numbers to left and even numbers to the right.

### **Structures**

- 26) Write a menu driven program to read details of book such as book number (int), title (string), quantity(int), cost(float) with the following menu options:

- a. Read Details //Read n book details
- b. Search for a book //Search for a given book number. If found display "Record found" else "Not Found"
- c. Total Stock Value //Stock Value is product of quantity and cost. Find sum of all stock value
- d. List //Display the details of all the book
- e. Exit

Use functions with proper arguments. Use global variable only if it is necessary.

- 27) Write a program to store information of 10 employees and to display information of an employee depending on the employee number given.
- 28) Create an application to enter the roll no., name of the student and marks in five subjects (like English, Physics, Mathematics and computer) in an user defined structure Student with following attributes:
- Rollno as integer
  - Name as 25 characters
  - Marks as an array of 5 integers
  - Total and Percentage as float
  - Grade as 2 characters
- Write the code to enter the above Student structure data and calculate total, percentage and grade in a tabular form.

## **Project**

The project has to be developed in C++ language with array and structures. A group of 2-3 students as team may be allowed to work on one project.

The project should include:

- Presentation on the computer
- Project report (Listing, Sample Outputs, Documentations)
- Viva

\* 1 mark is for innovation while writing program.

The aim of the project is to highlight the abilities of algorithmic formulation, modular programming, optimized code preparation, systematic documentation and other associated aspects of Software Development.

Theme of the project can be

- Any subsystem of a System Software or Tool
- Any Scientific or a fairly complex algorithmic situation
- School Management, Banking, Library Information System, Hotel or Hospital Management System, Transport query system
- Quizzes / Games;
- Tutor, Computer Aided Learning Systems

\*\*\*\*\*

***Q1. Write a program to do all the arithmetic operation on the entered numbers.***

```
#include<iostream.h>
#include<conio.h>

void main()
{ int n, n1;

    cout<<"enter the numbers: ";
    cin>>n>>n1;
    cout<<"\nthe sum is "<<n+n1;
    cout<<"\nthe difference is "<<n-n1;

    cout<<"\nthe product is "<<n*n1;
    cout<<"\nthe remainder is "<<n%n;

    cout<<"\nthe quotient is "<<n/n1;

    getch();
}
```

## Output:

```
C:\Users\itlab1\Desktop\b0r.exe
enter the numbers: 4 2
the sum is 6
the difference is 2
the product is 8
the remainder is 0
the quotient is 2
```

**Q2. Write a program to find the minimum no. Of dirhams (1000, 500, 200, 100, 50, 20, 10, 1) required for the given amount.**

```
#include<iostream.h>
#include<conio.h>

void main()
{
    int a, b,c,d,e;
    cout<<"enter the amount: ";
    cin>>a;
    b=a/1000;
    c=a%1000;
    d=(c%500);
    e= (d%200)%100;
    cout<<"\nno. of 1000(S) in the amount is: "<<b;
    cout<<"\nno. of 500 in the amount is: "<<c/500;
    cout<<"\nno. of 200 in the amount is: "<<d/200;
    cout<<"\nno.of 100 in the amount is: "<<(d%200)/100;
    cout<<"\nno. of 50 in the amount is: "<<e/50;
    cout<<"\nno. of 20 in the amount is: "<<(e%50)/20;
    cout<<"\nno. of 10 in the amount is: "<<((e%50)%20)/10;
    cout<<"\nno.of 1s in the amount is : "<<((e%50)%20)%10;
}
```

getch();

}

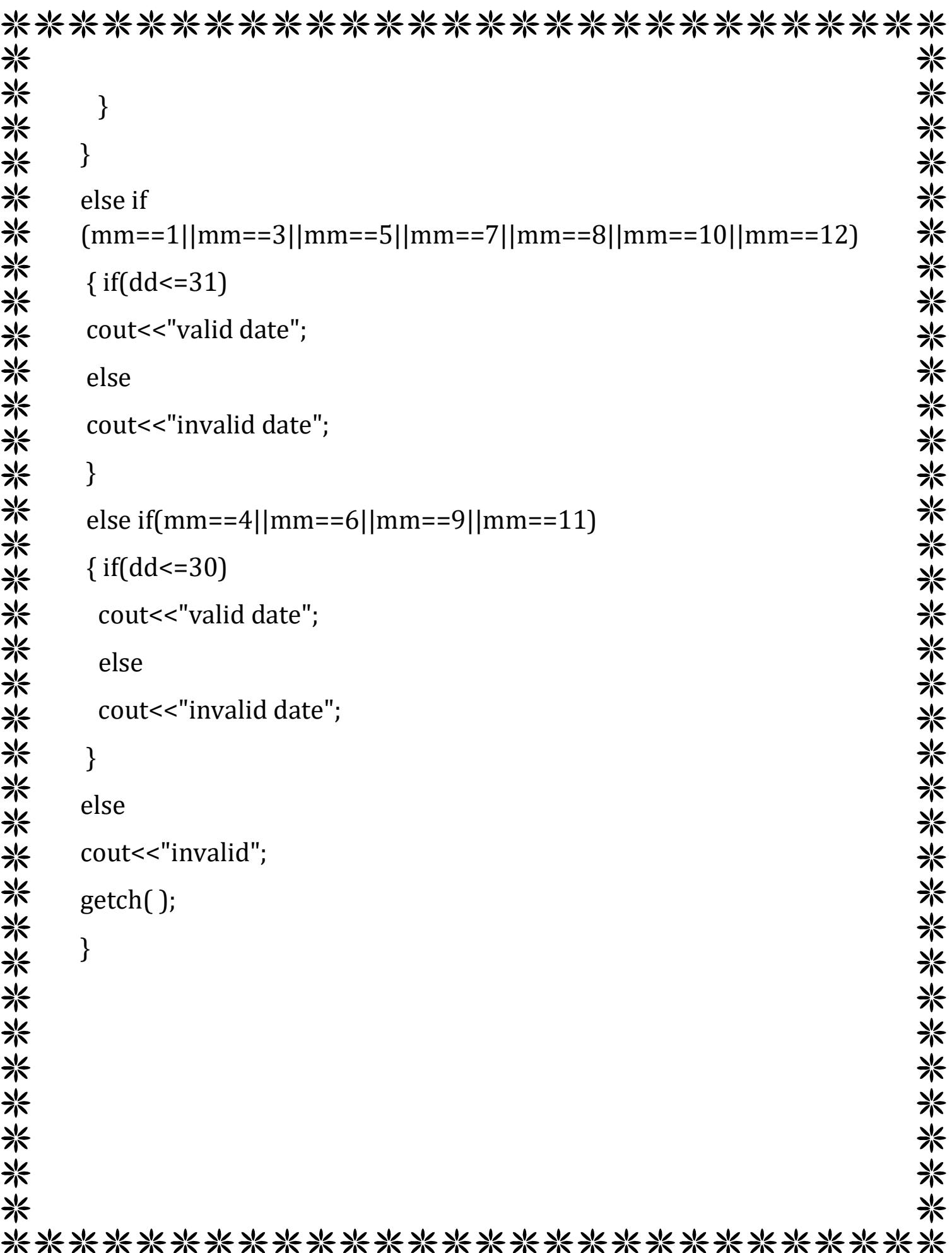
## Output:

```
C:\Users\itlab1\Desktop\b0r.exe
enter the amount: 45879
no. of 1000(S) in the amount is: 45
no. of 500 in the amount is: 1
no. of 200 in the amount is: 1
no.of 100 in the amount is: 1
no. of 50 in the amount is: 1
no. of 20 in the amount is: 1
no. of 10 in the amount is: 0
no.of 1s in the amount is : 9
```

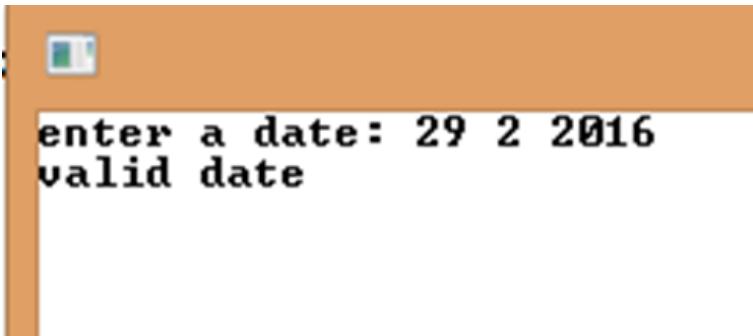
***Q.3. Write a program to check whether the given date is valid or not.***

```
#include<iostream.h>
#include<conio.h>
void main()
{ int dd, mm, yyyy;
cout<<"enter a date: ";
cin>>dd>>mm>>yyyy;
if(mm==2)
{ if(yyyy%4==0)
{ if((yyyy%100==0) && (yyyy%400!=0))
{if (dd<=28)
    cout<<"valid date";
else
    cout<<"invaid date";
}
else
{if(dd<=29)
    cout<<"valid date";
else
    cout<<"invalid date";
}
}
```

```
*****  
* }  
* }  
* else if  
* (mm==1||mm==3||mm==5||mm==7||mm==8||mm==10||mm==12)  
* { if(dd<=31)  
* cout<<"valid date";  
* else  
* cout<<"invalid date";  
* }  
* else if(mm==4||mm==6||mm==9||mm==11)  
* { if(dd<=30)  
* cout<<"valid date";  
* else  
* cout<<"invalid date";  
* }  
* else  
* cout<<"invalid";  
* getch( );  
* }
```



