While loop:

Loops are used to repeat a block/group of statements continuously until the given condition becomes false.

Loops reduce program size and improves performance.

In loops beginning and ending points are same.

Basically 2 types of loops are available.

1. **Entry/pre controlled loops.**
2. **Exit/post controlled loops.**

In entry control loops, condition is tested first and it is true then only statements block is executed.

Under entry control loops we are having

i. While loop
ii. For loop

In exit control loop, the statements are executed first and later condition is tested.

Under exit control loop we are having

i. do while.

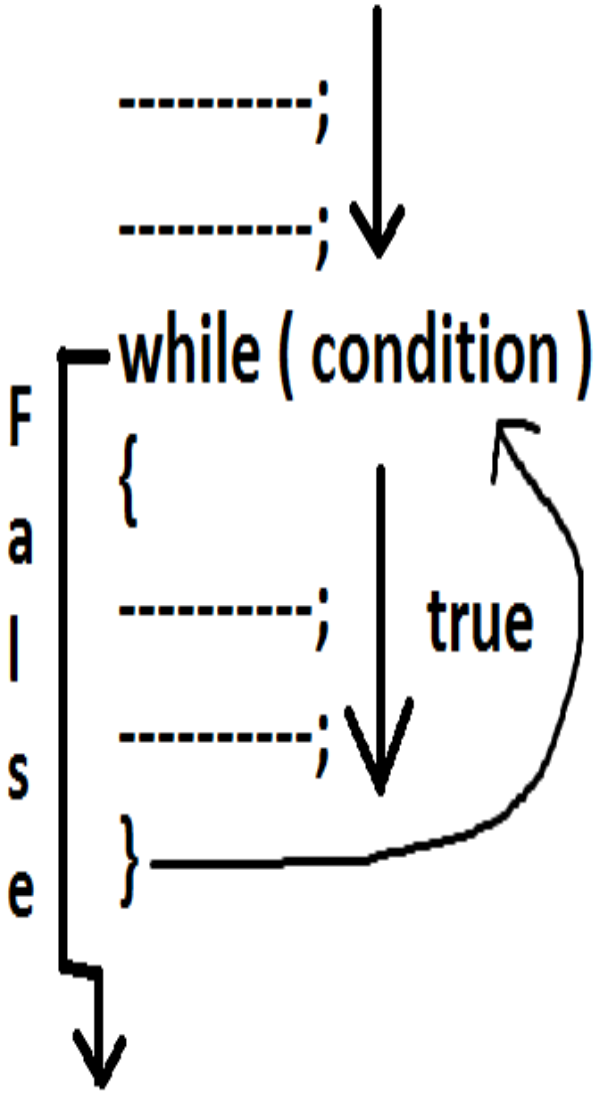
While loop:

- while is a keyword.
- In while loop condition is tested first and it is true then only while block statements are executed. After executing while block statements, the program execution automatically shifted/jumped to while condition at the beginning. If it is true then once again the while block statements are repeated. Like this the

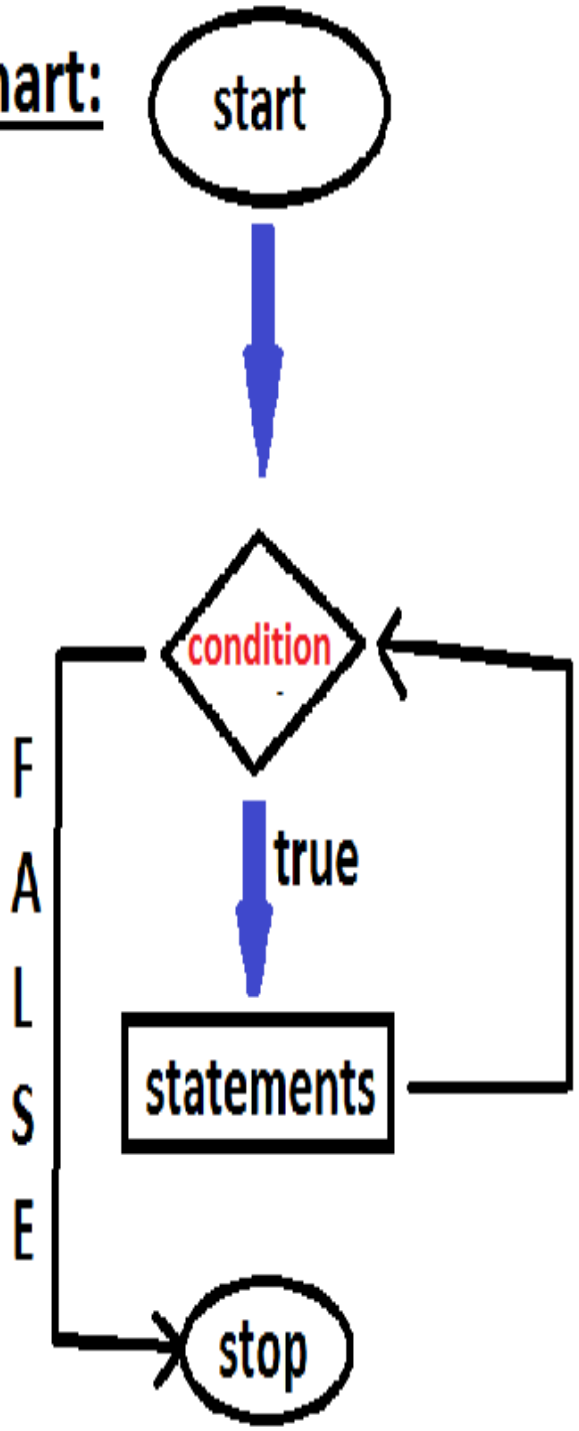
process is continued until while condition becomes false.

- **While is entry control loop.**

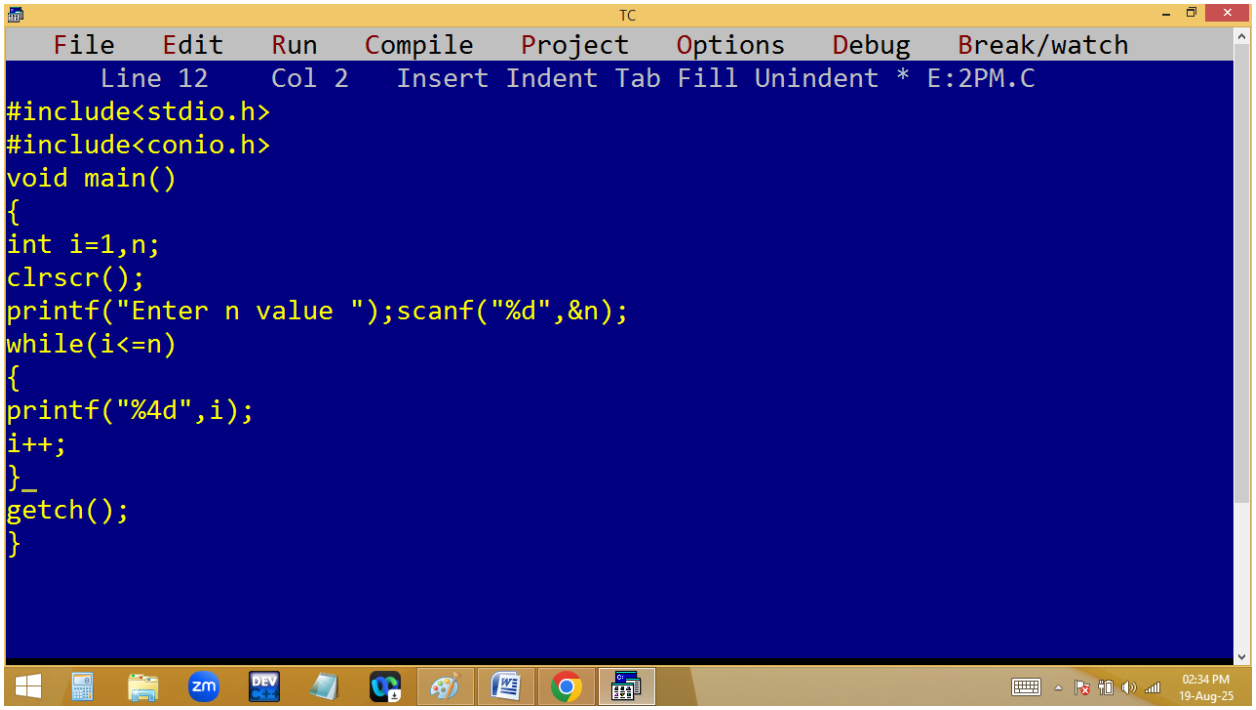
Syntax:

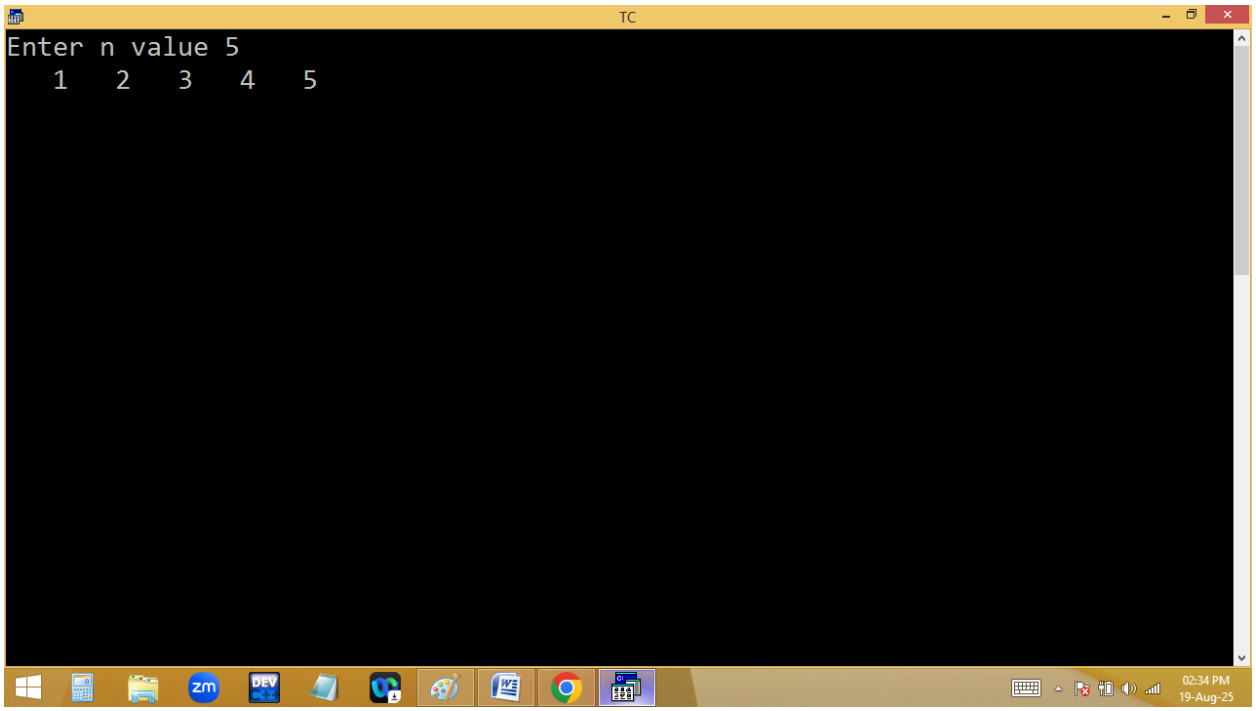


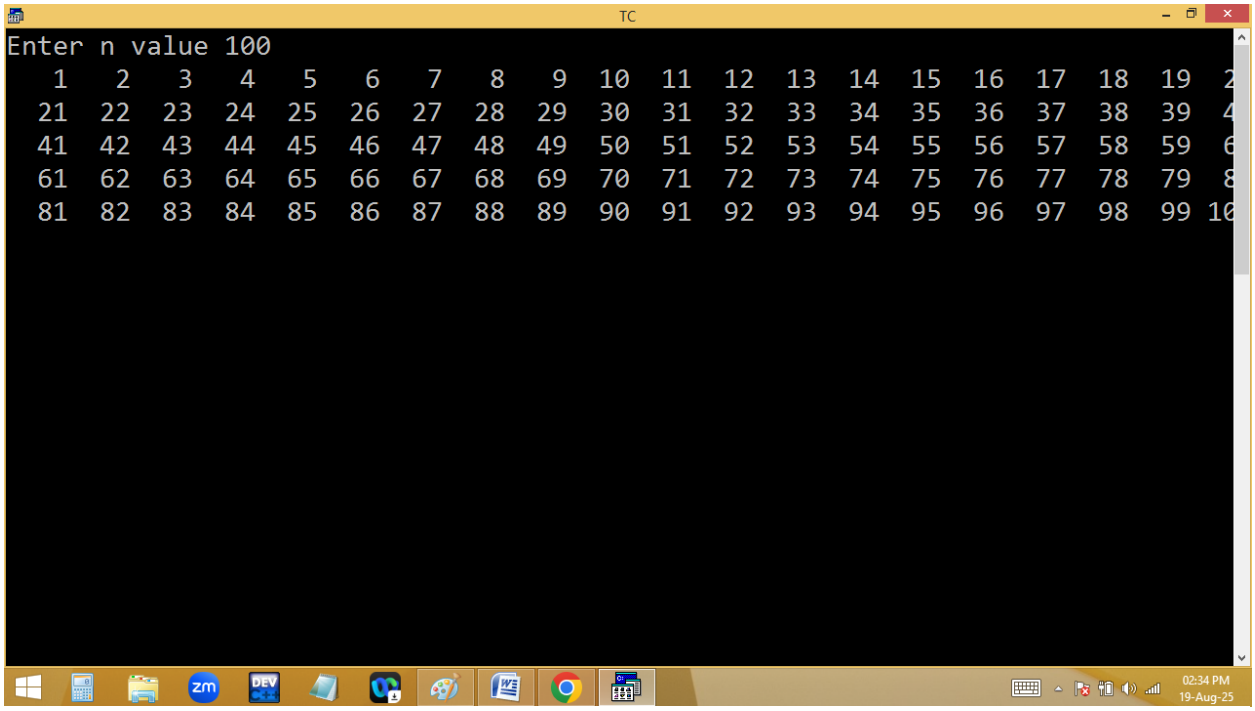
Flow chart:

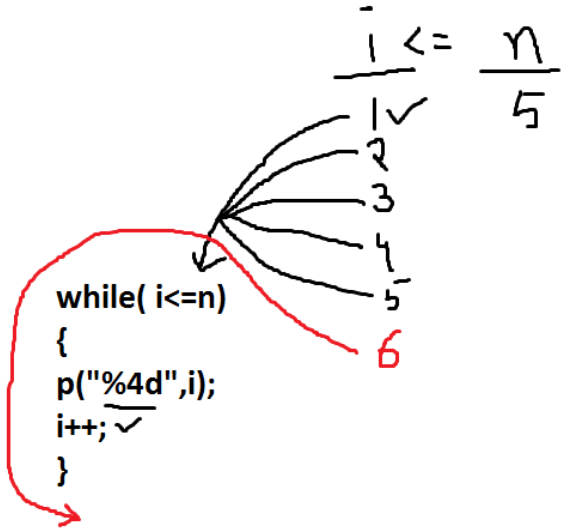


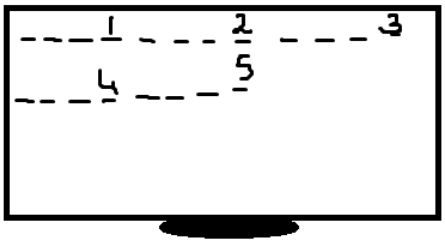
Printing 1..n numbers?

