Write a program in C to read 10 numbers from keyboard and find their sum and average.

Test Data:

Input the 10 numbers:

Number-1 :2

...

Number-10 :2

***Expected Output*:**

The sum of 10 no is: 55

The Average is: 5.500000

```c
#include <stdio.h>
void main()
{
    int i,n,sum=0;
     float avg;
     printf("Input the 10 numbers : \n");
     for (i=1;i<=10;i++)
     {
                printf("Number-%d :",i);

           scanf("%d",&n);
           sum +=n;
     }
     avg=sum/10.0;
     printf("The sum of 10 no is : %d\nThe Average is :
%f\n",sum,avg);

}
```

Sample Output:

```
Input the 10 numbers:
Number-1 :1
Number-2 :2
Number-3 :3
Number-4 :4
Number-5 :5
Number-6 :6
Number-7 :7
Number-8 :8
Number-9 :9
Number-10 :10
The sum of 10 no is: 55
The Average is: 5.500000
```

Write a program in C to display the cube of the number upto given an integer.
Test Data :
Input number of terms : 5
***Expected Output* :**
Number is : 1 and cube of the 1 is :1
Number is : 2 and cube of the 2 is :8
Number is : 3 and cube of the 3 is :27
Number is : 4 and cube of the 4 is :64
Number is : 5 and cube of the 5 is :125

```
#include <stdio.h>

void main()

 {

    int i,ctr;

    printf("Input number of terms: ");

    scanf("%d", &ctr);

    for(i=1;i<=ctr;i++)

    {

       printf("Number is: %d and cube of %d is :%d
\n",i,i, (i*i*i));

    }

 }
```

Sample Output:

```
Input number of terms: 5
Number is: 1 and cube of 1 is :1
Number is: 2 and cube of 2 is :8
Number is: 3 and cube of 3 is :27
Number is: 4 and cube of 4 is :64
Number is: 5 and cube of 5 is :125
```

Write a program in C to display the multiplication table of a given integer.
Test Data:
Input the number (Table to be calculated): 15
***Expected Output*:**
15 X 1 = 15
...
...
15 X 10 = 150

```c
#include <stdio.h>

void main()

{

   int j,n;

   printf("Input the number (Table to be calculated): ");

   scanf("%d",&n);

   printf("\n");

   for(j=1;j<=10;j++)

   {

     printf("%d X %d = %d \n",n,j,n*j);

   }

}
```

Sample Output:

```
Input the number (Table to be calculated): 15

15 X 1 = 15
15 X 2 = 30
15 X 3 = 45
15 X 4 = 60
15 X 5 = 75
15 X 6 = 90
15 X 7 = 105
15 X 8 = 120
15 X 9 = 135
15 X 10 = 150
```

Write a program to check if the entered number is Armstrong or not.

e.g. 153 is an Armstrong number.
The summation of cubes of all the digits should be exactly equal to the number
153 = (1*1*1) + (5*5*5) + (3*3*3) = 1 + 125 + 27 =153

```
#include<stdio.h>

#include<conio.h>

main()

{

int n,n1,rem,sum;

sum = 0;

printf("\n Enter a number : ");

scanf("%d",&n);

n1 = n;

while(n>0)

{

rem = n % 10;

sum = sum + (rem*rem*rem);

n = n / 10;

}

if(sum==n1)

printf("\n Number is Armstrong");

else

printf("\n Number is not Armstrong");

}
```

Write a program to check whether the given number is palindrome or not.
i.e. if no is 12421 it is palindrome.