**Output:**



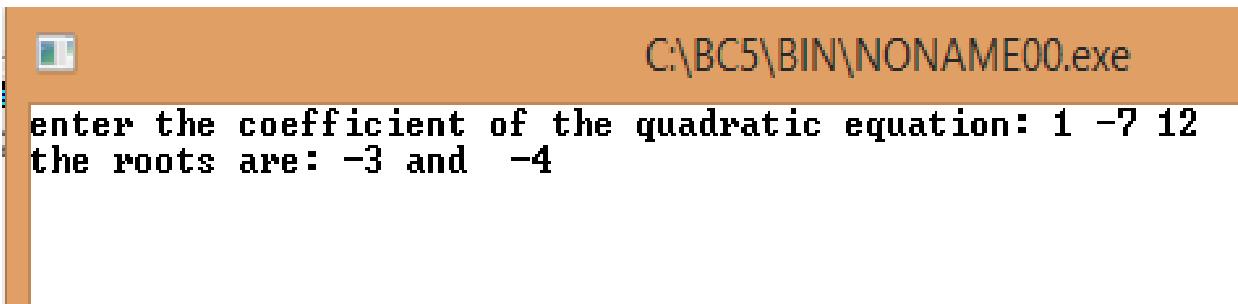
***Q.4. Write a program that read the co-efficient of the quadratic equation and identify the value of the root of the given quadratic equation.***

```
#include<iostream.h>
#include<conio.h>
#include<math.h>
void main()
{int a,b,c,d;
float r1,r2;
cout<<"enter the coefficient of the quadratic equation: ";
cin>>a>>b>>c;
d=pow(b,2)-(4*a*c);
if(d>0)
{r1=(b+sqrt(d))/(a*2);
r2=(b-sqrt(d))/(a*2);
cout<<"the roots are: "<<r1<<" and "<<r2;
}
else if(d==0)
{r1=(b+sqrt(d))/(a*2);
r2=r1;
```

```
*****  
* cout<<" since the discriminant is 0, the roots r real and  
* equal. so the roots are: "<<r1<<" "<<r2;  
* }  
* else if(d<0)  
* { r1=(b+sqrt(d))/(a*2);  
*   r2=(b-sqrt(d))/(a*2);  
*   cout<<"roots are "<<r1<<" and "<<r2;  
* }  
* getch( );  
* }
```



## Output:



C:\BC5\BIN\NONAME00.exe

```
enter the coefficient of the quadratic equation: 1 -7 12
the roots are: -3 and -4
```

**Q5. An electronic shop has announced the following seasonal discounts on the purchase of certain items.**

<i>Amount purchased</i>	<i>Discount on TV system</i>	<i>Discount on music system</i>
0-25000	5%	10%
25001-50000	10%	20%
More than 50000	15%	30%

**Develop a program based on the above criteria, to input amount of purchase and the type of purchase (T / M) by a customer. Compute and print the net amount to be paid by a customer.**

**[Hint: Discount = (Discount rate /100) \* Amount of purchase  
Net amount = amount of purchase - discount.)]**

```
#include<iostream.h>
#include<conio.h>
void main()
{
    int a;
    float b;
    char ch;
    cout<<"\n\n\n*****T. TYPE OF PURCHASE: TV*****";
    cout<<"\n\n\n*****M. TYPE OF PURCHASE: MUSIC SYSTEM*****";
    cout<<"\n\n\n*****ENTER THE DESIRED TYPE OF PURCHASE: ";
    cin>>ch;
```

```
*****  
*  
* if(ch=='T')  
* {cout<<"\n\n\nenter the amount purchased: "  
* cin>>a;  
* if(a>0 && a<=25000)  
* {b= 0.05*a;  
* cout<<"\n\n\nyour discount is "<<b;  
* cout<<"\n\n\nthe net amount is "<<a-  
* b;  
* }  
* else if(a>=25001 && a<=50000)  
* { b= 0.1*a;  
* cout<<"\n\n\nyour discount is: "<<b;  
* cout<<"\n\n\nThe net amount is: "<<a-b;  
* }  
* else if(a>50000)  
* {b=0.15*a;  
* cout<<"\n\n\nyour discount is: "<<b;  
* cout<<"\n\n\nThe net amount is: "<<a-b;  
* }  
* }  
  
* else if(ch=='M')  
* {cout<<"\n\n\nenter the amount purchased: "  
* cin>>a;  
* if(a>0 && a<=25000)
```

```
*****  
*  
* {b= 0.1*a;  
* cout<<"\n\n\nyour discount is "<<b;  
* cout<<"\n\n\nThe net amount is "<<a-b;  
* }  
* else if(a>=25001 && a<=50000)  
* { b= 0.2*a;  
* cout<<"\n\n\nyour discount is: "<<b;  
* cout<<"\n\n\nThe net amount is: "<<a-b;  
* }  
* else if(a>50000)  
* {b=0.3*a;  
* cout<<"\n\n\nyour discount is: "<<b;  
* cout<<"\n\n\nThe net amount is: "<<a-b;  
* }  
* }  
* else  
* cout<<"\n\n\ninvalid character";  
  
* getch ( );  
* }
```

## OUTPUT:

```
T. TYPE OF PURCHASE: TU

M. TYPE OF PURCHASE: MUSIC SYSTEM

ENTER THE DESIRED TYPE OF PURCHASE: T

enter the amount purchased: 45900

your discount is: 4590

The net amount is: 41310
```

***Q.6. Write a program to convert time entered in seconds into its equivalent hours, minutes and seconds.***

```
#include<iostream.h>
#include<conio.h>
void main()
{
    int x;
    cout<<"enter the time in seconds: ";
    cin>>x;
    cout<<"equivalent time: "<<x/(60*60)<<" hours
" <<(x%(60*60))/60<<" mins "<<(x%(60*60))%60<<" secs";
    getch();
}
```

## Output:



```
C:\Users\itlab1\Desktop\rithika.exe
enter the time in seconds: 7000
equivalent time: 1 hours 56 mins 40 secs
```

**Q.7. Write a program to accept electricity bill details (i.e.,) customer number, customer name, previous month meter reading and current month reading and then find no, of units consumed by the customer and amount payable to electricity department by performing following checks:**

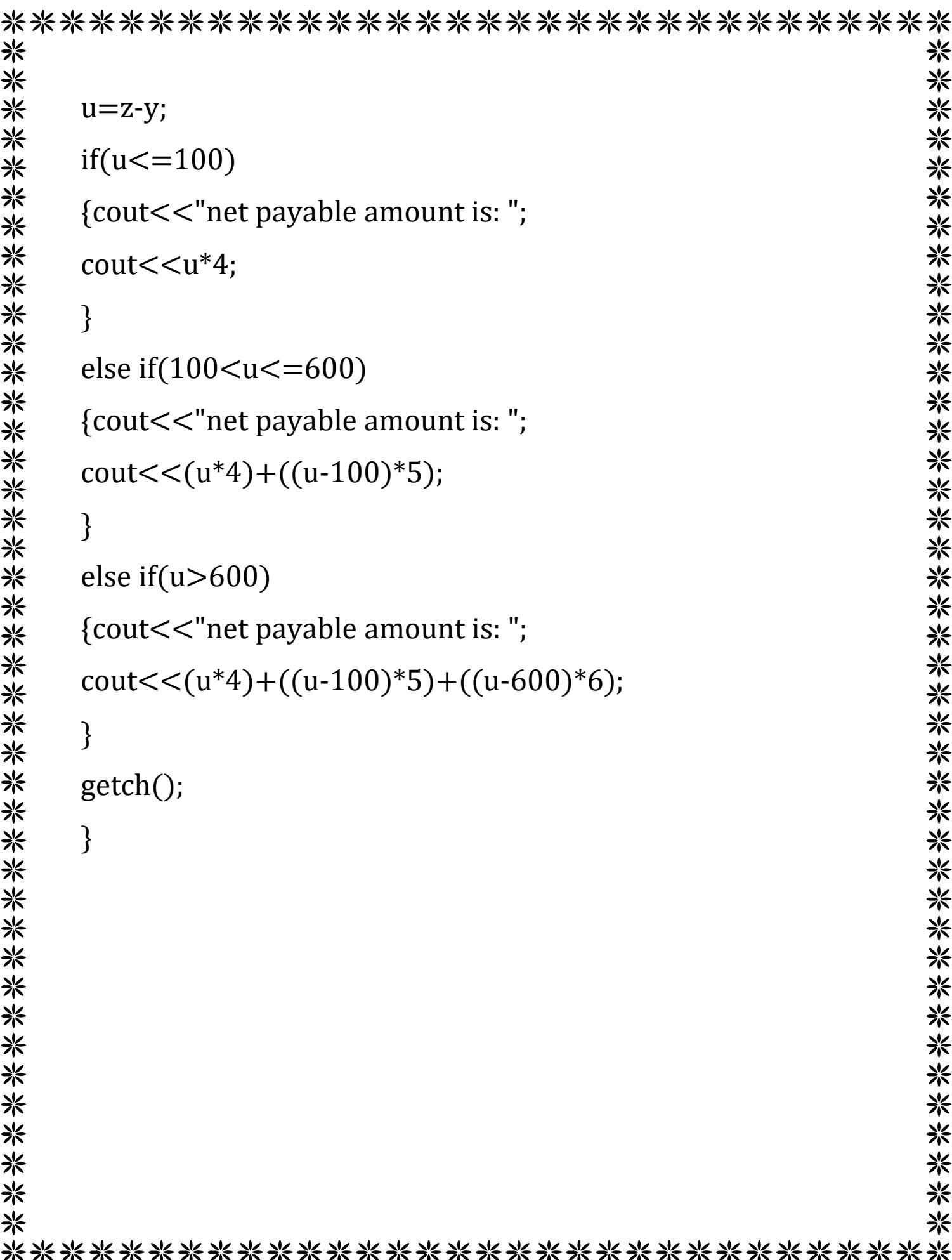
**First 100 units cost per unit is Rs. 4.00**