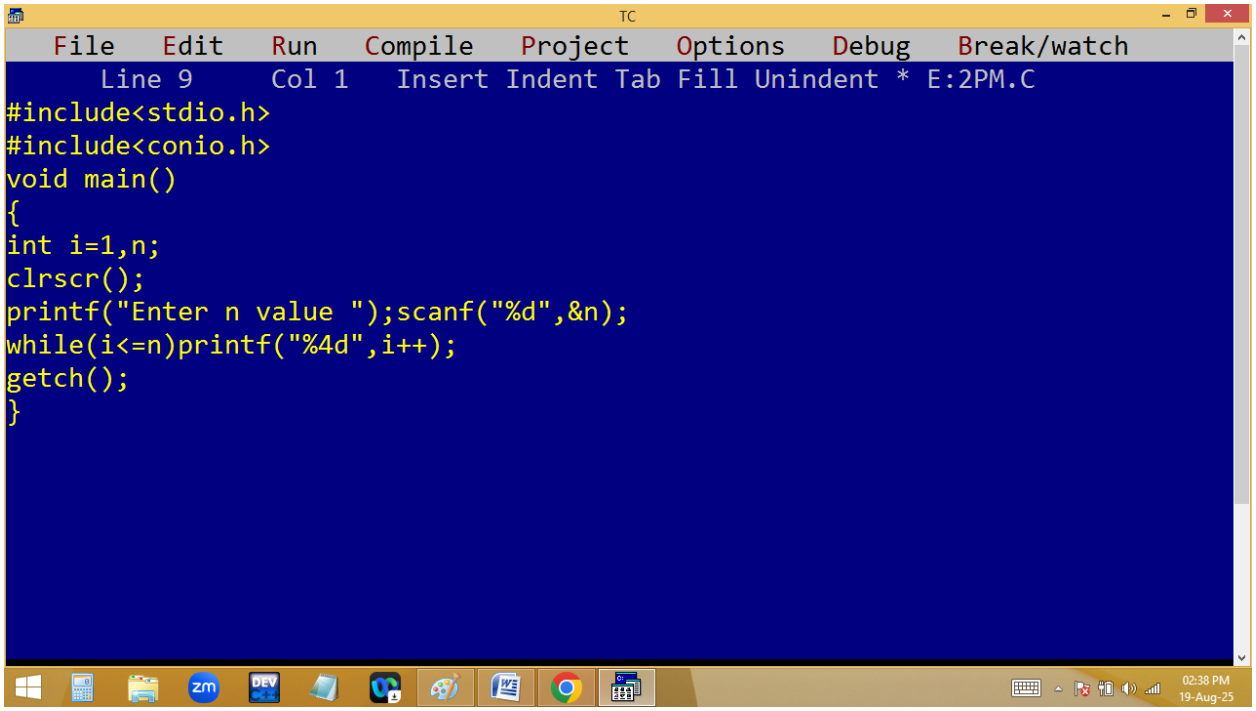


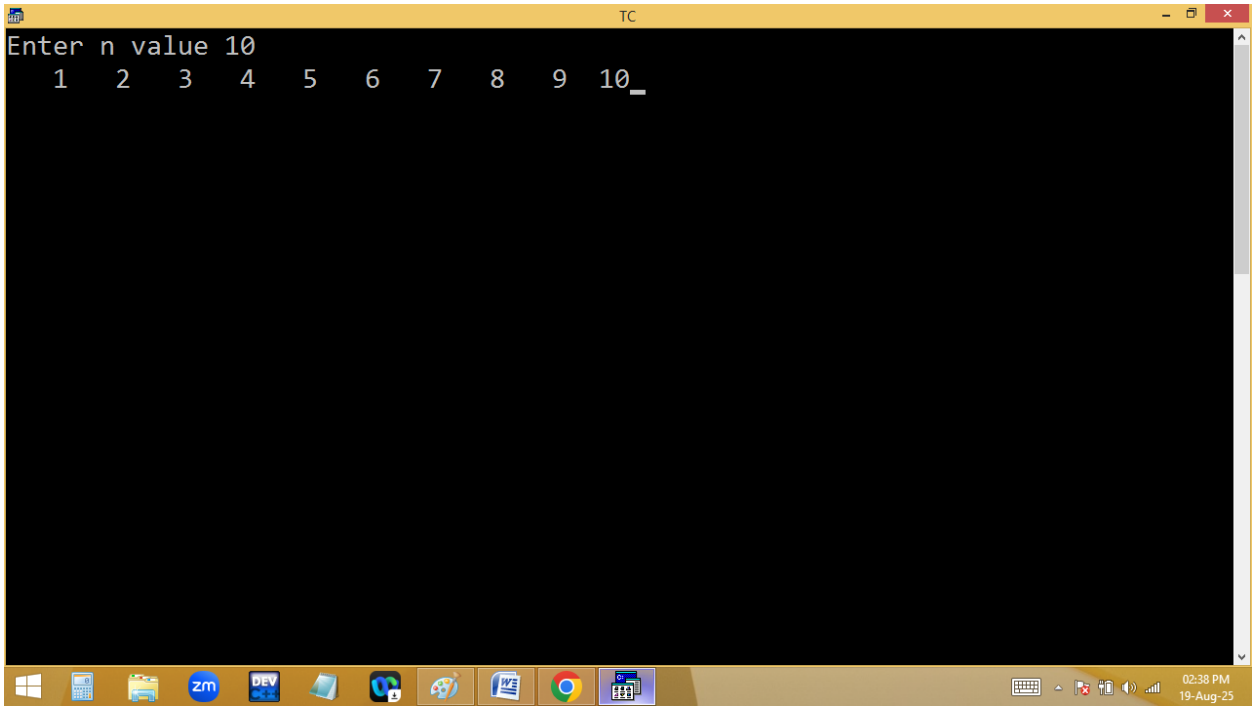



TC
Enter n value 100
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 2
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 4
41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 6
61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 8
81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 10
02:34 PM
19-Aug-25

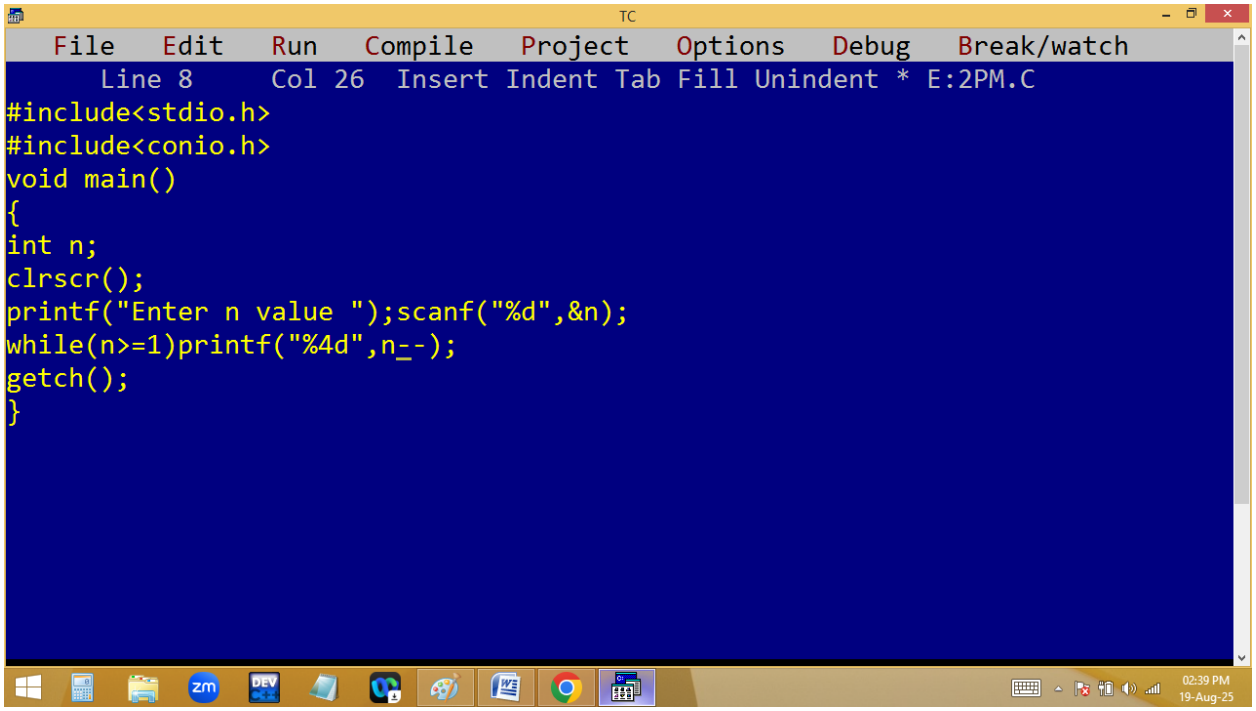

while(i<=n)
{
p("%4d",i);
i++;
}

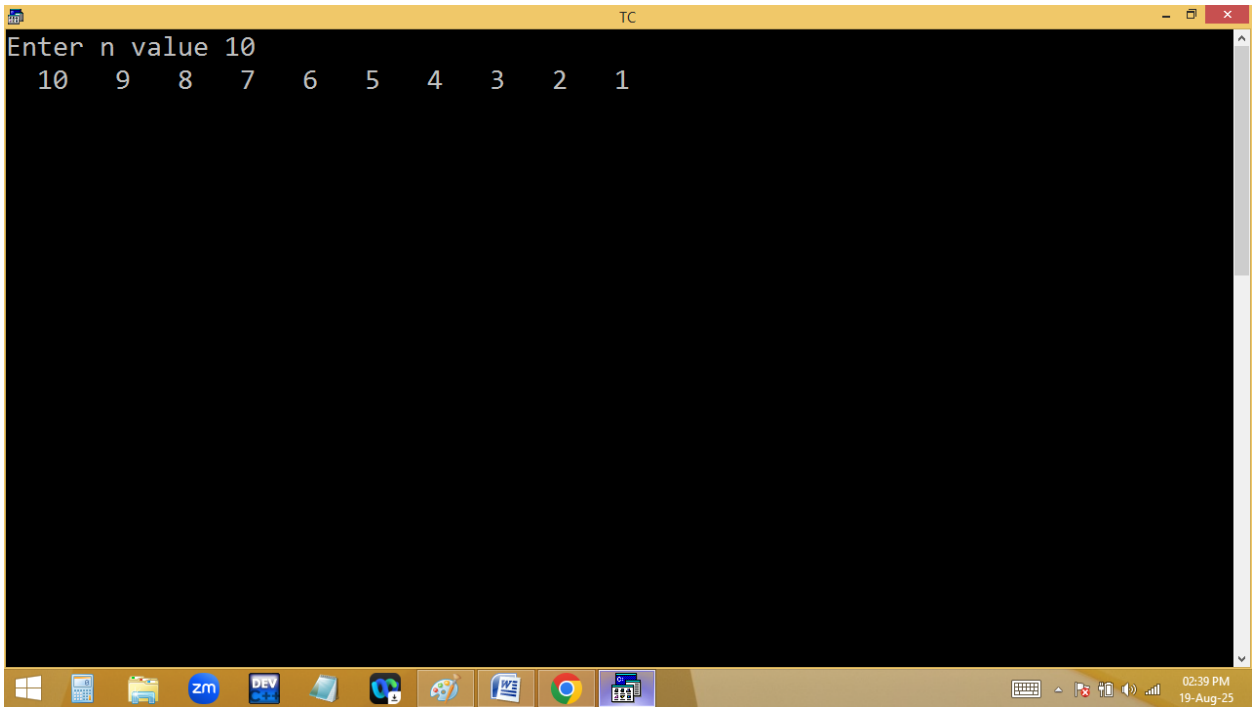


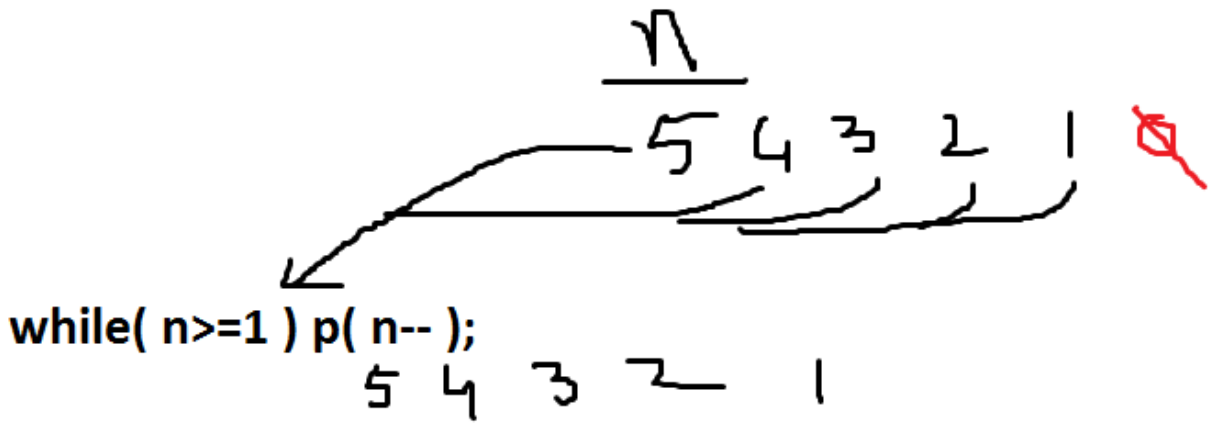

TC
File Edit Run Compile Project Options Debug Break/watch
Line 9 Col 1 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int i=1,n;
clrscr();
printf("Enter n value ");scanf("%d",&n);
while(i<=n)printf("%4d",i++);
getch();
}


TC
Enter n value 10
1 2 3 4 5 6 7 8 9 10

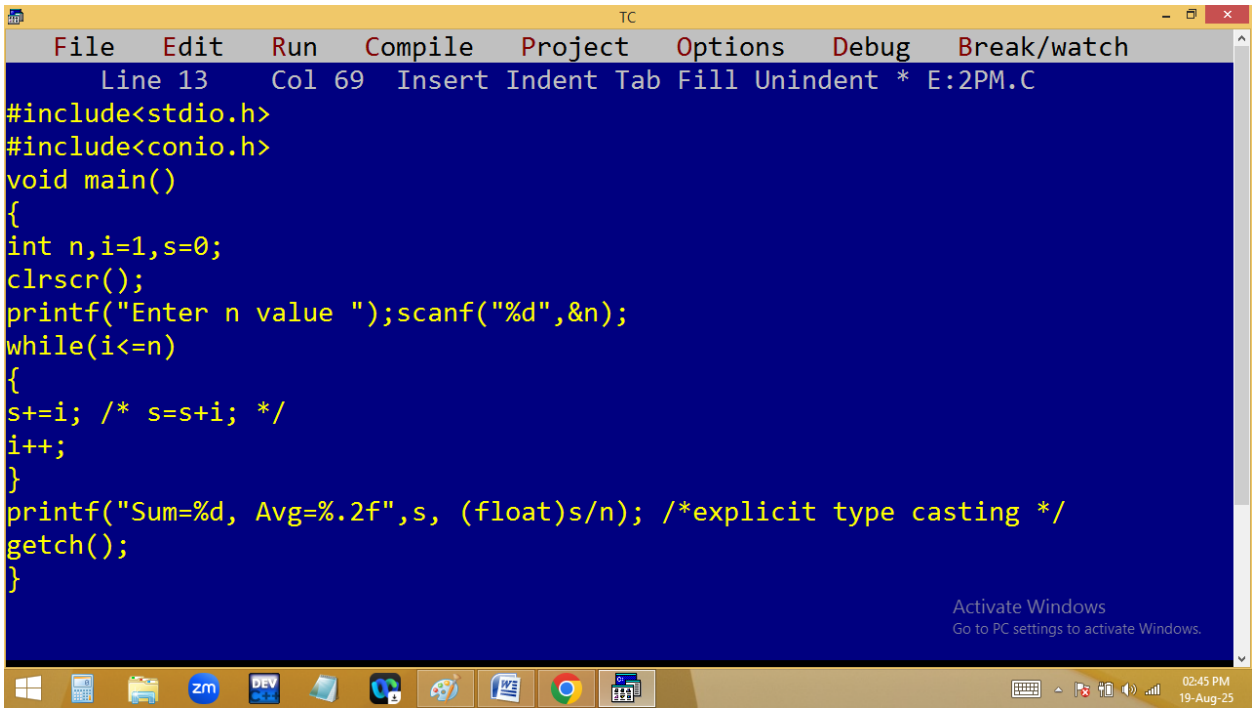
Printing 1..n no’s in reverse order:

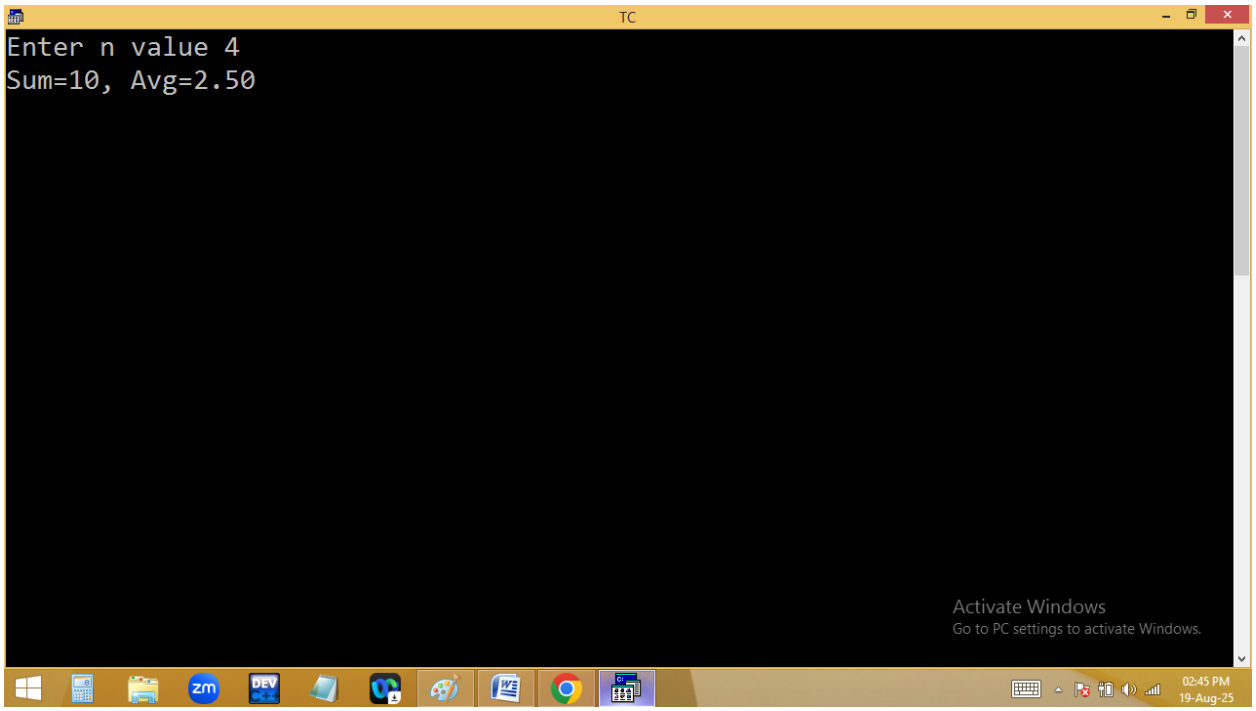


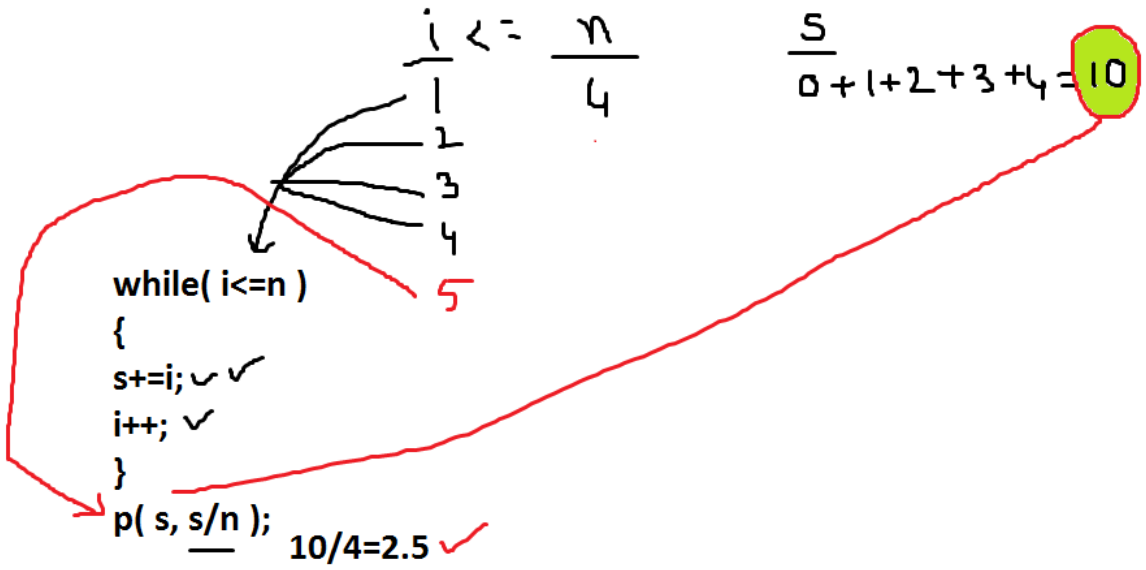




Finding 1..n no's sum and avg?


TC
File Edit Run Compile Project Options Debug Break/watch
Line 13 Col 69 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int n,i=1,s=0;
clrscr();
printf("Enter n value ");scanf("%d",&n);
while(i<=n)
{
s+=i; /* s=s+i; */
i++;
}
printf("Sum=%d, Avg=%.2f",s, (float)s/n); /*explicit type casting */
getch();
}
Activate Windows
Go to PC settings to activate Windows.
02:45 PM
19-Aug-25

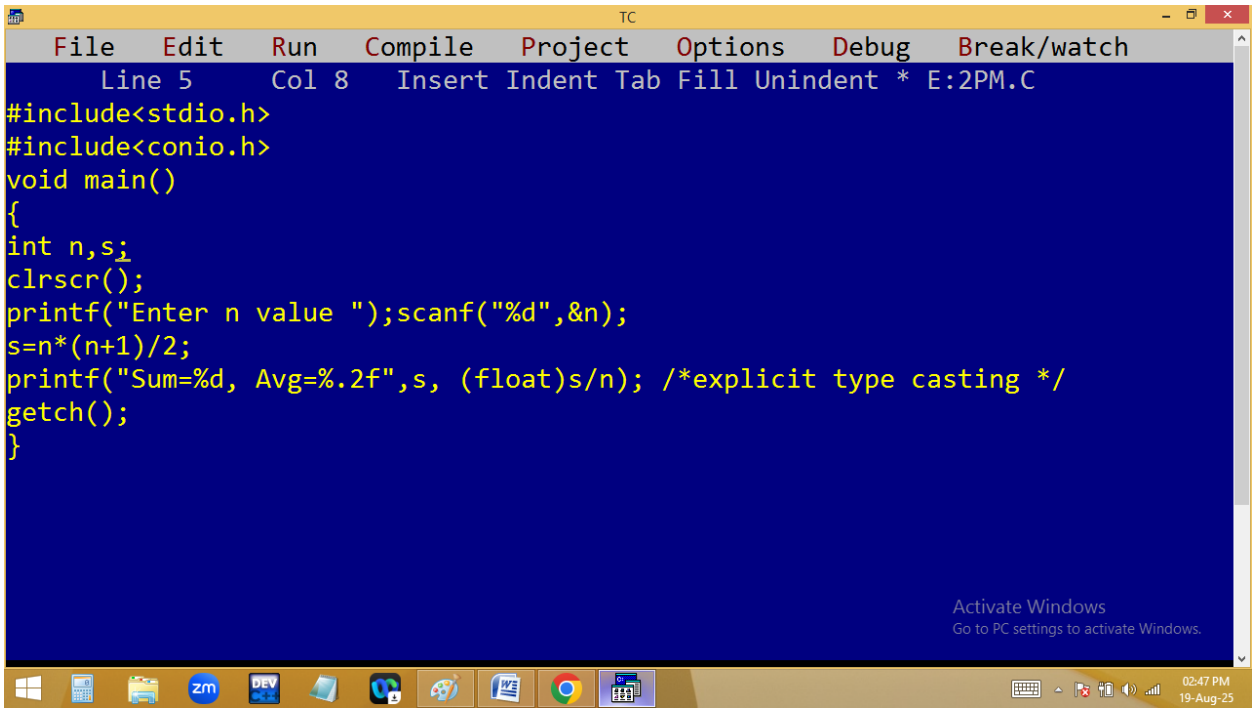


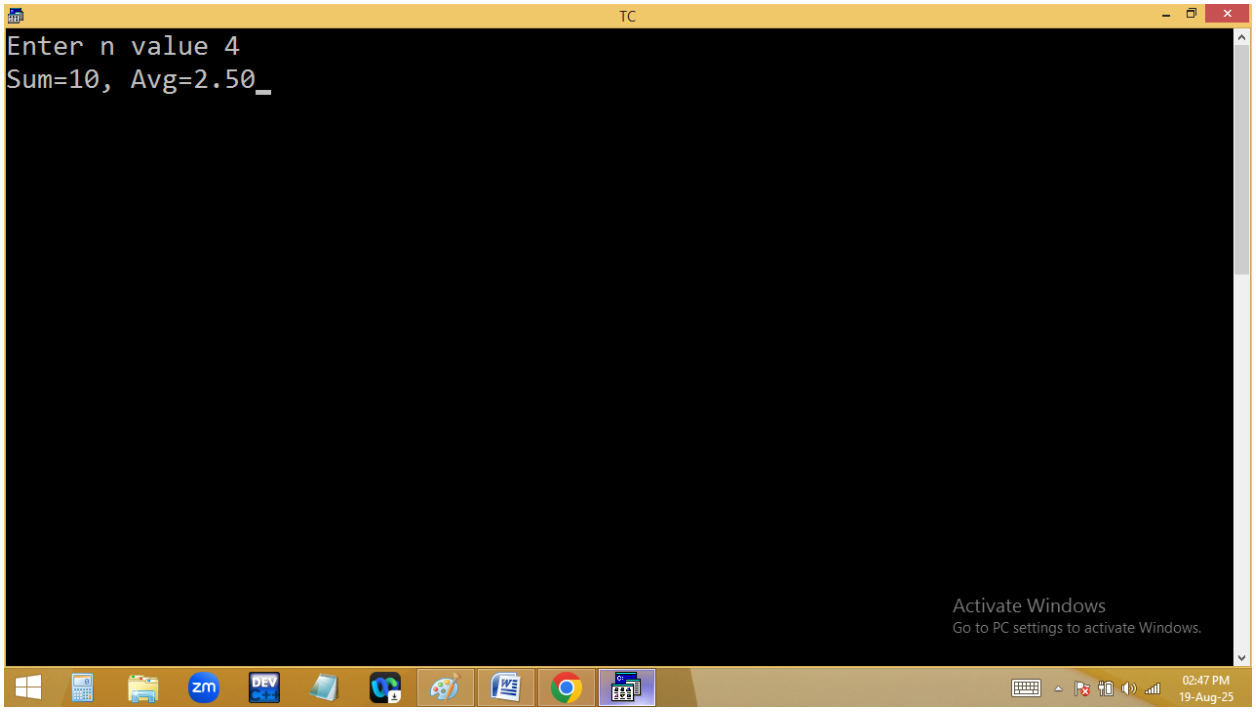


Without using loop?

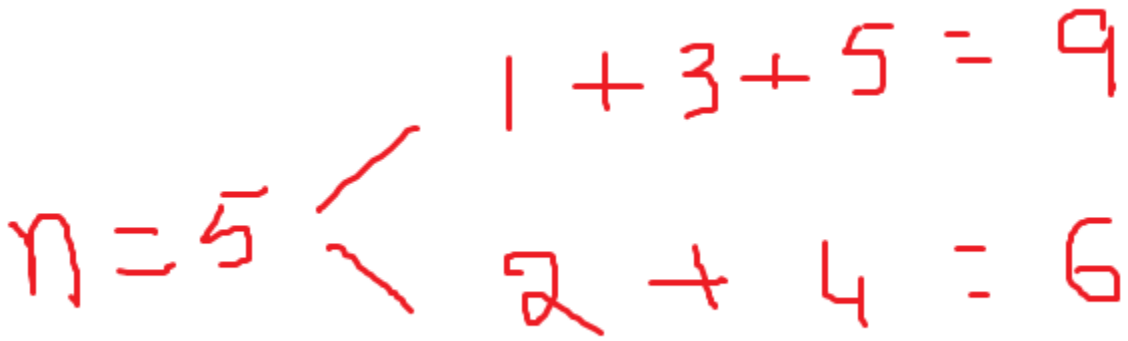
s = n*(n+1)/2;

s = 4 * 5 /2 = 10


TC
File Edit Run Compile Project Options Debug Break/watch
Line 5 Col 8 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int n,s;
clrscr();
printf("Enter n value ");scanf("%d",&n);
s=n*(n+1)/2;
printf("Sum=%d, Avg=%.2f",s, (float)s/n); /*explicit type casting */
getch();
}
Activate Windows
Go to PC settings to activate Windows.
02:47 PM
19-Aug-25


TC
Enter n value 4
Sum=10, Avg=2.50
Activate Windows
Go to PC settings to activate Windows.
02:47 PM
19-Aug-25

Find 1..n even, odd no's sum?