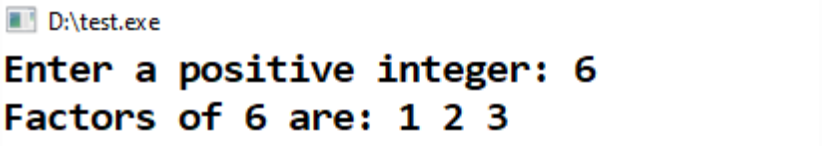
```
#include <stdio.h>
int main()
{
int n, reverse_no = 0, rem, original_no;
printf("Enter a a number : ");
scanf("%d", &n);
original_no = n;
while( n!=0 )
{
rem = n%10;
reverse_no = reverse_no*10 + rem;
n = n/10;
}
if (original_no == reverse_no)
printf("The number is palindrome.");
else
printf("The number is not palindrome.");
return 0;
}
```

Write a program to print Fibonacci series.

```
#include<stdio.h>
#include<conio.h>
main()
{
int a,b,c,i;
a = 1;
b = 2;
i = 1;
printf("1 2 ");
do
{
c = a + b;
printf (" %d ",c);
a = b;
b = c;
i = i + 1;
}while(i<5);
}
```

Write a algorithm and program to generate a factor of given number

```
#include <stdio.h>
int main()
{
int num, i;
printf("Enter a positive integer: ");
scanf("%d", &num);
printf("Factors of %d are: ", num);
for (i = 1; i < num; ++i)
{
if (num % i == 0)
{
printf("%d ", i);
}
}
return 0;
}
```



NESTED LOOPS

Write a program to display the following:

```
*
**
***
****
*****
```

```
#include<stdio.h>
#include<conio.h>
main()
{
int i,j;
for(i=1;i<=5;i++)
{
      for(j=1;j<=i;j++)
      {
      printf("* ");
      }
printf("\n");
}
}
```

Write a program to display pascal triangle.

A

A B

A B C

A B C D

A B C D E

```
#include<stdio.h>
int main() {
int i, j;
for(i=1;i<=5;i++)
{
for(j=1;j<=i;j++)
{
printf("%c ",'A' + j-1);
}
printf("\n");
}
}
```

Write a program to generate following patterns.

5

4 4

3 3 3

2 2 2 2

1 1 1 1 1

```
#include<stdio.h>
int main() {
int a, i;
for(a = 5; a >= 1; a--)
{
      for(i = a;i <= 5;i++)
      {
      printf("%d ", a);
      }
printf("\n");
}
return 0;
}
```

Write a program to generate following patterns.

1
2 3
4 5 6
7 8 9 10

```
#include<stdio.h>

int main() {

int i,j, k=1;

for(i=1;i<=5;i++)

{

for(j=1;j<i;j++)

{

printf("%d ",k);

k++;

}

printf("\n");

}

return 0;

}
```

Write a program to calculate summation of series.
1/2 + 3/4 + 5/6 + 7/8 + …….. up to n terms.

```
#include<stdio.h>

int main() {

int i,j,n;

float sum = 0;

printf("Enter the value of n : ");

scanf("%d",&n);

for(i=1,j=1;i<=n; i++,j=j+2)

{

sum=sum+(float)(j)/(j+1);

}

printf("Sum of series is %f",sum);

}
```

```
Enter the value of n : 10

Sum of series is 8.535515
```

Practice Programs

1. Write a program to print the following pattern.

(Note : Not only 4 lines, it should print n lines taken from user)

A

B B

C C C

D D D D

2. Write a program to display the following pattern.

ABCD

ABC

AB

A

3. Write a program to display following pattern.

ABCD

ABC

AB

A

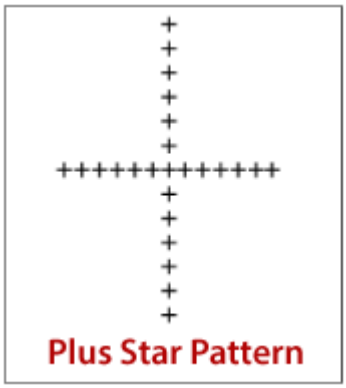
4. 

5. 
Pyramid Star Pattern

6. 
Hollow Pyramid
Star Pattern

7. 
Half Diamond Star
Pattern

8. 
Diamond Star Pattern

9. 

10. Write a program for finding sum of series,

1 + 2 + 3 + 4 upto n terms.