**Next 500 units cost per unit is Rs. 5.00**

**Beyond 600 units cost per unit is Rs. 6.00**

```
#include<iostream.h>
#include<conio.h>
void main()
{ int x, y, z, u;
cout<<"enter the customer number: ";
cin>>x;
cout<<"enter the previous month reading: ";
cin>>y;
cout<<"enter the current month reading: ";
cin>>z;
```

```
*****  
*  
*  
* u=z-y;  
* if(u<=100)  
* {cout<<"net payable amount is: "  
* cout<<u*4;  
* }  
* else if(100<u<=600)  
* {cout<<"net payable amount is: "  
* cout<<(u*4)+((u-100)*5);  
* }  
* else if(u>600)  
* {cout<<"net payable amount is: "  
* cout<<(u*4)+((u-100)*5)+((u-600)*6);  
* }  
* getch();  
* }
```



## Output:

```
C:\Users\itlab1\Desktop\rithika.exe
enter the customer number: 12345
enter the previous month reading: 100
enter the current month reading: 900
net payable amount is: 6700
```

**Q.8. Write a program in C++ for area calculation of circle, square, rectangle and triangle using switch construct**

```
#include<iostream.h>

#include<conio.h>

void main()

{ char x;

cout<<"c. area of circle";

cout<<"\ns.area of square";

cout<<"\nr.area of rectangle";

cout<<"\nt.area of triangle";

cout<<"\nenter your choice: ";

cin>>x;

switch(x)
```

```
*****  
*  
* {case'c': {float x1;  
*  
*     const float pi=3.14;  
*  
*     cout<<"enter the radius of the circle: ";  
*  
*     cin>>x1;  
*  
*     cout<<"area of the circle "<<(pi*x1*x1);  
*  
* }  
*  
* break;  
*  
* case's': {float x1;  
*  
*     cout<<"enter the side of the square: ";  
*  
*     cin>>x1;  
*  
*     cout<<"area of square "<<(x1*x1);  
*  
* }  
*  
* break;  
*****
```

```
*****  
*  
*  
* case'r':{float x1, x2;  
*  
*     cout<<"enter the sides of the rectangle: ";  
*  
*     cin>>x1>>x2;  
*  
*     cout<<"area of the rectangle is "<<(x1*x2);  
*  
* }  
*  
* break;  
*  
* case't':{float x1, x2;  
*  
*     cout<<"enter the height and base of the triangle: ";  
*  
*     cin>>x1>>x2;  
*  
*     cout<<"area of the triangle is: "<<(0.5*x1*x2);  
*  
* }  
*  
* break;  
*  
* default: cout<<"invalid";  
*****
```

```
}
```

```
getch();
```

```
}
```

## Output:

```
C:\Users\itlab1\Desktop\rithika.exe
c. area of circle
s.area of square
r.area of rectangle
t.area of triangle
enter your choice: t
enter the height and base of the triangle: 2.5 86.954
area of the triangle is: 108.693
```

**Q.9. Write a menu driven program using functions to do the following on a given number.**

**a. Reverse the number and display both the numbers.**

**b. Find the sum of digits of the number.**

**c. Count the no of odd and even digits present in it**

```
#include<iostream.h>
#include<conio.h>
void rev(int n)
{int rev=0,rem,n1;
n1=n;
while(n!=0)
{rem=n%10;
rev=rev*10+rem;
n=n/10;
}
cout<<"the orginal number is: ";
cout<<n1;
cout<<"the reverse is: ";
cout<<rev;
}
```

```
*****  
*  
* void sum(int n)  
* {int sum=0,n1,rem;  
* n1=n;  
* while(n!=0)  
* {rem=n%10;  
* sum=sum+rem;  
* n=n/10;  
* }  
* cout<<"the sum of digit of number "<<n1<<" is"<<sum;  
* }  
* void oddeven(int n)  
* {int rem,odd=0,even=0,n1;  
* n1=n;  
* while(n!=0)  
* {rem=n%10;  
* if(rem%2==0)  
* even=even+1;  
* else  
* odd=odd+1;  
* n=n/10;  
* }  
* cout<<"the no.of odd digits present in the number  
* "<<n1<<" is"<<odd;  
*
```

```
*****  
* cout<<"the no.of even digits present in the number  
* "<<n1<<" is"<<even;  
* }  
* void main()  
* {int a;  
* char ch;  
* cout<<"enter the number: ";  
* cin>>a;  
* cout<<"\na. Reverse the number and display both the  
* numbers.";  
* cout<<"\nb. Find the sum of digits of the number.";  
* cout<<"\nc. Count the no of odd and even digits present  
* in it.";  
* cout<<"\nenter ur choice: ";  
* cin>>ch;  
* if(ch=='a')  
*     rev(a);  
* if(ch=='b')  
*     sum(a);  
* if(ch=='c')  
*     oddeven(a);  
* getch();  
* }
```

\*\*\*\*\*

## Output:

```
C:\USERS\KATHIRVEL\DESKTOP\matrix display.exe
enter the number: 567
a. Reverse the number and display both the numbers.
b. Find the sum of digits of the number.
c. Count the no of odd and even digits present in it.
enter ur choice: b
the sum of digit of number 567 is18
```

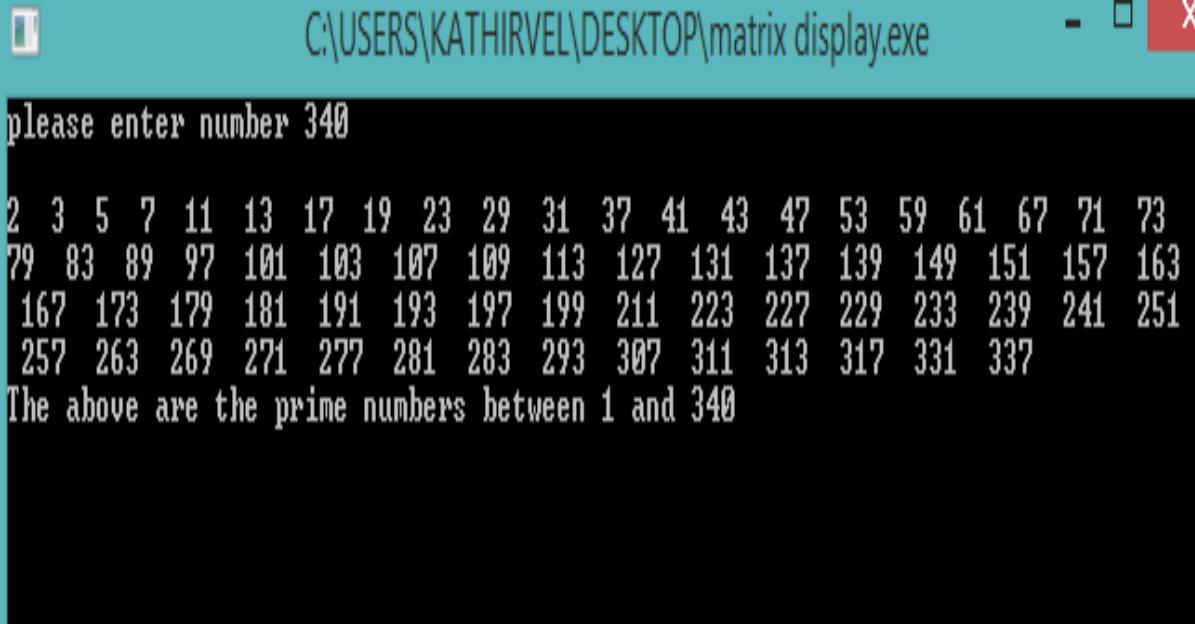
**Q.10. Write a program to print all the prime numbers between 1 and n.**

```
#include<iostream.h>
#include<conio.h>
void main()
{
    int n;
    int i;
    int j;
    int flag;

    cout<<"please enter number ";
    cin>>n;
    cout<<endl;
    for(i=2;i<=n;i++)
    {
        flag=1;
        for(j=2;j<=i/2;j++)
        {
            if(i%j==0)
            {
                flag=0;
                break;
            }
        }
    }
```

```
*****  
*  
* if(flag==1)  
* cout<<i<<" ";  
* }  
* cout<<"\nThe above are the prime numbers between 1  
* and "<<n;  
* getch();  
* }
```

## Output:



The screenshot shows a terminal window titled "C:\USERS\KATHIRVEL\DESKTOP\matrix display.exe". The window contains the following text:  
please enter number 340  
2 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73  
79 83 89 97 101 103 107 109 113 127 131 137 139 149 151 157 163  
167 173 179 181 191 193 197 199 211 223 227 229 233 239 241 251  
257 263 269 271 277 281 283 293 307 311 313 317 331 337  
The above are the prime numbers between 1 and 340