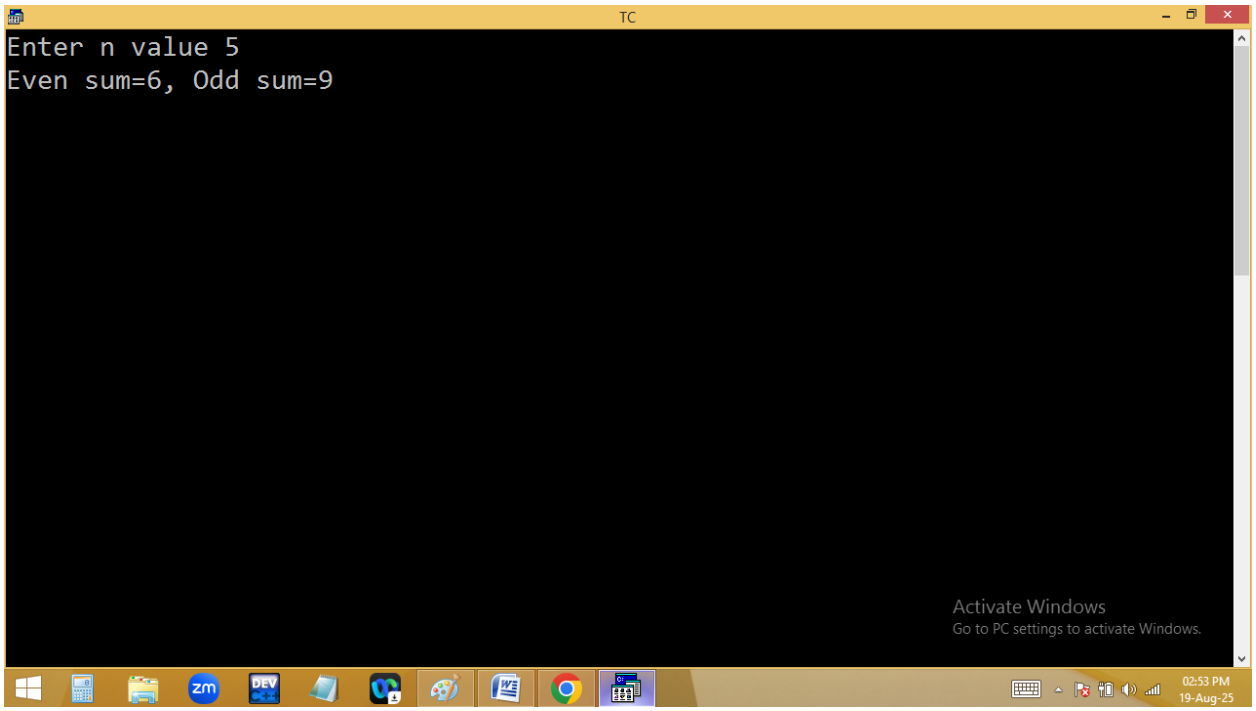
TC

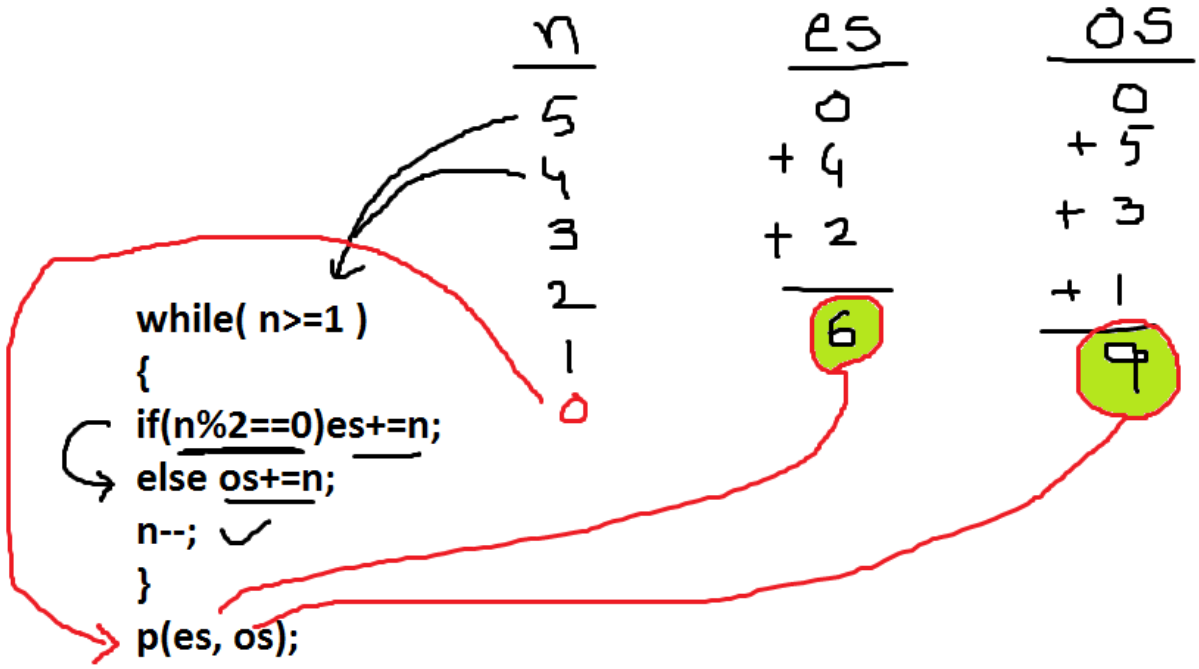
File Edit Run Compile Project Options Debug Break/watch

Line 13 Col 41 Insert Indent Tab Fill Unindent * E:2PM.C

```
#include<stdio.h>
#include<conio.h>
void main()
{
int n,es=0,os=0;
clrscr();
printf("Enter n value ");scanf("%d",&n);
while(n>=1)
{
if(n%2==0)es+=n; else os+=n;
n--;
}
printf("Even sum=%d, Odd sum=%d",es,os);_
getch();
}
```

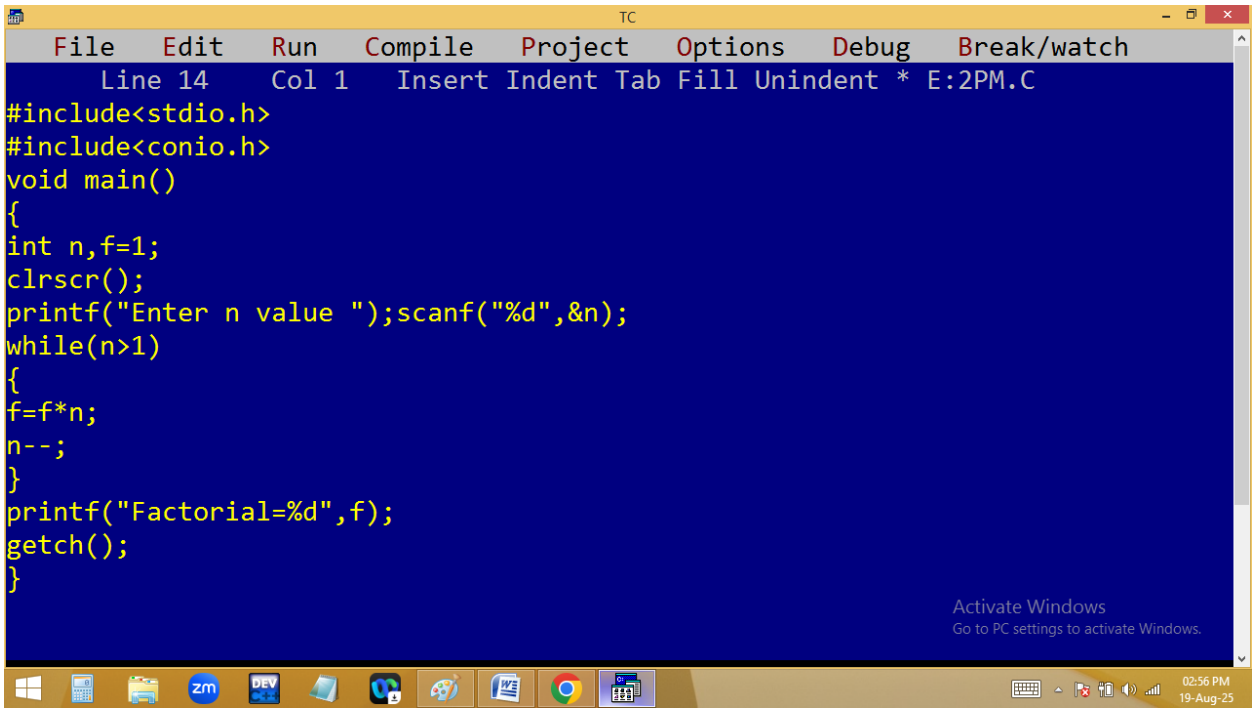

02:53 PM
19-Aug-25

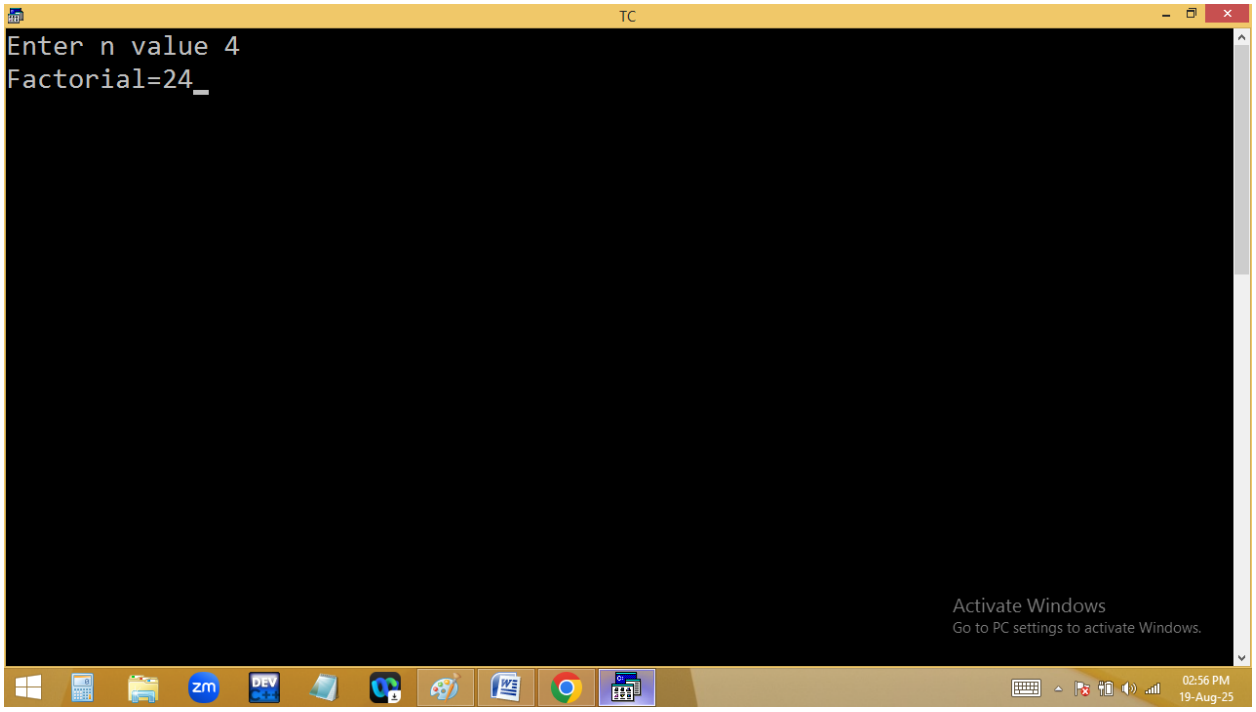


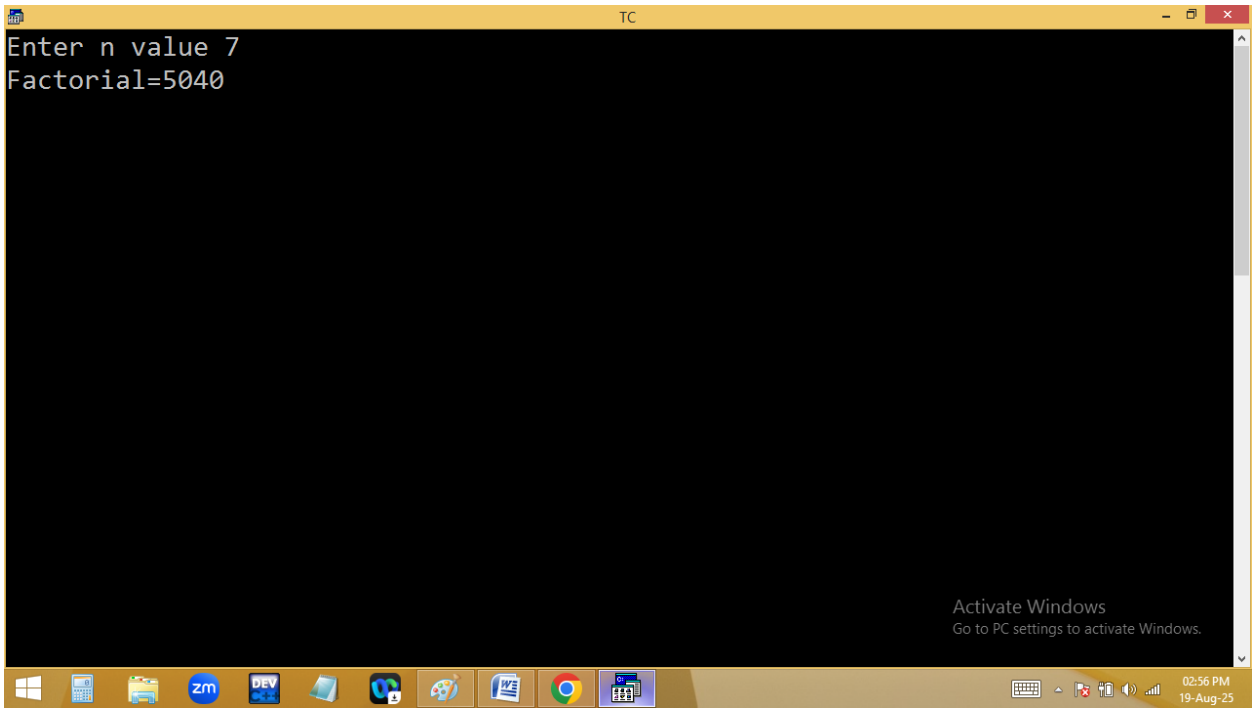


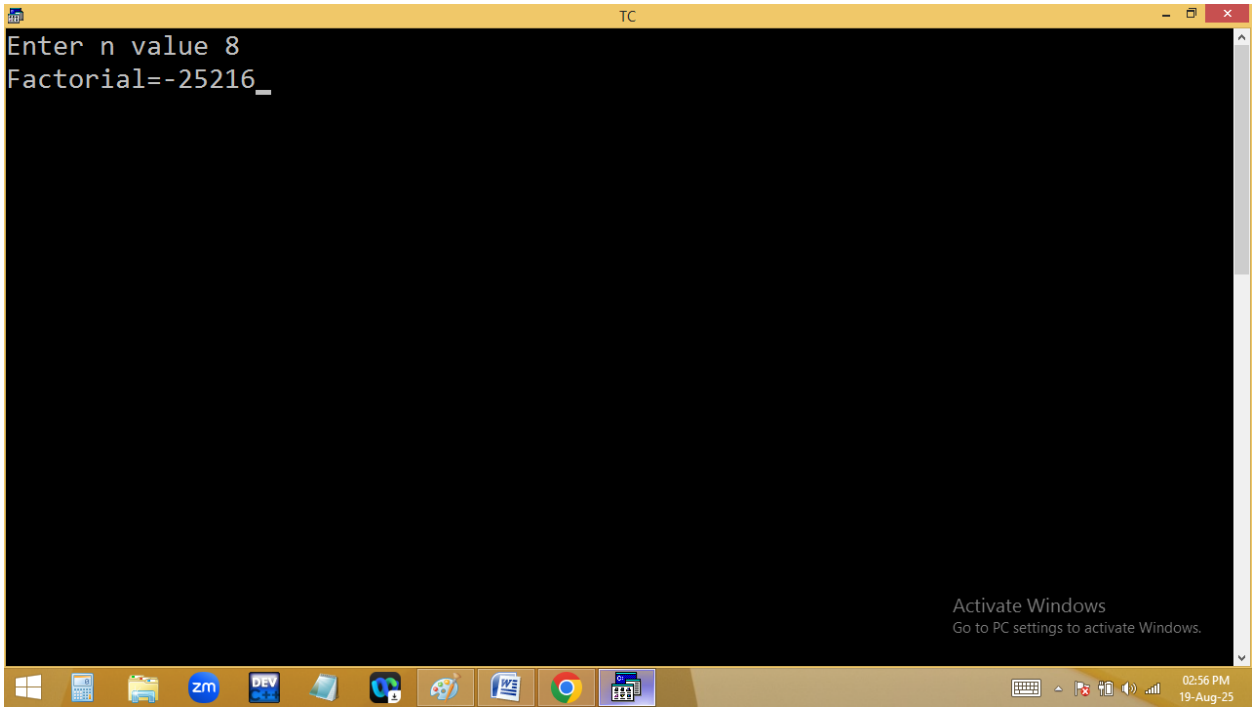
Finding factorial of given no?