Output:

```
Enter the n i.e. max values of series: 5
Sum of the series: 1 + 2 + 3 + 4 + 5 = 15
```

Sol 1.

```
#include<stdio.h>
int main() {
int i,j;
for(i='A';i<'E';i++)
{
for(j='A';j<=i;j++)
{
printf("%c ",i);
}
printf("\n");
}
}
```

Sol 2.

```
#include<stdio.h>
int main()
{
int i, j;
for(i=1; i <=4; i++)
{
for (j=1; j <=i-1; j++)
{
printf (" ");
}
for (j=1; j <=5-i; j++)
{
printf ("%c",(char)(j+64));
}
printf ("\n");
}
}
```

Sol 3.

```
#include<stdio.h>
int main()
{
int i, j;
for(i=1; i <=4; i++)
{
for (j=1; j <=5-i; j++)
{
printf ("%c",(char)(j+64));
}
printf ("\n");
}
}
```

Sol 4:

```
int main()
{
    int n;
    printf("Enter the number of rows");
    scanf("%d",&n);
    for(int i=1;i<=n;i++)
    {
        for(int j=1;j<=n;j++)
        {
            if(i==1 ||i==n||j==1||j==n)
            {
            printf("*");
            }
            else
            printf(" ");
        }
        printf("\n");
    }

    return 0;
}
```

Sol 5.

```
#include <stdio.h>
int main()
{
    int n,m;
    printf("Enter the number of rows");
    scanf("%d",&n);
    m=n;
   for(int i=1;i<=n;i++)
   {
       for(int j=1;j<=m-1;j++)
       {
           printf(" ");
       }
       for(int k=1;k<=2*i-1;k++)
       {
         printf("*");
       }
       m--;

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

Sol 6.

```
#include <stdio.h>

int main()
{
    int n,m;
    printf("Enter the number of rows");
    scanf("%d",&n);
    m=n;
   for(int i=1;i<=n;i++)
   {
       for(int j=1;j<=m-1;j++)
       {
           printf(" ");
       }
       for(int k=1;k<=2*i-1;k++)
       {
          if(k==1 || k==2*i-1 || i==n)
         printf("*");
         else
         printf(" ");
       }
       m--;

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

Sol 7.

```
#include <stdio.h>
int main()
{
    int n;
    printf("Enter the number of columns");
    scanf("%d",&n);

for(int i=1;i<=n;i++)
{
  for(int j=1;j<=i;j++)
  {
    printf("*");
  }

  printf("\n");
}
for(int i=n-1;i>=1;i--)
{
  for(int j=1;j<=i;j++)
    {
     printf("*");
   }
   printf("\n");
 }
    return 0;
}
```

Sol 8.

```
#include <stdio.h>
int main(void) {
  int n;
  printf("Enter the number of rows\n");
  scanf("%d",&n);

  int spaces=n-1;

  int stars=1;

  for(int i=1;i<=n;i++)
  {
    for(int j=1;j<=spaces;j++)
    {
      printf(" ");
    }

    for(int k=1;k<=stars;k++)
    {
      printf("*");
    }

    if(spaces>i)
    {
      spaces=spaces-1;
      stars=stars+2;
```

```
  }
  if(spaces<i)
  {
    spaces=spaces+1;
    stars=stars-2;
  }
  printf("\n");
}
return 0;}
```

Sol 9.

```
#include <stdio.h>
int main(void) {
  int n;
  printf("Enter the odd number only");
  scanf("%d", &n);
  for(int i=1;i<=n;i++)
  {
    if(i==((n/2)+1))
    {
      for(int j=1;j<=n;j++)
      {
        printf("*");
      }

    }
    else
    {
    for(int j=1;j<=n/2;j++)
    {
      printf(" ");
    }
    printf("*");
    }
    printf("\n");
  }    return 0;  }
```

Sol 10.

```
#include<stdio.h>
int main()
{
int n,i;
int sum=0;
printf("Enter the n i.e. max values of series: ");
scanf("%d",&n);
sum = (n * (n + 1)) / 2;
printf("Sum of the series: ");
for (i =1;i <= n;i++) {
if (i!=n)
printf("%d + ",i); else
printf("%d = %d ",i,sum);
}
return 0;
}
```