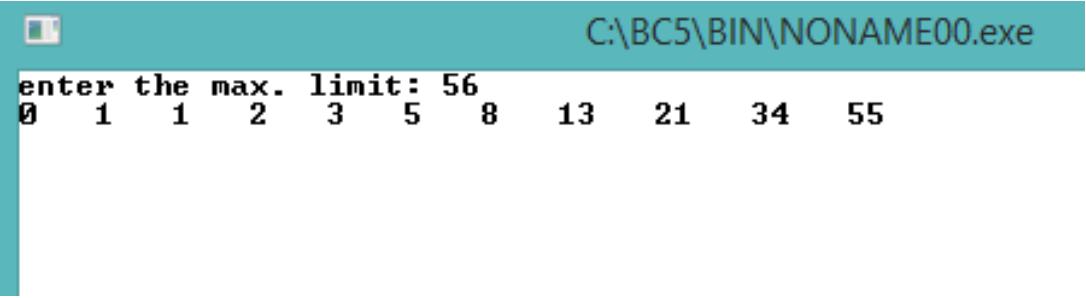
***Q.11. write a program to print the fibannoci series.***

```
#include<iostream.h>
#include<conio.h>

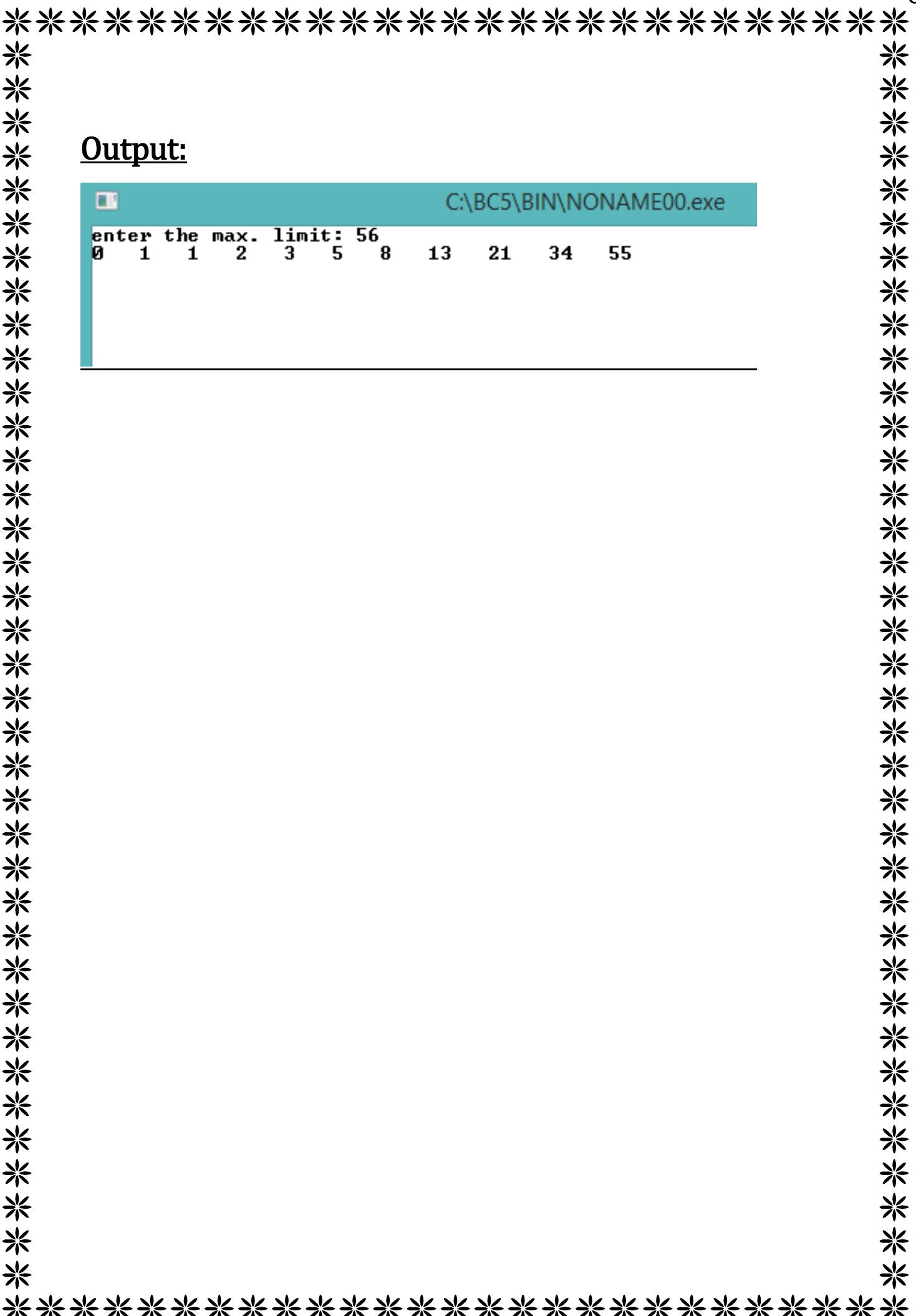
void main()
{int f,s,n,t;
f=0;
s=1;
cout<<"enter the max. limit: ";
cin>>n;
cout<<f<<" "<<s;
t=f+s;

while(t<=n)
{ cout<<" "<<t;
f=s;
s=t;
t=f+s;
}
getch();
}
```

\*\*\*\*\*  
\*\*\*\*\*  
\*\*\*\*\*  
**Output:**



The screenshot shows a Windows command-line interface window. The title bar reads "C:\BC5\BIN\NONAME00.exe". The window contains the following text:  
enter the max. limit: 56  
0 1 1 2 3 5 8 13 21 34 55



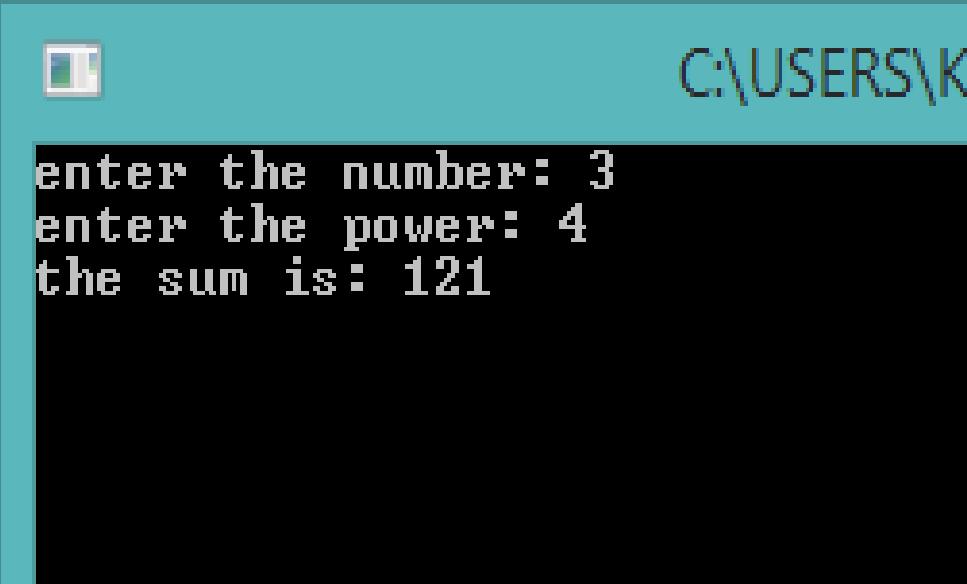
**Q.12. Write a program to display the following series:**

$$S = 1 + x + x^2 + \dots + x^n$$

```
#include<iostream.h>
#include<conio.h>
void main()
{int x,n,p,s=0;
cout<<"enter the number: ";
cin>>x;
cout<<"enter the power: ";
cin>>n;
for(int i=0;i<=(n);i++)
{ p=1;
  for(int j=0;j<i;j++)
    p=p*x;

  s=s+p;
}
cout<<"the sum is: ";
cout<<s;
getch();
}
```

## Output:



```
C:\USERS\K
enter the number: 3
enter the power: 4
the sum is: 121
```

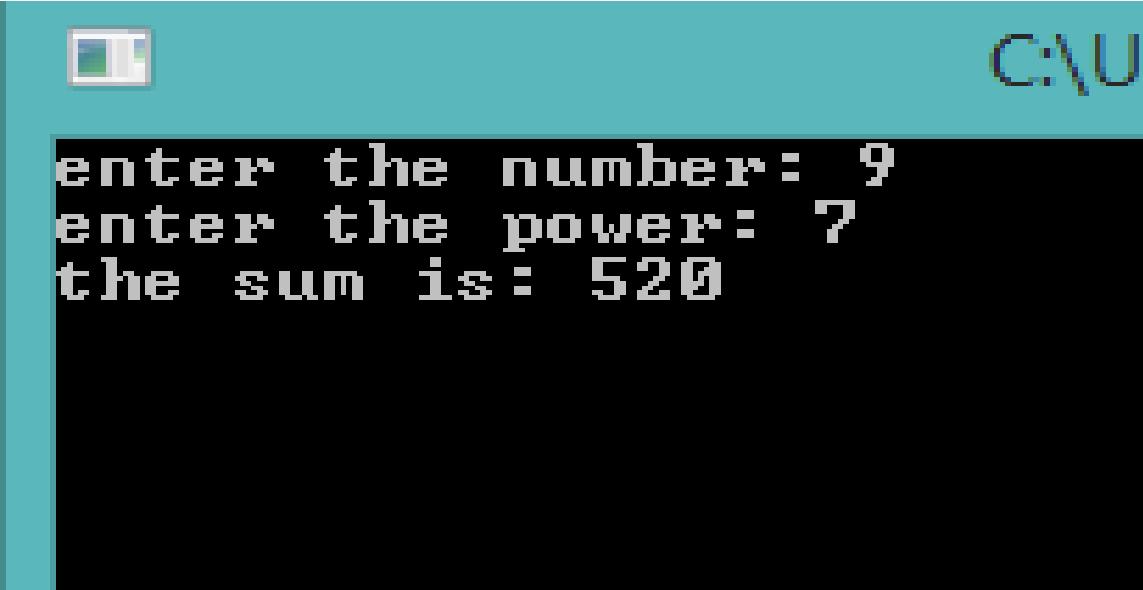
**Q.12 B. Write a program to display the following series:**

$$S = \frac{x^2}{2!} + \frac{x^3}{3!} - \frac{x^4}{4!} + \dots + \frac{x^n}{n!}$$

```
#include<iostream.h>
#include<conio.h>
#include<math.h>
void main()
{int fact=1,sum=0;
cout<<"enter the number: ";
int x;
cin>>x;
cout<<"enter the power: ";
int n;
cin>>n;
for(int i=1;i<=n;i++)
{int p=pow(x,i);
fact=i*fact;
if(i%2!=0)
sum=sum+(p/fact);
else
sum=sum-(p/fact);
}
}
```

```
*****  
*****  
***** cout<<"the sum is: ";  
***** cout<<sum;  
***** getch();  
***** }
```