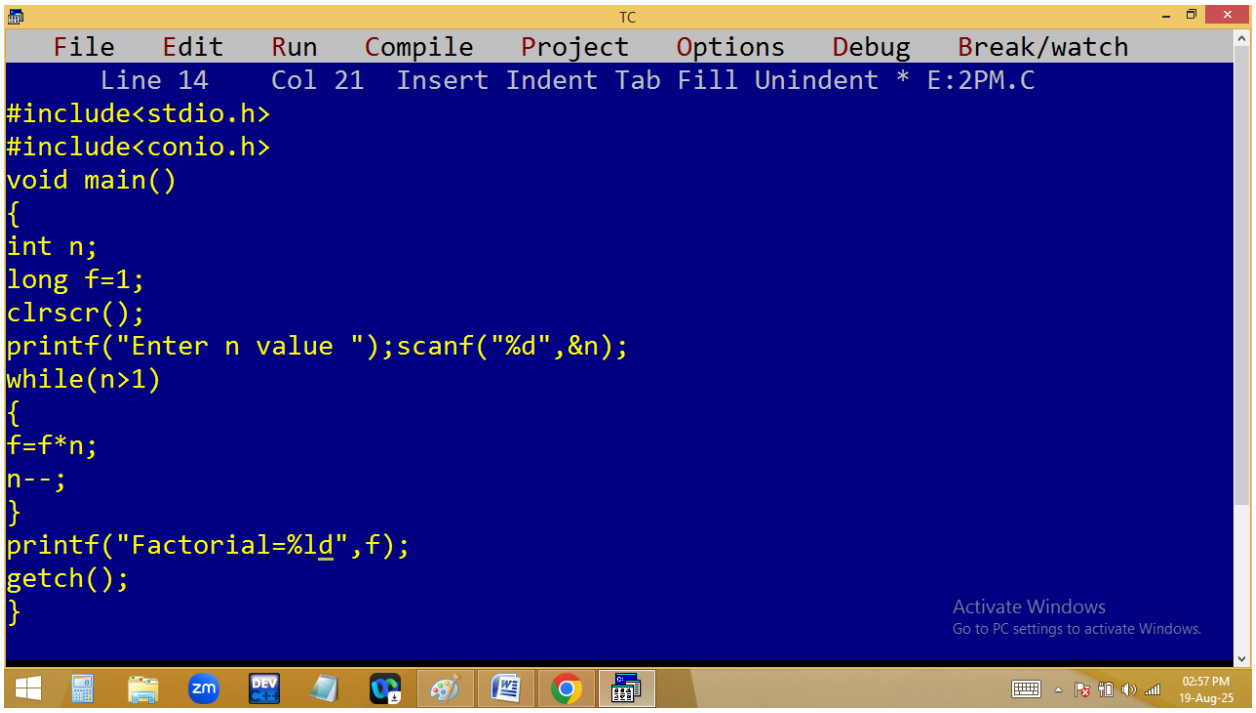
Eg: 4 ➔ 4*3*2*1=24

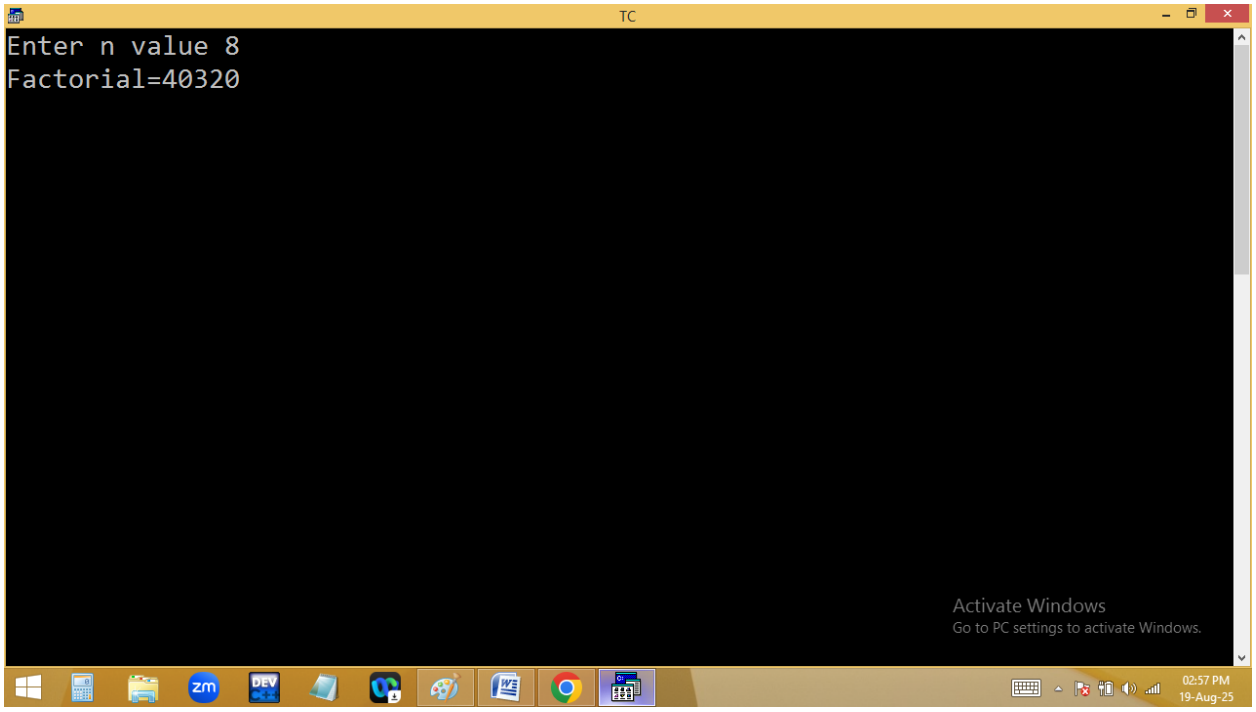

TC
File Edit Run Compile Project Options Debug Break/watch
Line 14 Col 1 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int n,f=1;
clrscr();
printf("Enter n value ");scanf("%d",&n);
while(n>1)
{
f=f*n;
n--;
}
printf("Factorial=%d",f);
getch();
}
Activate Windows
Go to PC settings to activate Windows.
02:56 PM
19-Aug-25

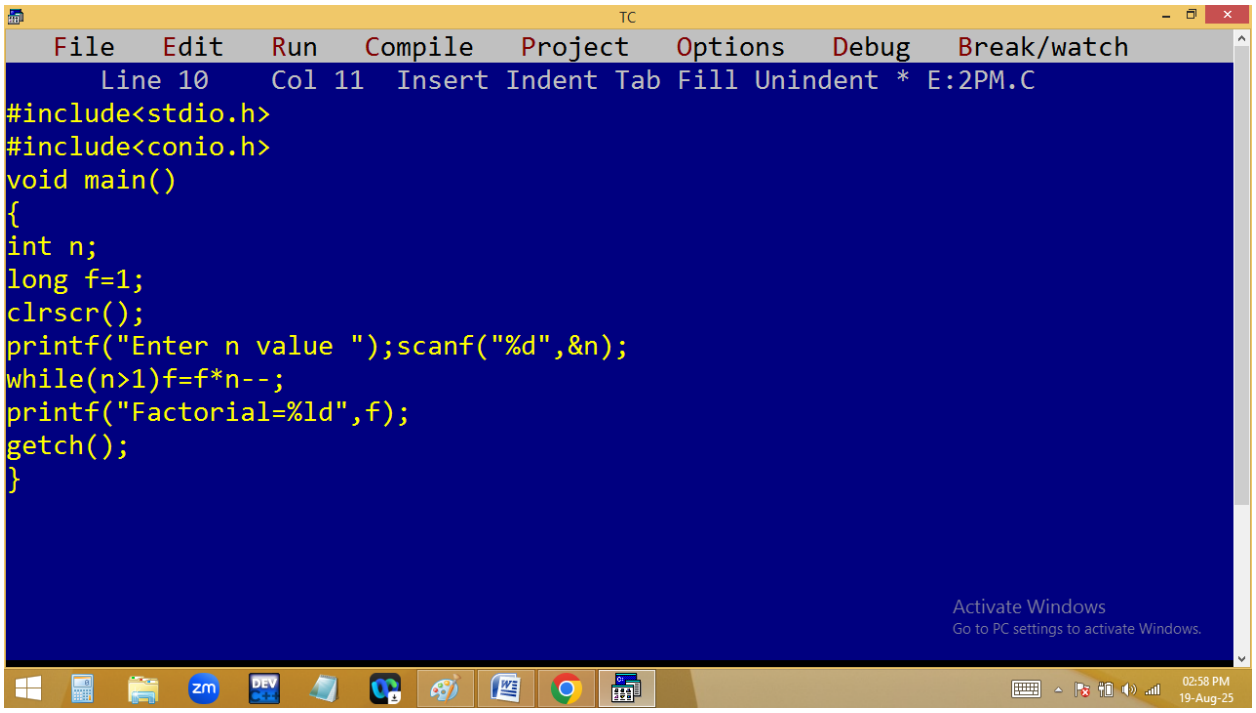

TC
Enter n value 4
Factorial=24
Activate Windows
Go to PC settings to activate Windows.
02:56 PM
19-Aug-25

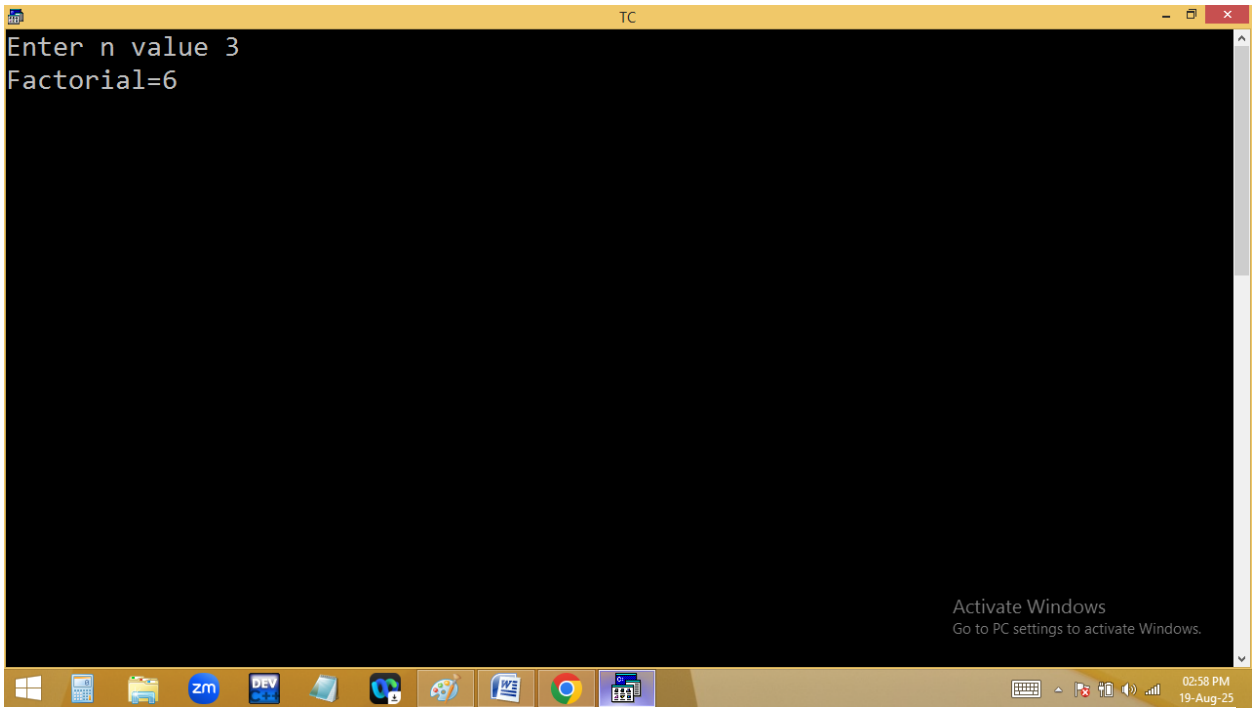

TC
Enter n value 7
Factorial=5040
Activate Windows
Go to PC settings to activate Windows.
02:56 PM
19-Aug-25

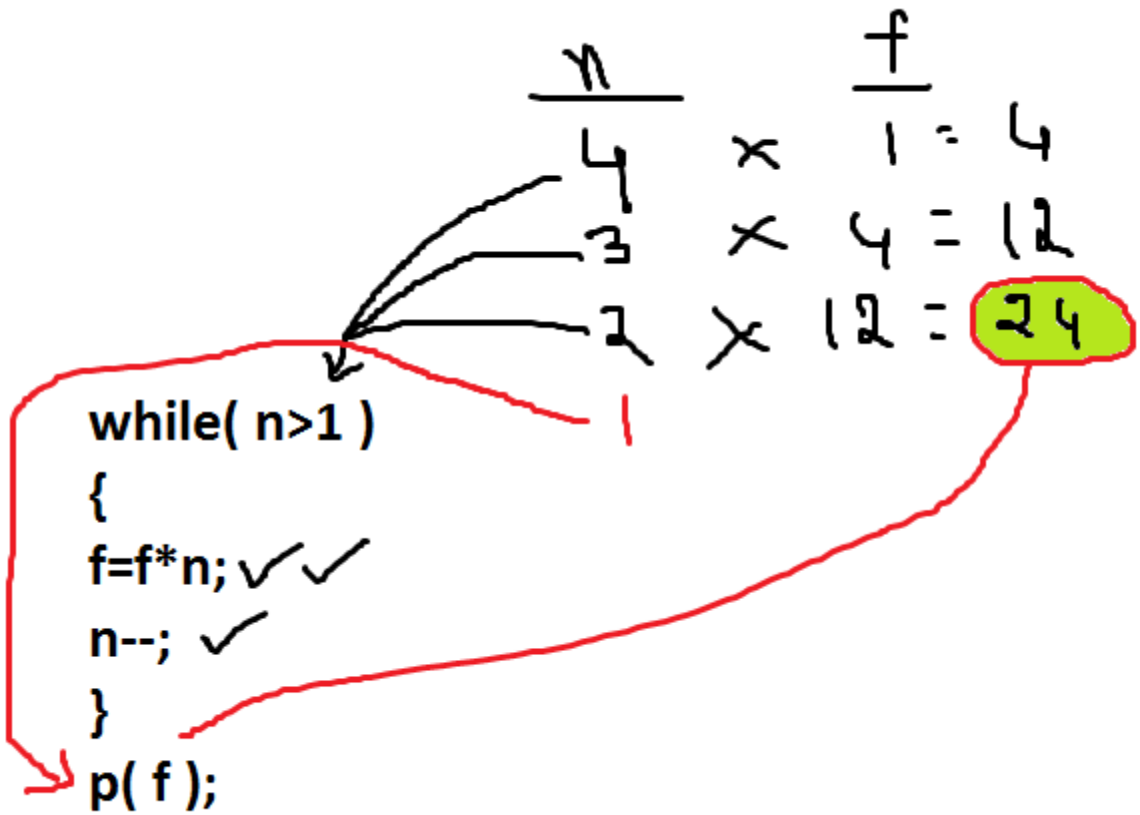

TC
Enter n value 8
Factorial=-25216
Activate Windows
Go to PC settings to activate Windows.
02:56 PM
19-Aug-25


TC
File Edit Run Compile Project Options Debug Break/watch
Line 14 Col 21 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int n;
long f=1;
clrscr();
printf("Enter n value ");scanf("%d",&n);
while(n>1)
{
f=f*n;
n--;
}
printf("Factorial=%ld",f);
getch();
}
Activate Windows
Go to PC settings to activate Windows.
02:57 PM
19-Aug-25

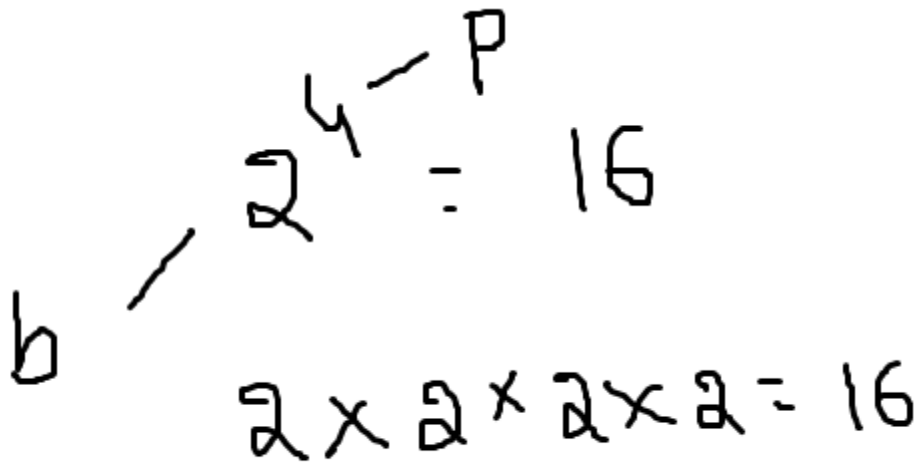

TC
Enter n value 8
Factorial=40320
Activate Windows
Go to PC settings to activate Windows.
02:57 PM
19-Aug-25


TC
File Edit Run Compile Project Options Debug Break/watch
Line 10 Col 11 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int n;
long f=1;
clrscr();
printf("Enter n value ");scanf("%d",&n);
while(n>1)f=f*n--;
printf("Factorial=%ld",f);
getch();
}
Activate Windows
Go to PC settings to activate Windows.
02:58 PM
19-Aug-25


TC
Enter n value 3
Factorial=6
Activate Windows
Go to PC settings to activate Windows.
02:58 PM
19-Aug-25


n
f
4 x 1 = 4
3 x 4 = 12
2 x 12 = 24
1
while(n>1)
{
f=f*n;
n--;
}
p(f);

Find power using user defined program?