## Output:



```
enter the number: 9
enter the power: 7
the sum is: 520
```

**Q13. Write a program to generate the following pattern for n lines:**

```
    1  
   1 2 1  
  1 2 3 2 1  
 1 2 3 4 3 2 1
```

```
#include<iostream.h>  
  
#include<conio.h>  
  
void main()  
  
{int i, j, k, a, n;  
  
cout<<"enter the number of lines: ";  
  
cin>>n;  
  
for(i=1;i<=n;i++)  
  
{  
    for(k=n;k>i;k--)
```

```
*****  
* cout<<" ";  
*  
* for(int j=1;j<=i;j++)  
*  
* cout<<" "<<j;  
*  
* for(a=i-1;a>=1;a--)  
*  
* cout<<" "<<a;  
*  
* cout<<endl;  
*  
* }  
*  
* getch();  
* }
```



## Output:

```
C:\USERS\KATHIRVEL\DESKTOP\NONAME00.exe
enter the number of lines: 10
          1
         1 2 1
        1 2 3 2 1
       1 2 3 4 3 2 1
      1 2 3 4 5 4 3 2 1
     1 2 3 4 5 6 5 4 3 2 1
    1 2 3 4 5 6 7 6 5 4 3 2 1
   1 2 3 4 5 6 7 8 7 6 5 4 3 2 1
  1 2 3 4 5 6 7 8 9 8 7 6 5 4 3 2 1
 1 2 3 4 5 6 7 8 9 10 9 8 7 6 5 4 3 2 1
```

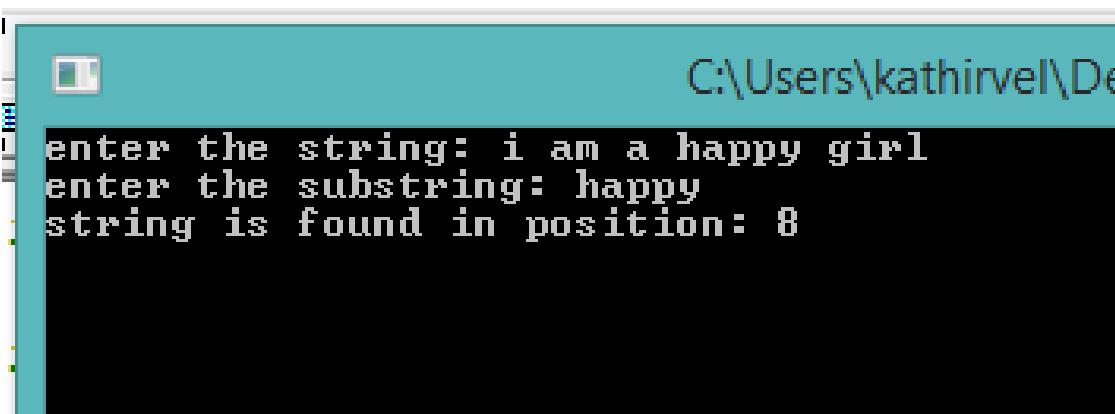
**Q.14. To accept a string and search for a sub-string  
(a group of contiguous characters). If the search is  
successful return the position of the substring  
otherwise return -1**

```
#include<iostream.h>
#include<conio.h>
#include<stdio.h>
void main()
{char str[10],sub[10];
int j=0,flag=1,len=0,len1;
cout<<"enter the string: ";
gets(str);
cout<<"enter the substring: ";
gets(sub);
for(int k=0;sub[k]!=0;k++)
len+=k;
for(int k=0;str[k]!=0;k++)
len1+=k;
for(int i=0;i<10;i++)
{ if(str[i]==sub[j])
flag=0;
for(j=1;j<len;j++)
{if(str[i+j]!=sub[j])
{break;
}
}
}
if(flag==0)
cout<<"Position is: "<<i+1;
else
cout<<"Not Found";
}
```

```
*****  
*  
* flag=1;  
* }  
* }  
* if(flag==0)  
* {cout<<"string is found in position: "<<(i+1);  
* break;  
* }  
* else  
* j=0;  
* }  
* if(flag==1)  
* cout<<"string not found: 1";  
* getch();  
* }
```



## Output:



A screenshot of a terminal window titled 'C:\Users\kathirvel\De'. The window displays the following text:  
enter the string: i am a happy girl  
enter the substring: happy  
string is found in position: 8

**Q.15. Write a program to read a string. The program should handle the options as given below:**

- a. Check for Palindrome**
- b. Search for a given substring**
- c. Reverse all the string**
- d. Frequency of alphabets in each string**
- e. Exit**

**Use functions with proper arguments for each menu options. Use global variables only if it is necessary.**

```
#include<iostream.h>
#include<conio.h>
#include<stdio.h>
#include<stdlib.h>
void palio()
{
    char str[20],sub[20];
    int len=0,i,z;
    cout<<"enter the string: ";
    gets(str);

    for(int j=0;str[j]!='\0';j++)
        len=j;
```

```
*****  
*  
* z=len;  
*  
* for(i=0;i<=z;i++)  
* {sub[i]=str[len--];  
* }  
*  
* sub[i]='\0';  
* cout<<"the new string: "<<sub;  
*  
* if(str==sub)  
* cout<<"nit is a paliandrome";  
* else  
* cout<<"nit is not a paliandrome";  
* }  
* void search()  
* {char str[10],sub[10];  
* int j=0,flag=1,len=0,len1;  
* cout<<"enter the string: ";  
* gets(str);  
* cout<<"enter the substring: ";  
* gets(sub);  
* for(int k=0;sub[k]!=0;k++)  
* len+=k;  
* for(int k=0;str[k]!=0;k++)  
* len1+=k;  
* }
```

```
*****  
*  
* for(int i=0;i<10;i++)  
* { if(str[i]==sub[j])  
*     flag=0;  
*     for(j=1;j<len;j++)  
*     {if(str[i+j]!=sub[j])  
*      {break;  
*      flag=1;  
*     }  
*     }  
*     if(flag==0)  
*     {cout<<"string is found in position: "<<(i+1);  
*      break;  
*     }  
*     else  
*     j=0;  
*   }  
*   if(flag==1)  
*   cout<<"string not found: 1";  
* }  
* void rev()  
* {char str[20],sub[20];  
* int len=0,i,z;  
* cout<<"enter the string: ";  
* gets(str);  
* }
```

```
*****  
*  
* for(int j=0;str[j]!='\0';j++)  
* len=j;  
*  
* z=len;  
*  
* for(i=0;i<=z;i++)  
* {sub[i]=str[len--];  
* }  
*  
* sub[i]='\0';  
* cout<<"the new string: "<<sub;  
* }  
* void freq()  
* {char ch[20],temp;  
* int freq[26];  
* cout<<"enter the string: ";  
* gets(ch);  
* for(int i=0;ch[i]!='\0';i++)  
* {if(ch[i]<='Z'&&ch[i]>='A')  
* ch[i]=ch[i]+32;  
*  
* freq[ch[i]-97]++;  
* }  
* temp='A';  
* for(int i=0;i<26;i++)  
*
```

```
*****  
* { if(freq[i]!=0)  
*     cout<<ch<<"="<<freq[i]<<endl;  
*     temp++;}  
* }  
* void main()  
* {char b;  
* cout<<"a. Check for Palindrome";  
* cout<<"\nb. Search for a given substring";  
* cout<<"\nc. Reverse all the string";  
* cout<<"\nd. Frequency of alphabets in each string";  
* cout<<"\ne. Exit";  
* cout<<"\nenter ur choice: ";  
* cin>>b;  
* if(b=='a')  
*     palio();  
* if(b=='b')  
*     search();  
* if(b=='c')  
*     rev();  
* if(b=='d')  
*     freq();  
* if(b=='e')  
*     exit(0);  
* getch();  
* }  
*****
```

## Output:

```
C:\Users\kathirvel\Desktop\15th question.exe
a. Check for Palindrome
b. Search for a given substring
c. Reverse all the string
d. Frequency of alphabets in each string
e. Exit
enter ur choice: c
enter the string: i am rithika
the new string: akihtir ma i
```