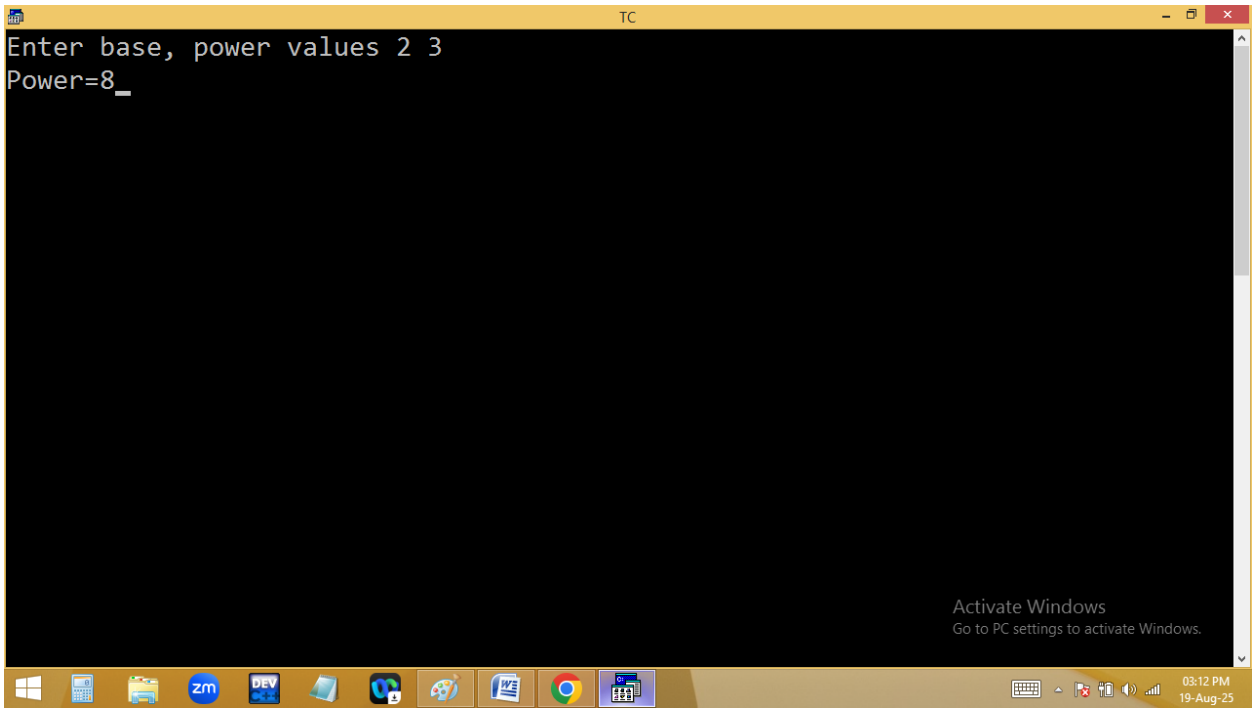
TC

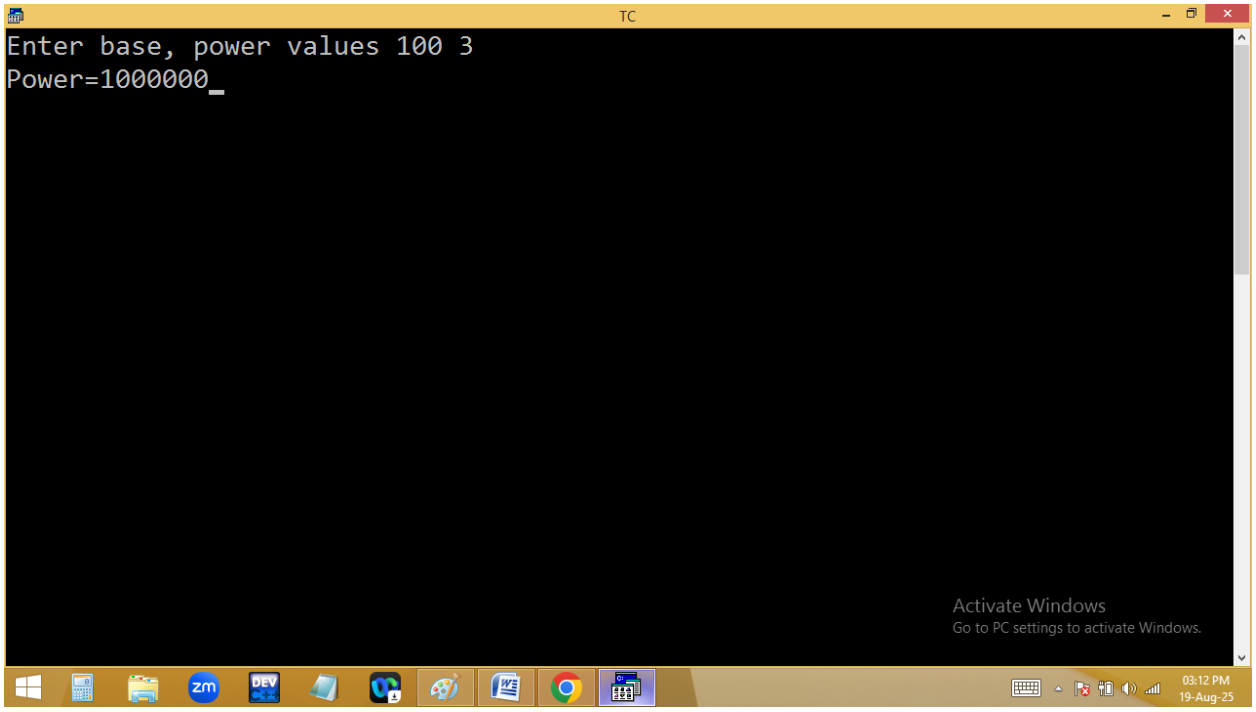
File Edit Run Compile Project Options Debug Break/watch

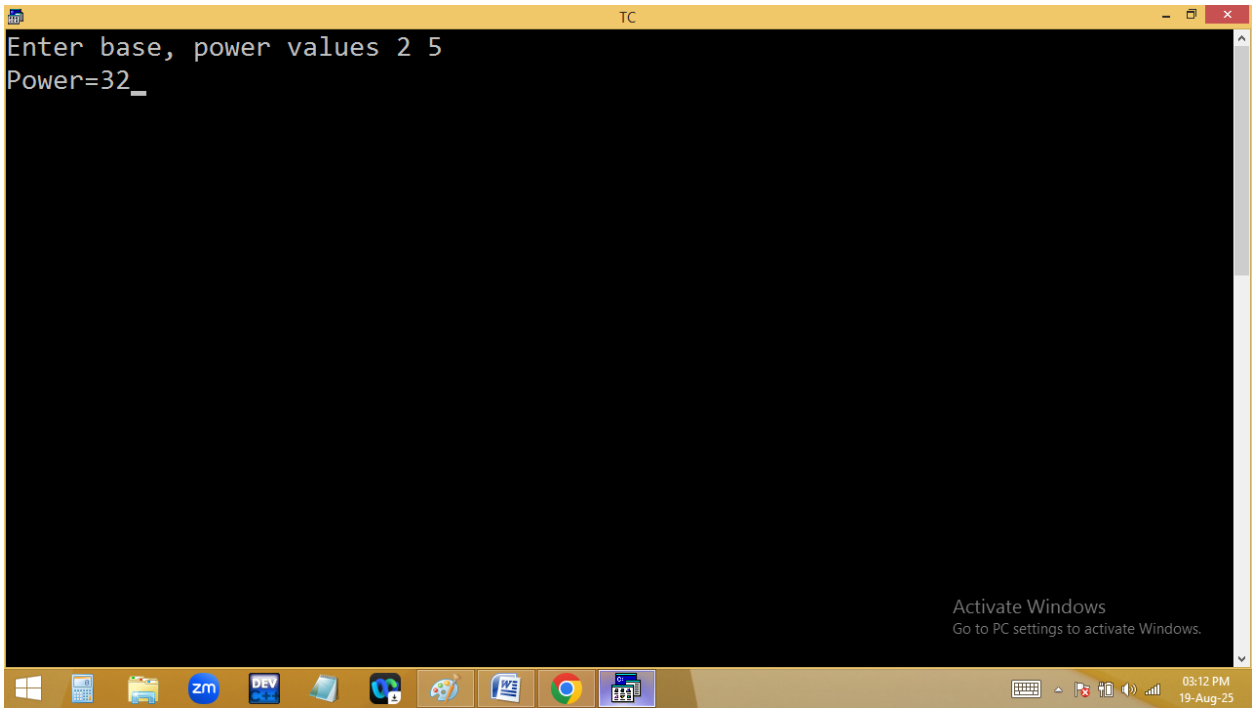
Line 14 Col 23 Insert Indent Tab Fill Unindent * E:2PM.C

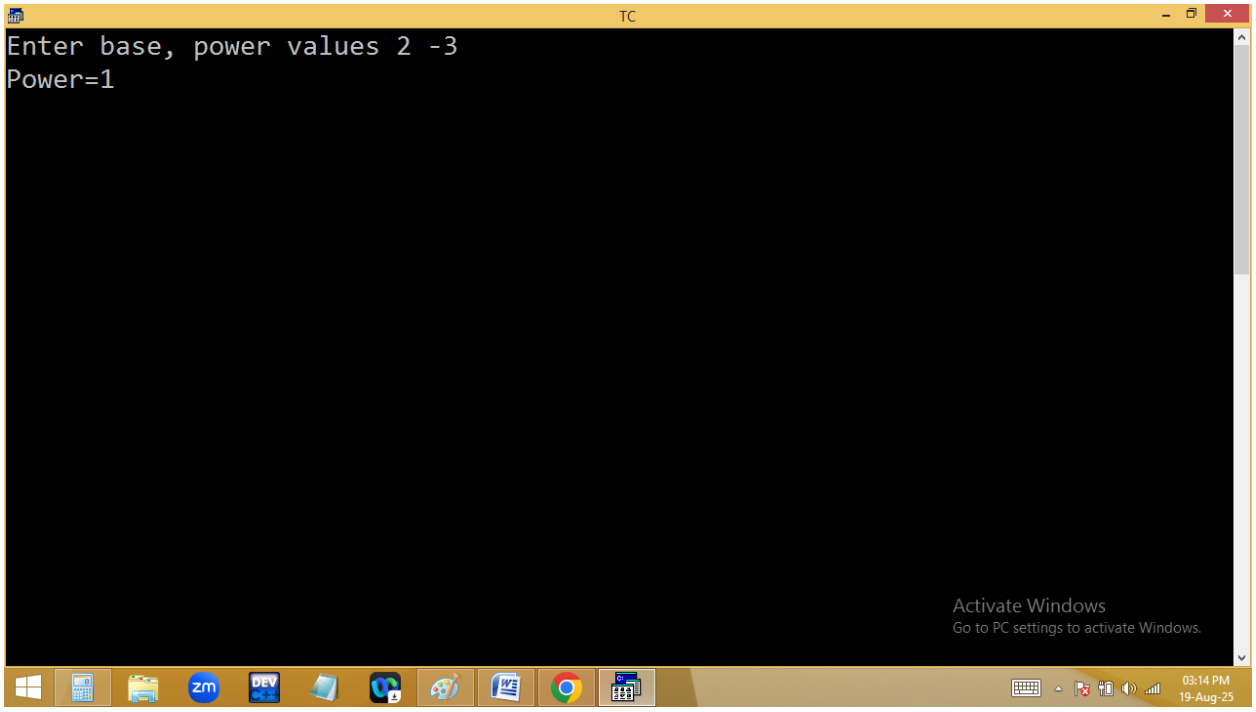
```
#include<stdio.h>
#include<conio.h>
void main()
{
int b,p;
long pwr=1;
clrscr();
printf("Enter base, power values ");scanf("%d %d",&b, &p);
while(p>=1)
{
pwr = pwr * b;
p--;
}
printf("Power=%ld",pwr);
getch();
}
```