**Q.16. Write a program to enter a list of strings and create new list that consists of those strings with their first characters removed**

```
#include<iostream.h>
#include<conio.h>
#include<stdio.h>
void main()
{char a[50],a1[50],a2[50];
int n;
cout<<"enter the no. of strings(max.3): ";
cin>>n;
if(n==3)
{cout<<"enter the string: ";
gets(a);
gets(a1);
gets(a2);
int d,n1,n2;
for(int i=0;a[i]!='\0';i++)
d=i+1;
for(int i1=0;a1[i1]!='\0';i1++)
n1=i1+1;
for(int i2=0;a2[i2]!='\0';i2++)
n2=i2+1;
for(int j=0;j<d;j++)
}
```

```
*****  
*  
* a[j]=a[j+1];  
* d--;  
*  
* for(int j1=0;j1<n1;j1++)  
* a1[j1]=a1[j1+1];  
* n1--;  
*  
* for(int j2=0;j2<n2;j2++)  
* a2[j2]=a2[j2+1];  
* n2--;  
*  
* cout<<"the strings are: "<<endl;  
* cout<<a<<endl;  
* cout<<a1<<endl;  
* cout<<a2<<endl;  
* }  
* if(n==2)  
* {int d,n1;  
* cout<<"enter the string: ";  
* gets(a);  
* gets(a1);  
* for(int i=0;a[i]!='\0';i++)  
* d=i+1;  
* for(int i1=0;a1[i1]!='\0';i1++)  
* n1=i1+1;  
*****
```

```
*****  
*  
*     for(int j=0;j<d;j++)  
*         a[j]=a[j+1];  
*         d--;  
*  
*     for(int j1=0;j1<n1;j1++)  
*         a1[j1]=a1[j1+1];  
*         n1--;  
*  
*     cout<<"the strings are: "<<endl;  
*     cout<<a<<endl;  
*     cout<<a1<<endl;  
*  
* }  
* if(n==1)  
* {cout<<"enter the string: ";  
* gets(a);  
* int d;  
* for(int i=0;a[i]!='\0';i++)  
*     d=i+1;  
* for(int j=0;j<d;j++)  
*     a[j]=a[j+1];  
*     d--;  
*
```

```
*****  
*****  
***** cout<<"the strings is: ";  
***** cout<<a;  
***** }  
***** getch();  
***** }
```

## Output:



C:\USERS\KATHIRVEL\Desktop\NONAME00.exe

```
enter the no. of strings(max.3): 3
enter the string: krithika is a pretty girl.
duber is a new generation transportation service.
He is a happy boy.
the strings are:
rithika is a pretty girl.
uber is a new generation transportation service.
e is a happy boy.
```

**Q.17. Write a program to input any string and count number of uppercase, lowercase, vowels, consonants and digits.**

```
#include<iostream.h>
#include<conio.h>
#include<stdio.h>
void main()
{char ch[100];
int vow=0,con=0,low=0,upp=0,dig=0;
cout<<"enter the string: ";
gets(ch);
for(int a=0;ch[a]!='\0';a++)
{if((ch[a]>='a'&&ch[a]<='z')||(ch[a]>='A'&&ch[a]<='Z'))
 {if(ch[a]=='a'||ch[a]=='e'||ch[a]=='i'||ch[a]=='o'||ch[a]=='u'||ch[a]=='A'||ch[a]=='E'||ch[a]=='I'||ch[a]=='O'||ch[a]=='U')
vow=vow+1;
else
con=con+1;
if(ch[a]>='a'&&ch[a]<='z')
low=low+1;
if(ch[a]>='A'&&ch[a]<='Z')
upp=upp+1;
}
if(ch[a]>='0'&&ch[a]<='9')
```

```
*****  
*  
* dig=dig+1;  
* }  
* cout<<"\n number of uppercase: "<<upp;  
* cout<<"\nnumber of lowercase: "<<low;  
* cout<<"\nnumber of vowels: "<<vow;  
* cout<<"\nnumber of consonants: "<<con;  
* cout<<"\nnumber of digits: "<<dig;  
* getch();  
* }  
*****
```

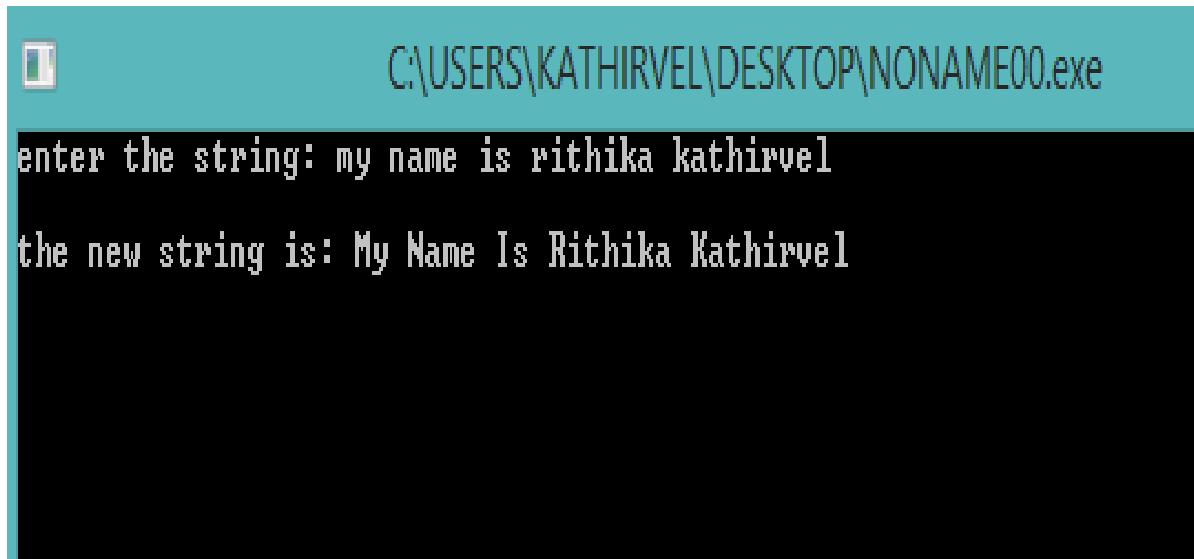
## Output:

```
C:\USERS\KATHIRVEL\Desktop\NONAME01.exe
enter the string: The DOG is BARKING at the stangers
number of uppercase: 11
number of lowercase: 17
number of vowels: 9
number of consonants: 19
number of digits: 0
```

**Q.18. Write a program that takes a string with multiple words and then capitalizes the first letter of each word and forms a new string out of it.**

```
#include<iostream.h>
#include<conio.h>
#include<stdio.h>
void main()
{char a[100];
cout<<"enter the string: ";
gets(a);
if(a[0]>='a'&&a[0]<='z')
a[0]=a[0]-32;
for(int k=0;a[k]!='\0';k++)
{if(a[k]==' ')
{if(a[k+1]>='a'||a[k+1]<='z')
a[k+1]=a[k+1]-32;
}
cout<<"\nthe new string is: ";
cout<<a;
getch();
}
```

## Output:



```
C:\USERS\KATHIRVEL\Desktop\NONAME00.exe
enter the string: my name is rithika kathirvel
the new string is: My Name Is Rithika Kathirvel
```

**Q.19. Write a program to create an array L1 with n values. Create two user defined functions even ( ) - to create an array which store only even values from L1 and Odd ( ) - to create an array which store only odd values from the L1.**

```
#include<iostream.h>
#include<conio.h>
void even(int arr[],int size)
{int dup[100],z=0,k=0;
for(int i=0;i<size;i++)
{if(arr[i]%2==0)
{k=k+1;
dup[z++]=arr[i];
}
}
cout<<"\nThe even values are: ";
for(int i=0;i<k;i++)
cout<<dup[i]<<" ";
}
void odd(int arr[],int size)
{int dup[100],k=0,z=0;
for(int i=0;i<size;i++)
{if(arr[i]%2!=0)
{k=k+1;
```

```
*****  
*  
*     dup[z++]=arr[i];  
*     }  
*     }  
*     cout<<"\nThe following are the odd values: ";  
*     for(int i=0;i<k;i++)  
*         cout<<dup[i]<<" ";  
*     }  
* void main()  
* {int a[100],n;  
* cout<<"enter the size: ";  
* cin>>n;  
* cout<<"enter the array: ";  
* for(int i=0;i<n;i++)  
*     cin>>a[i];  
* even(a,n);  
* odd(a,n);  
* getch();  
* }
```



## Output:



C:\BC5\BIN\NONAME00.exe

```
enter the size: 5
enter the array: 12 23 25 26 30

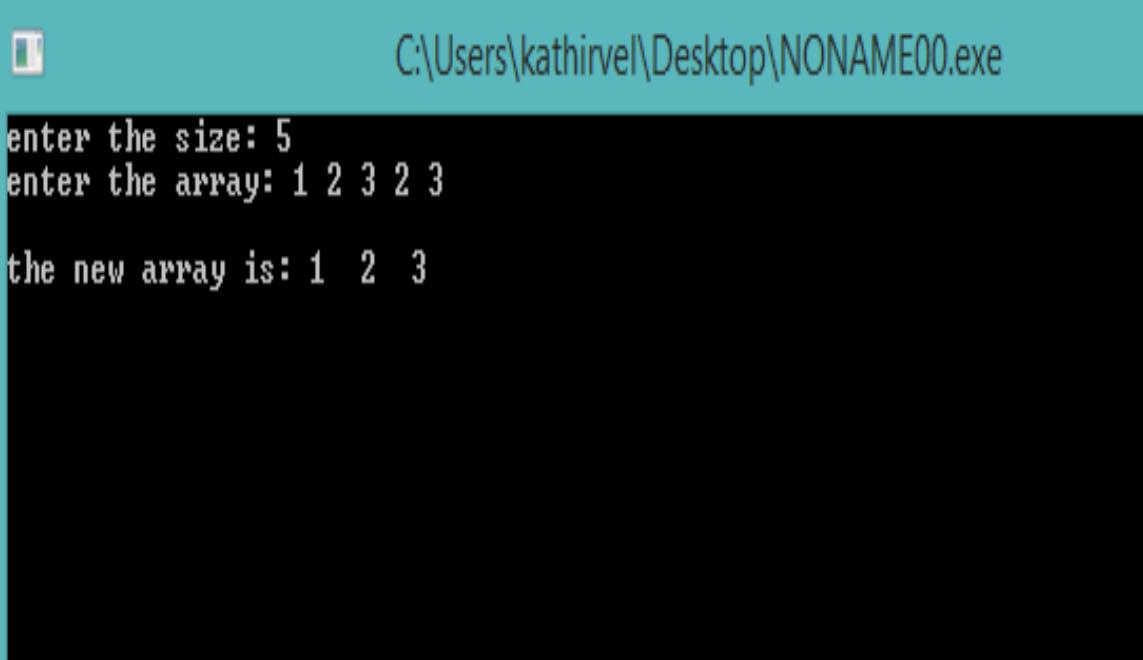
The even values are: 12 26 30
The following are the odd values: 23 25
```

***Q.20. Write a program to remove all adjacent duplicate elements from the given array. The program should contain a function del\_adjacent\_dups to delete duplicate elements.***

```
#include<iostream.h>
#include<conio.h>
void del_adjacent_dups(int arro[],int n1);
void main()
{int n,arr[100];
cout<<"enter the size: ";
cin>>n;
cout<<"enter the array: ";
for(int i=0;i<n;i++)
cin>>arr[i];
del_adjacent_dups(arr,n);
getch();
}
void del_adjacent_dups(int arro[],int n1)
{for(int i=0;i<n1;i++)
{for(int j=i+1;j<n1;j++)
{if(arro[i]==arro[j])
{for(int a=j;j<n1-1;j++)
{}}}}}
```

```
*****  
*  
* arro[a]=arro[a+1];  
* n1--;  
* j--;  
* }  
* }  
* }  
* cout<<"\nthe new array is: "  
* for(int i=0;i<n1;i++)  
* cout<<arro[i]<<" "  
* }  
*****
```

## Output:



```
enter the size: 5
enter the array: 1 2 3 2 3
the new array is: 1 2 3
```

**Q.21. Write a menu driven program to read a numeric array and do the following using functions:**

- (i) To get the position and insert an element.**
- (ii) To delete an element from the array.**
- (iii) To search for an element.**
- (iv) To sort the given array.**

```
#include<iostream.h>
#include<conio.h>
void main()
{ int a[100],n;
  char ch;
  cout<<"enter the size: ";
  cin>>n;
  cout<<endl;
  cout<<"enter the elements: ";
  for(int i=0;i<n;i++)
    cin>>a[i];
  cout<<"\na.enter the given elemnet in a given position";
  cout<<"\nb.delete an element for the array";
  cout<<"\nc.search for an element";
  cout<<"\nd.to sort the given array";
```

```
*****  
* cout<<endl;  
* cout<<"enter your choice: ";  
* cin>>ch;  
* if(ch=='a')  
* { int pos, val;  
* cout<<"enter the position and value: ";  
* cin>>pos>>val;  
* for(int j=n;j>=pos;j--)  
* a[j]=a[j-1];  
* n++;  
* a[pos-1]=val;  
* cout<<"the new array is: ";  
* for( int i=0;i<n;i++)  
* cout<<" "<<a[i];  
* }  
* else if(ch=='b')  
* { int val,pos,flag;  
* cout<<"enter the value to be deleted: ";  
* cin>>val;  
* for(int i=0;i<n;i++)  
* {if(val==a[i])  
* {pos=i;  
* }
```

```
*****  
*  
* flag=1;  
* break;  
* }  
* }  
* if(flag==1)  
* {for(int j=pos;j<n;j++)  
* a[j]=a[j+1];  
* n--;  
* cout<<" the new array is: ";  
* for(int i=0;i<n;i++)  
* cout<<" "<<a[i];  
* }  
* else  
* cout<<"value not found";  
* }  
* else if(ch=='c')  
* {int val,pos,flag=0;  
* cout<<"enter the val to be searched: ";  
* cin>>val;  
* for(int i=0;i<n;i++)  
* {if(a[i]==val)  
* {pos=i+1;  
* }  
* }  
* cout<<"the value is at position: " << pos;  
* }  
*****
```

```
*****  
*  
* flag=1;  
* }  
* }  
* if(flag==1)  
* cout<<"the elemet is found in position: "<<pos;  
* if(flag==0)  
* cout<<"not found";  
* }  
* else if(ch=='d')  
{for (int i = 0; i < n; i++)  
{  
    for (int j = i+1; j < n; j++)  
    {  
        if (a[j]<a[i])  
        {  
            int tmp = a[i];  
            a[i] = a[j];  
  
            a[j] = tmp;  
        }  
    }  
}
```

```
*****  
*****  
***** cout<<"the array is asending order is: ";  
***** for(int i=0;i<n;i++)  
***** cout<<a[i]<<" ";  
***** }  
***** getch();  
***** }
```

## Output:

```
C:\Users\kathirvel\Downloads\rithika array.exe
enter the size: 5
enter the elements: 12 13 14 15 16
a.enter the given elemnet in a given position
b.delete an element for the array
c.search for an element
d.to sort the given array
enter your choice: a
enter the position and value: 3 45
the new array is: 12 13 45 14 15 16
```

**Q.22. Write a function which accept 2D array of integers and its size as arguments and displays the sum of elements which lie on diagonals. Assuming the 2D list to be a square matrix with odd dimension [i.e. 3 x 3]**

**Example of the list content is**

**5 4 3**

**6 7 8**

**1 2 9**

**Output through the function should be**

**Diagonal One Sum: 21**

**Diagonal Two Sum: 11**

```
#include<iostream.h>

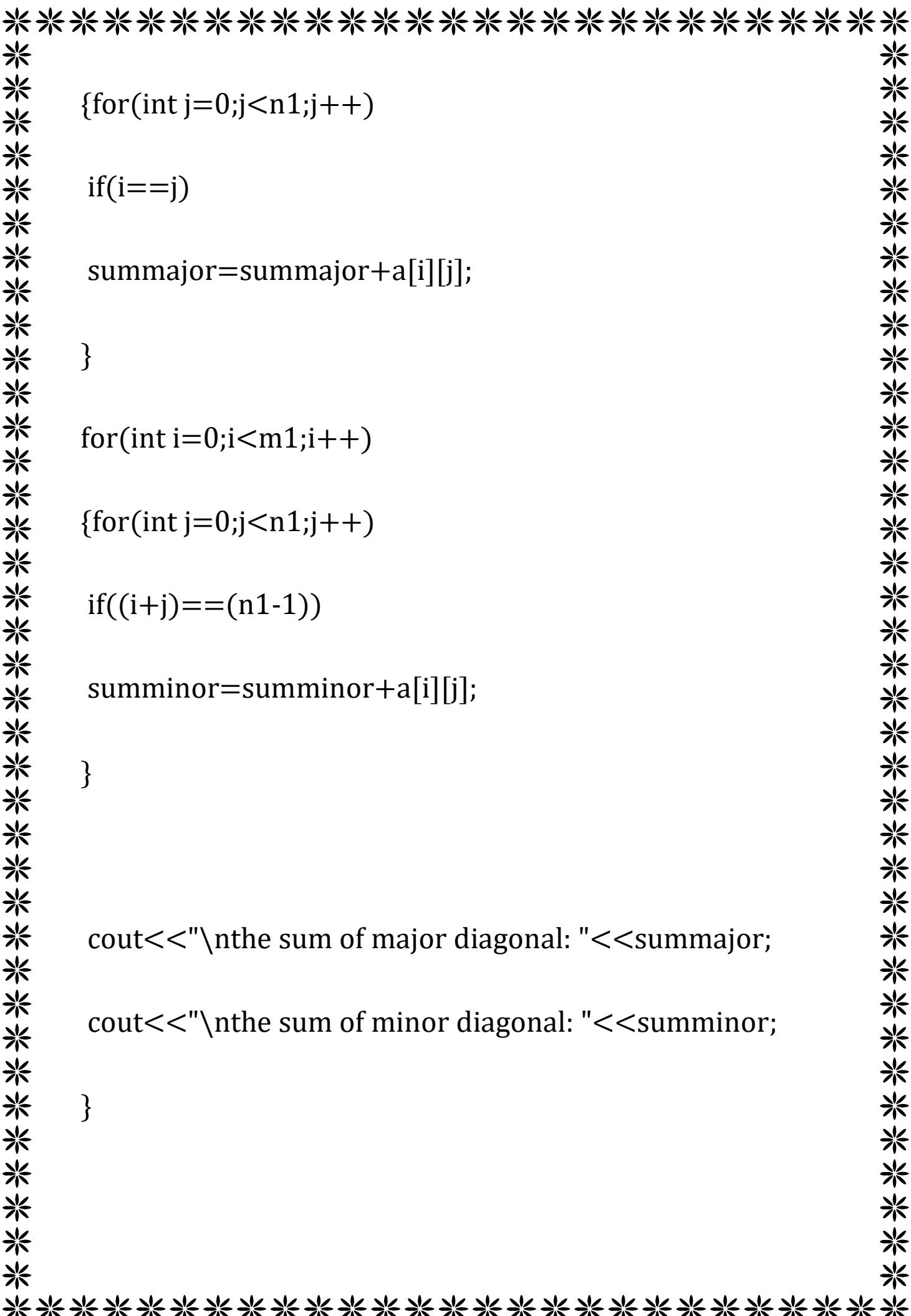
#include<conio.h>

void sumdiagonals(int arr[][100],int m1,int n1);

void main()
{
    int arr[100][100],m,n;
    cout<<"enter the dimensions: ";
}
```

```
*****  
*  
* cin>>m>>n;  
*  
* cout<<"enter the elements: "<<endl;  
*  
* for(int i=0;i<m;i++)  
*  
* {for(int j=0;j<n;j++)  
*  
*     cin>>arr[i][j];  
*  
*     cout<<'\n';  
*  
* }  
*  
* sumdiagonals(arr,m,n);  
*  
* getch();  
*  
* }  
*  
* void sumdiagonals(int a[][100],int m1,int n1)  
*  
* {int summajor=0,summinor=0;  
*  
* for(int i=0;i<m1;i++)
```

```
*****  
*  
* {for(int j=0;j<n1;j++)  
*  
*     if(i==j)  
*  
*         summajor=summajor+a[i][j];  
*  
*     }  
*  
* for(int i=0;i<m1;i++)  
*  
* {for(int j=0;j<n1;j++)  
*  
*     if((i+j)==(n1-1))  
*  
*         summinor=summinor+a[i][j];  
*  
*     }  
*  
* cout<<"\nthe sum of major diagonal: "<<summajor;  
*  
* cout<<"\nthe sum of minor diagonal: "<<summinor;  
*  
* }
```