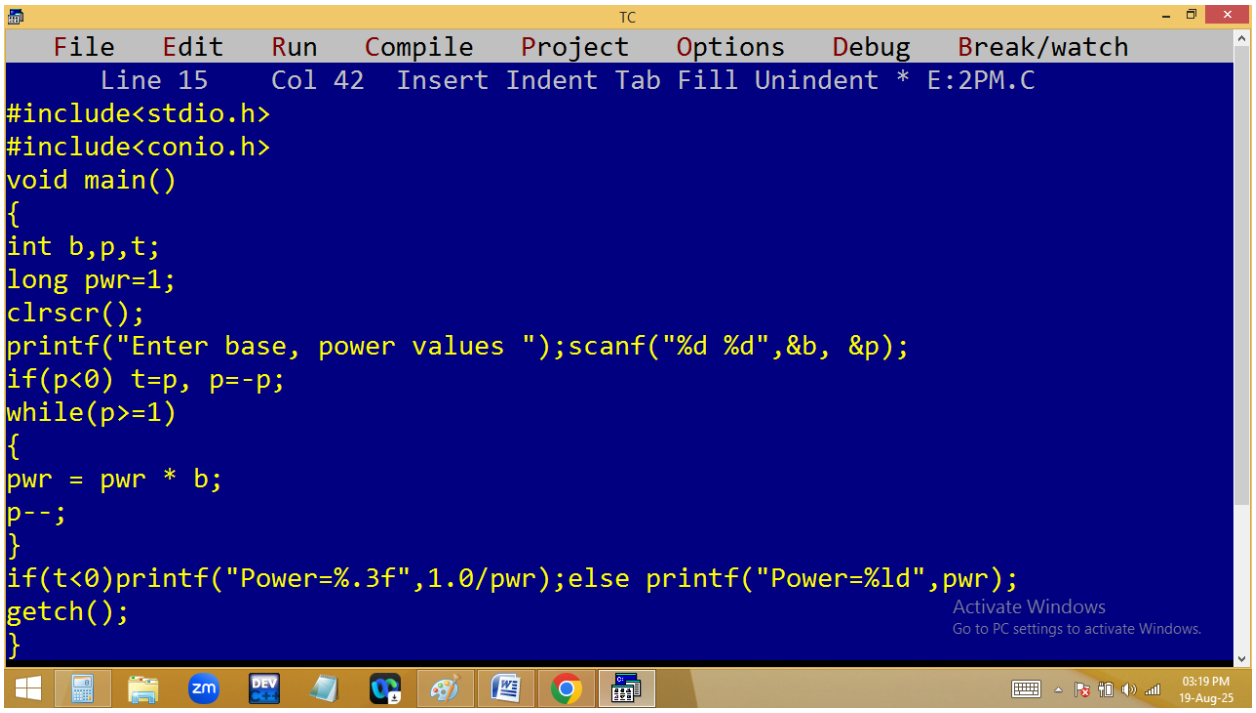

03:12 PM
19-Aug-25

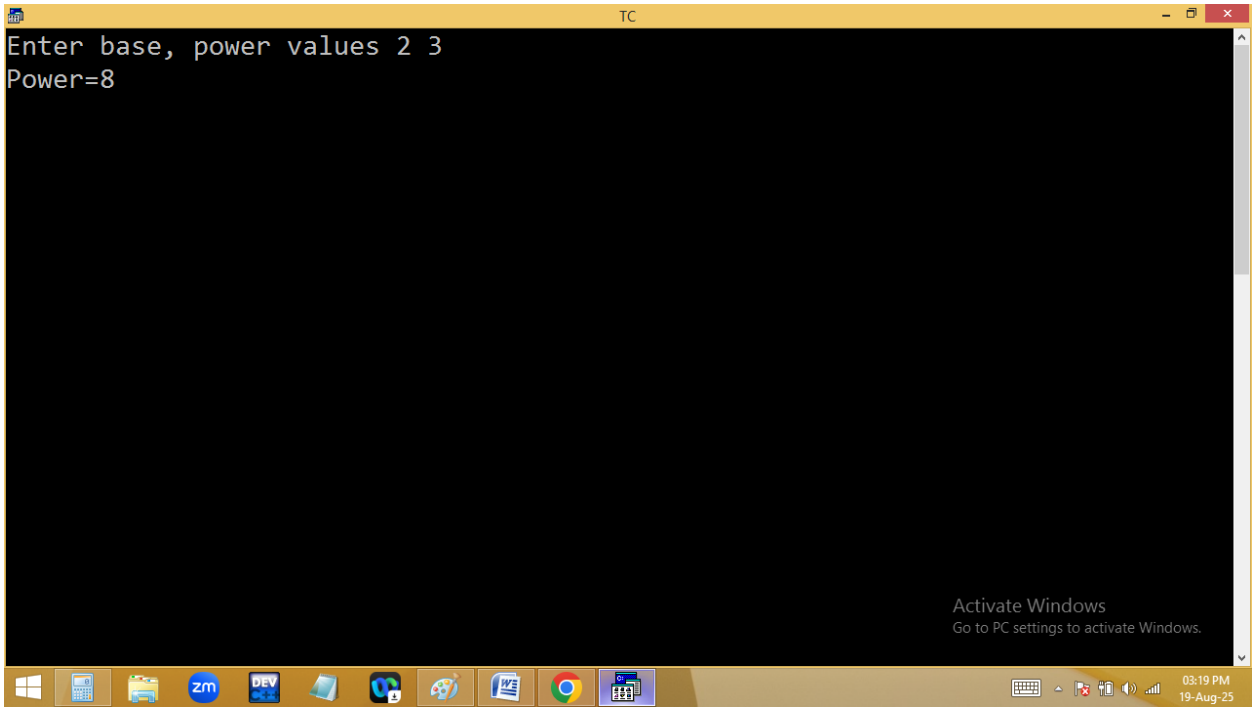

TC
Enter base, power values 2 3
Power=8
Activate Windows
Go to PC settings to activate Windows.
03:12 PM
19-Aug-25

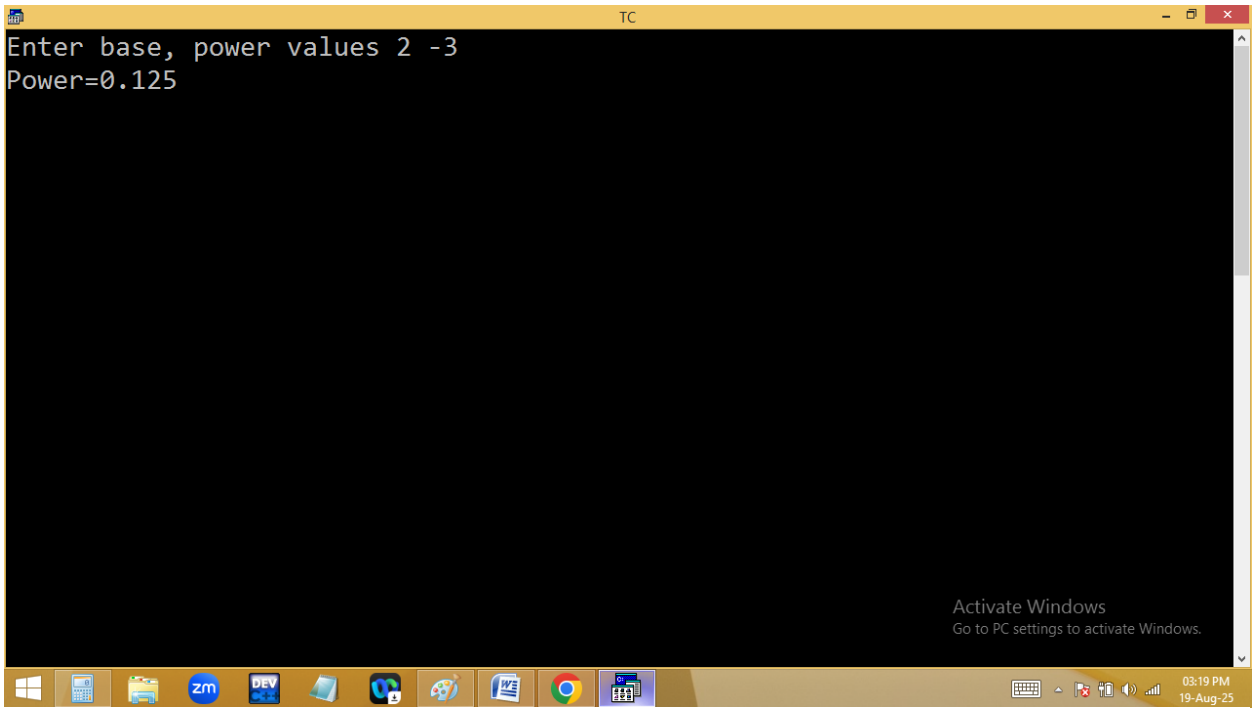

TC
Enter base, power values 100 3
Power=1000000
Activate Windows
Go to PC settings to activate Windows.
03:12 PM
19-Aug-25

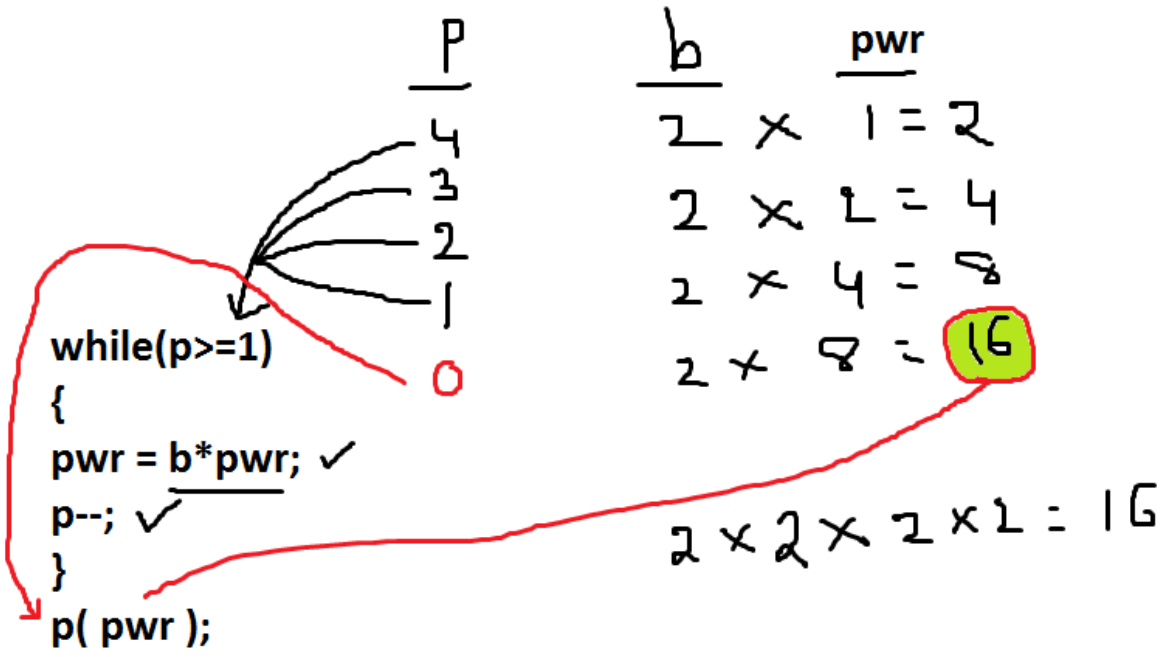

TC
Enter base, power values 2 5
Power=32
Activate Windows
Go to PC settings to activate Windows.
03:12 PM
19-Aug-25


TC
Enter base, power values 2 -3
Power=1
Activate Windows
Go to PC settings to activate Windows.
03:14 PM
19-Aug-25


TC
File Edit Run Compile Project Options Debug Break/watch
Line 15 Col 42 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int b,p,t;
long pwr=1;
clrscr();
printf("Enter base, power values ");scanf("%d %d",&b, &p);
if(p<0) t=p, p=-p;
while(p>=1)
{
pwr = pwr * b;
p--;
}
if(t<0)printf("Power=%.3f",1.0/pwr);else printf("Power=%ld",pwr);
getch();
}
Activate Windows
Go to PC settings to activate Windows.
03:19 PM
19-Aug-25

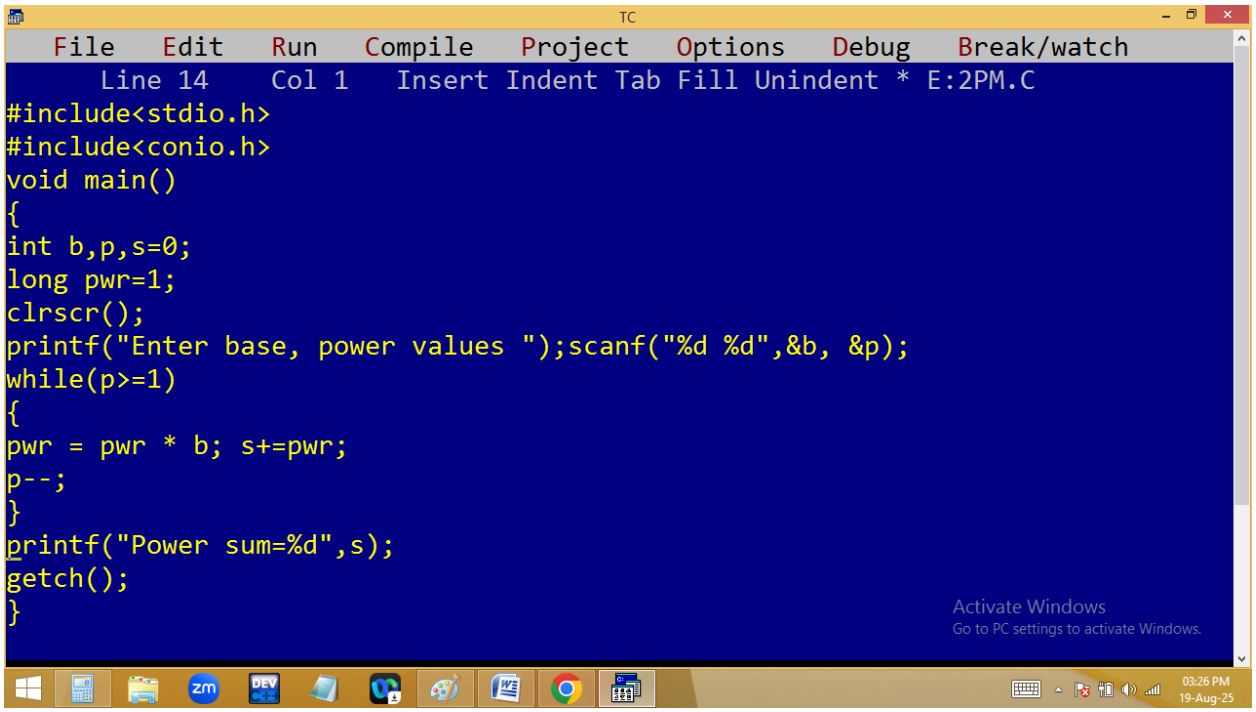

TC
Enter base, power values 2 3
Power=8
Activate Windows
Go to PC settings to activate Windows.
03:19 PM
19-Aug-25

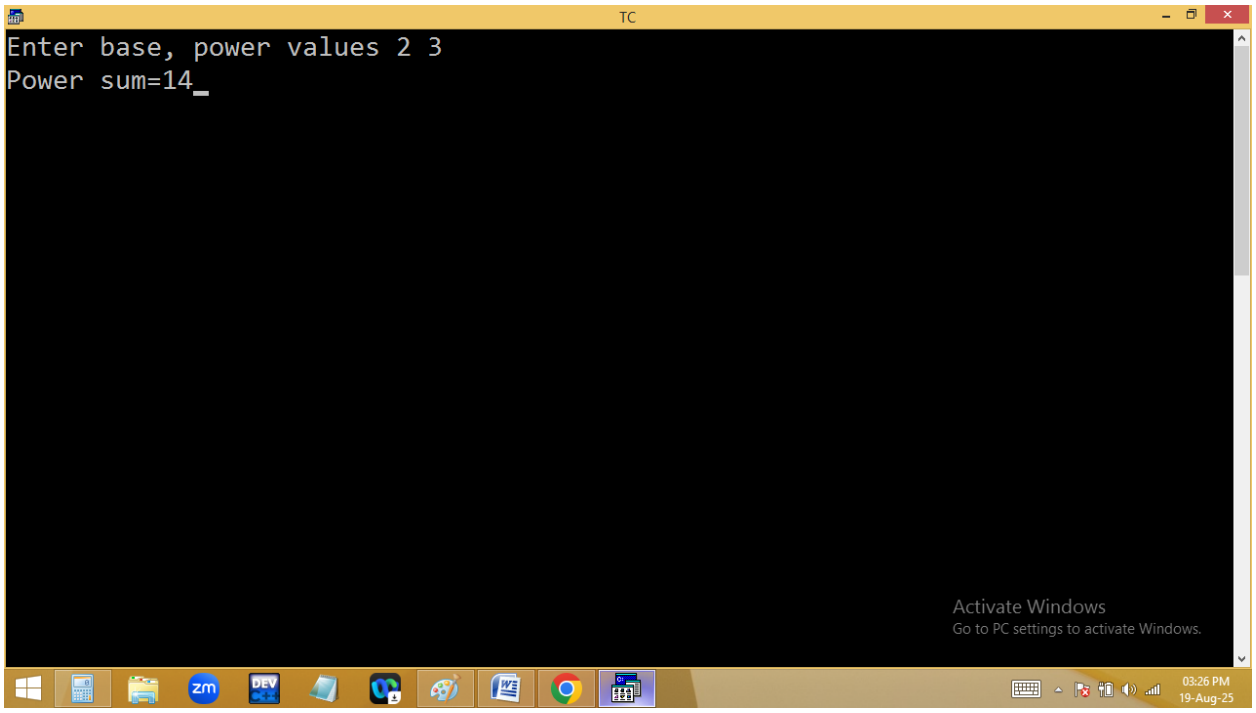

TC
Enter base, power values 2 -3
Power=0.125
Activate Windows
Go to PC settings to activate Windows.
03:19 PM
19-Aug-25

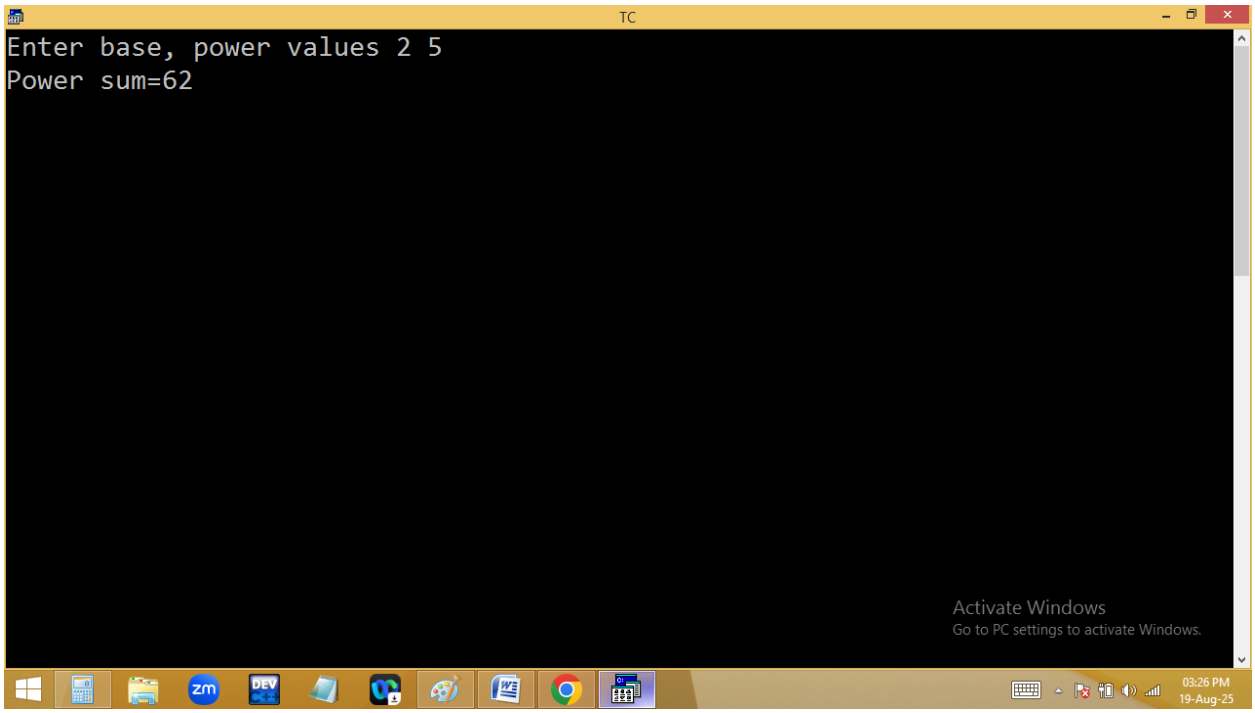

P
4
3
2
1
0
b
pwr
2 x 1 = 2
2 x 2 = 4
2 x 4 = 8
2 x 8 = 16
while(p>=1)
{
pwr = b*pwr;
p--;
}
p(pwr);
2 x 2 x 2 x 1 = 16

Finding powers sum?