## Output:

```
enter the dimensions: 3 3
enter the elements:
5 4 3
6 7 8
1 2 9

the sum of major diagonal: 21
the sum of minor diagonal: 11
```

**Q.23. Write a program to display the upper and lower triangular matrix.**

```
#include<iostream.h>
#include<conio.h>
void main()
{int a[100][100],m,n;
cout<<"enter the dimensions: ";
cin>>m>>n;
cout<<"enter the elements: "<<endl;
for(int i=0;i<m;i++)
{for(int j=0;j<n;j++)
cin>>a[i][j];
cout<<'\'n';
}
cout<<"\nthe upper triangular matrix is: "<<endl;
for(int i=0;i<m;i++)
{for(int j=0;j<n;j++)
if(i<=j)
cout<<a[i][j]<" ";
```

```
*****  
*  
* cout<<endl;  
*  
* }  
* cout<<"\nthe lower triangular matrix is: "<<endl;  
* for(int i=0;i<m;i++)  
* {for(int j=0;j<n;j++)  
* if(i>=j)  
* cout<<a[i][j]<" ";  
* cout<<endl;  
* }  
* getch();  
* }
```

## Output:

```
enter the dimensions: 3 3
enter the elements:
5 4 3
6 7 8
1 2 9

the upper triangular matrix is:
543
78
9

the lower triangular matrix is:
5
67
129
```

**Q.24. Write a menu driven program to do the following using functions which accept 2-D array A, and its size m and n as arguments:**

- a) Sum of all elements of matrix of size  $m \times n$**
- b) To display row-wise sum of matrix of size  $m \times n$**
- c) To display column-wise sum of matrix of size  $m \times n$**
- d) To create transpose of matrix**

```
#include<iostream.h>
#include<conio.h>
void Sumelement(int a[][100],int m1, int n1)
{int sum=0;
for(int i=0;i<m1;i++)
{
    {for(int j=0;j<n1;j++)
        sum=sum+a[i][j];
    }
}
cout<<"\nthe sum of all elements: ";
cout<<sum;
}
```

```
*****  
*  
* void rowwisesum(int a[][100],int m1, int n1)  
* {int rowsum=0;  
* for(int i=0;i<m1;i++)  
* {  
* {for(int j=0;j<n1;j++)  
* rowsum=rowsum+a[i][j];  
* }  
* cout<<"\nThe sum of row"<<(i+1)<<"is"<<rowsum;  
* rowsum=0;  
* }  
* }  
* void columnwisesum(int a[][100],int m1,int n1)  
* {int columnsum=0, j;  
* for(int i=0;i<n1;i++)  
* { int colomnsum=0;  
* {for(int j=0;j<m1;j++)  
* columnsum=columnsum+a[i][j];  
* }  
* cout<<"\nThe sum of column"<<(i+1)<<"is"  
* "<<columnsum;  
* }  
* }  
*****
```

```
*****  
*  
* void transpose(int a[][100],int m1,int n1)  
* {int arro[100][100];  
*  
*     for(int i=0;i<m1;i++)  
*     {  
*         for(int j=0;j<n1;j++)  
*         {  
*             arro[j][i] = a[i][j];  
*         }  
*     }  
*  
*     cout<<"Transpose of Matrix: "<<endl;  
*     for(int i=0;i<n1;i++)  
*     {  
*         for(int j=0;j<m1;j++)  
*         {  
*             cout<<arro[i][j]<<" ";  
*  
*             if(j==n1-1)  
*                 cout<<endl;  
*         }  
*     }  
* }  
*****
```

```
*****
*
*
*
void main()
{
int arr[100][100],m,n;
char ch;
cout<<"enter the dimensions: ";
cin>>m>>n;
cout<<"enter the elements: "<<endl;
for(int i=0;i<m;i++)
{
for(int j=0;j<n;j++)
{
cin>>arr[i][j];
cout<<'\n';
}
cout<<"\na. Sum of all elements of matrix of size m*n";
cout<<"\nb. To display row-wise sum of matrix of size
m*n";
cout<<"\nc. To display column-wise sum of matrix of size
m*n";
cout<<"\nd. To create transpose of matrix";
cout<<"\nEnter your choice: ";
cin>>ch;
if(ch=='a')
Sumelement(arr,m,n);
if(ch=='b')  
*****
```

```
*****  
* rowwisesum(arr,m,n);  
* if(ch=='c')  
* columnwisesum(arr,m,n);  
* if(ch=='d')  
* transpose(arr,m,n);  
  
* getch();  
}
```

## Output:

```
C:\USERS\KATHIRVEL\DESKTOP\matrix display.exe
enter the dimensions: 3 3
enter the elements:
5 4 3
6 7 8
1 2 9

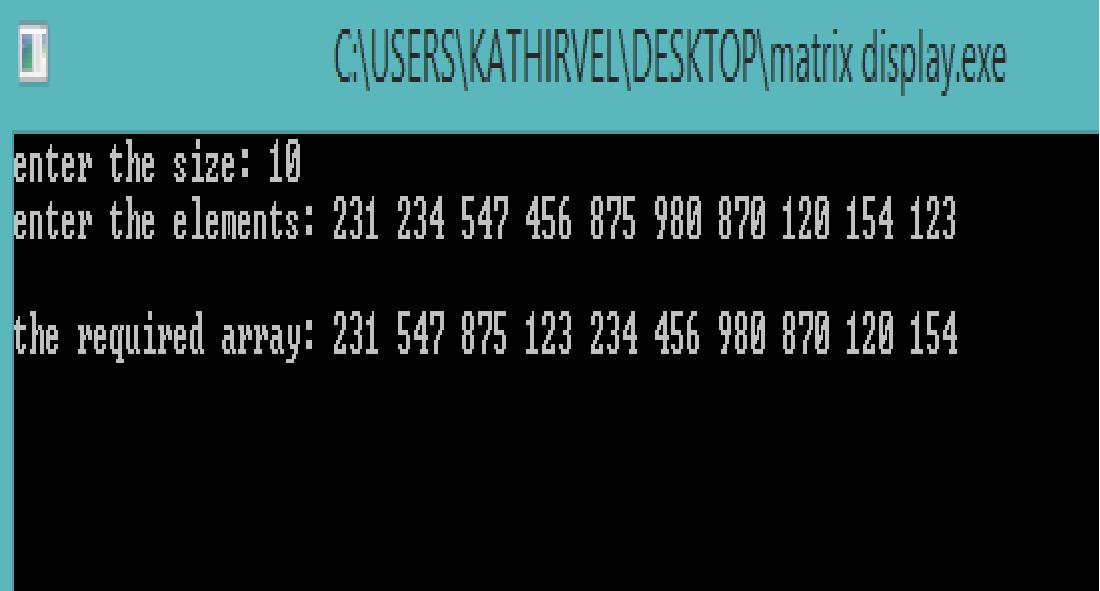
a. Sum of all elements of matrix of size m*n
b. To display row-wise sum of matrix of size m*n
c. To display column-wise sum of matrix of size m*n
d. To create transpose of matrix
enter your choice: d
Transpose of Matrix:
5 6 1
4 7 2
3 8 9
```

**Q.25. Write a program that accepts an integer array and pass the array to a user defined function shift( ) to shift all odd numbers to left and even numbers to the right.**

```
#include<iostream.h>
#include<conio.h>
void shift(int a[100],int n)
{int b[10],i,k=0;
for(i=0;i<n;i++)
{if(a[i]%2!=0)
{b[k]=a[i];
k++;
}
}
for(i=0;i<n;i++)
{ if(a[i]%2==0)
{ b[k]=a[i];
k++;
}
}
```

```
*****  
* }  
* }  
* cout<<"\nthe required array: ";  
* for(i=0;i<n;i++)  
* cout<<b[i]<<" ";  
* }  
* void main()  
* {int arr[100],n1;  
* cout<<"enter the size: ";  
* cin>>n1;  
* cout<<"enter the elements: ";  
* for(int i=0;i<n1;i++)  
* cin>>arr[i];  
* shift(arr,n1);  
* getch();  
* }  
*****
```

## Output:



```
C:\USERS\KATHIRVEL\DESKTOP\matrix display.exe
enter the size: 10
enter the elements: 231 234 547 456 875 980 870 120 154 123
the required array: 231 547 875 123 234 456 980 870 120 154
```