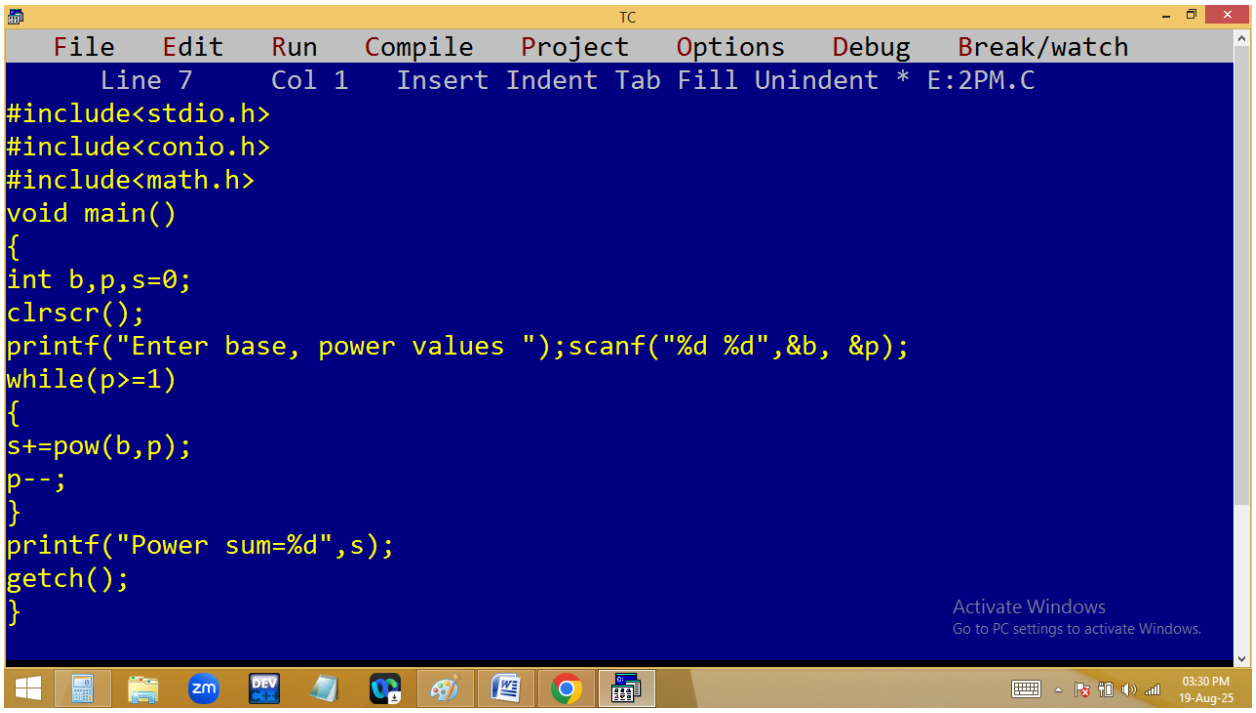
$2^5 \rightarrow 2^1 + 2^2 + 2^3 + 2^4 + 2^5 = 2 + 4 + 8 + 16 + 32 = 62$

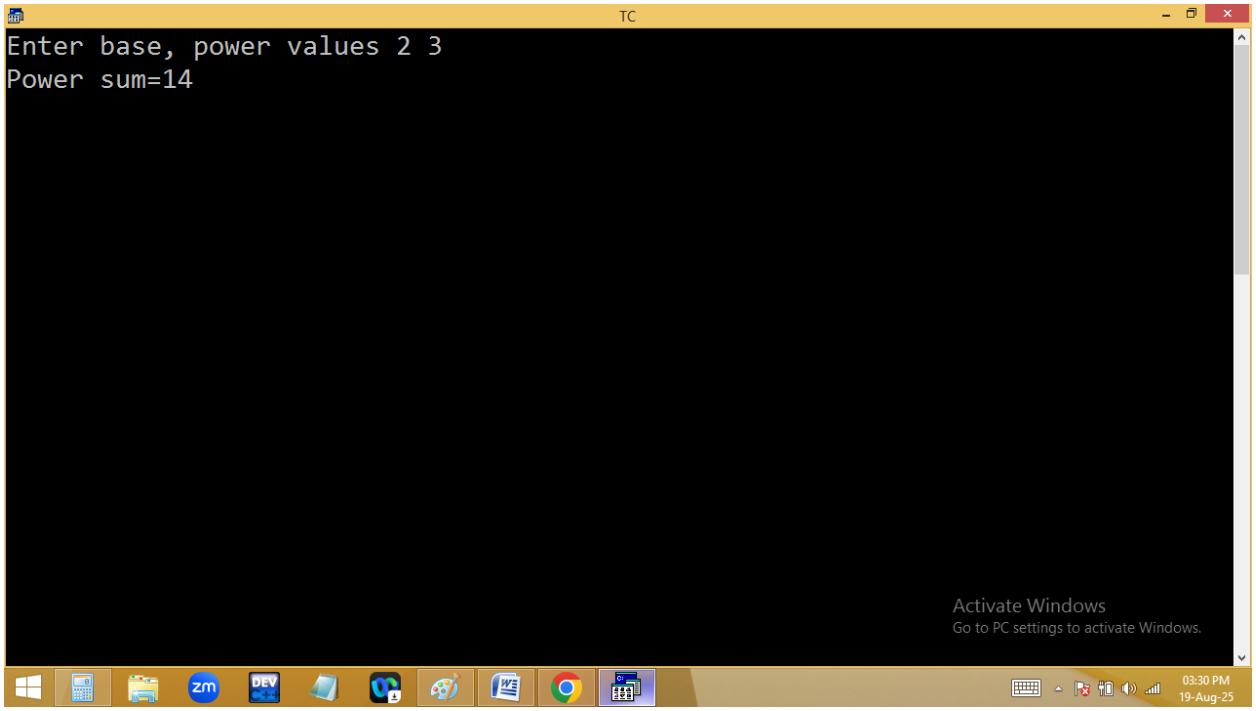




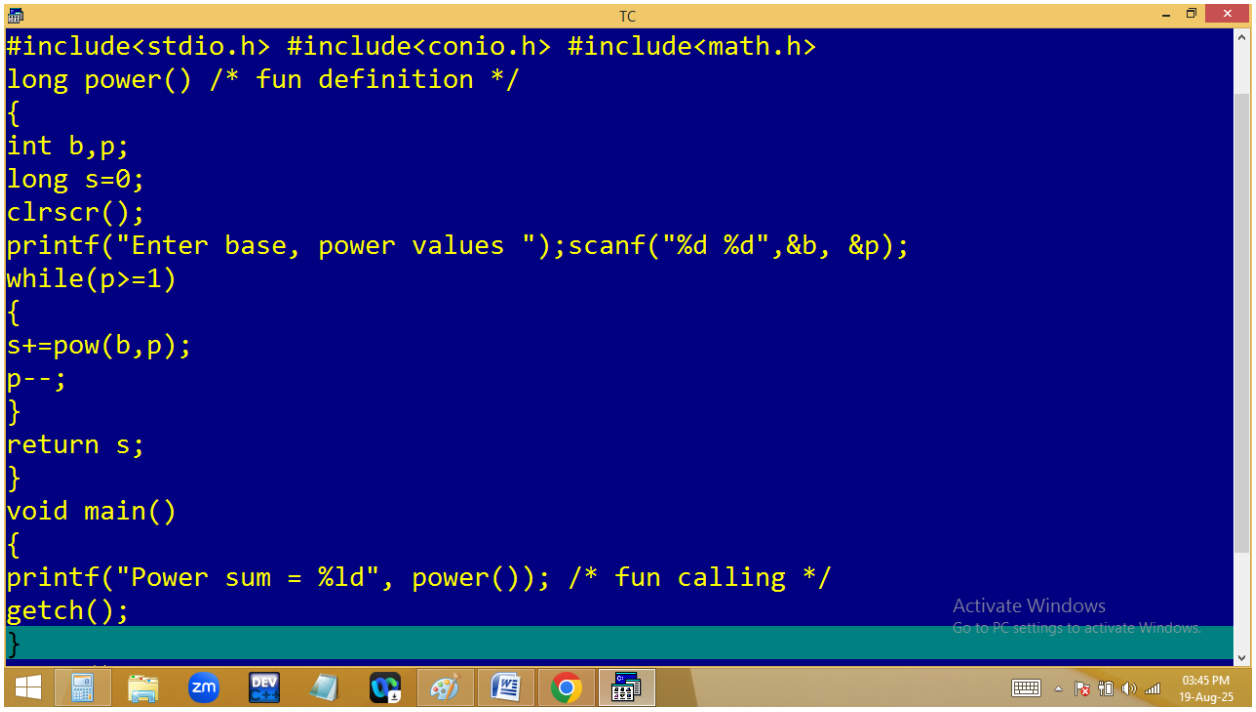

TC
Enter base, power values 2 5
Power sum=62
Activate Windows
Go to PC settings to activate Windows.
03:26 PM
19-Aug-25

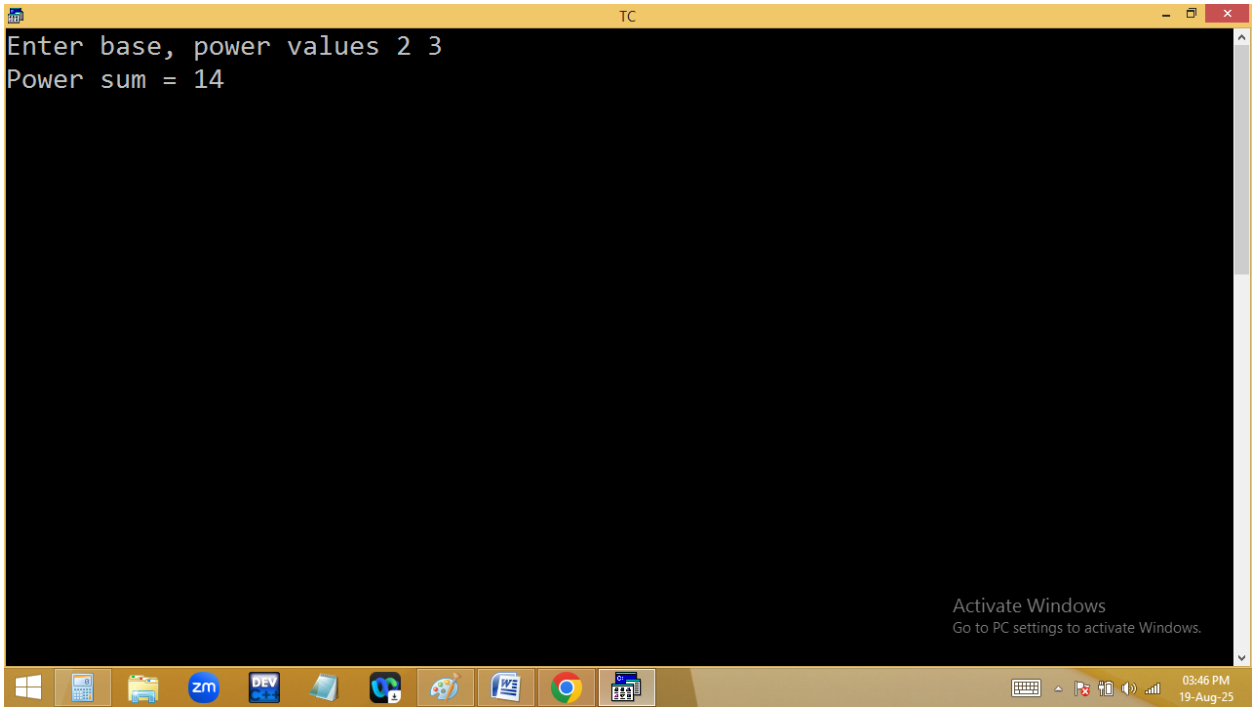
Using pow():

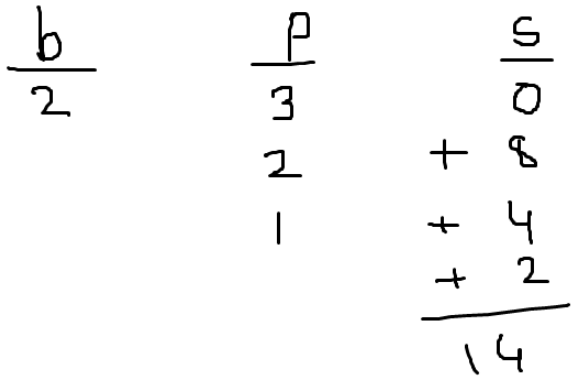

TC
File Edit Run Compile Project Options Debug Break/watch
Line 7 Col 1 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
#include<math.h>
void main()
{
int b,p,s=0;
clrscr();
printf("Enter base, power values ");scanf("%d %d",&b, &p);
while(p>=1)
{
s+=pow(b,p);
p--;
}
printf("Power sum=%d",s);
getch();
}
Activate Windows
Go to PC settings to activate Windows.
03:30 PM
19-Aug-25


TC
Enter base, power values 2 3
Power sum=14
Activate Windows
Go to PC settings to activate Windows.
03:30 PM
19-Aug-25

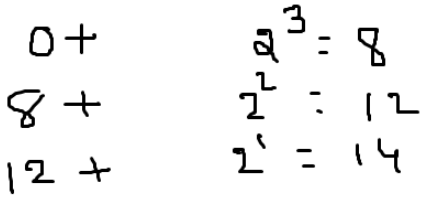
Using a user defined function?







s+=pow(b,p);



Home work:

Finding gcd / hcf of given two numbes.

Eg: take two numbers ➔ 4 and 6

4 factors are 1 2 4

6 factors are 1 2 3 6

Output: 2 is hcf of 4 and 6

2. finding lcm of given two numbers.

Eg: 4 and 6 lcm is 12

max a	max b
6 % 4 = 2	6
7 % 4 = 3	
8 % 4 = 0	8 % 6 = 2
9 % 4 = 1	
10 % 4 = 2	
11 % 4 = 3	
12 % 4 = 0	12 % 6 = 0