Finding 1..n even, odd numbers sum:

```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();
}
```

```
Enter n value 5
Even sum=6, Odd sum=9
```

$$\frac{n}{5 \% 2 = 1}$$
$$4 \% 2 = 0$$
$$3 \% 2 = 1$$
$$2 \% 2 = 0$$
$$1 \% 2 = 1$$

$$\frac{es}{0}$$
$$+ 4$$
$$2$$
$$\overline{6}$$

$$\frac{os}{0}$$
$$+ 5$$
$$3$$
$$1$$
$$\overline{9}$$

```
while( n>=1 )
{
if(n%2==0)es+=n;  /* es=es+n */
else os+=n; /* os=os+n */
n--;
}
p( es,  os );
```
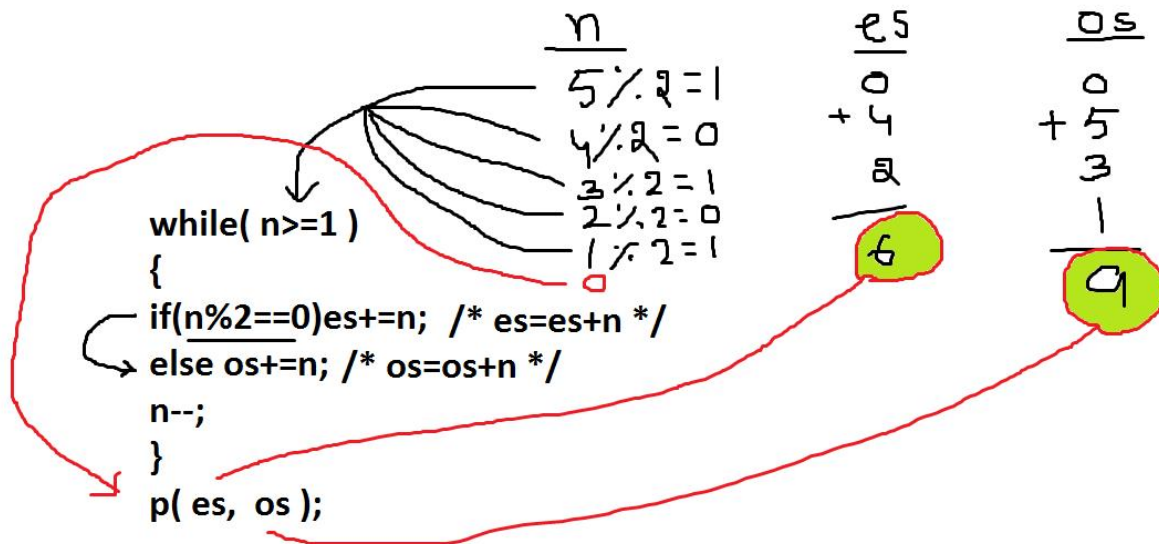
Finding factorial of given no.

```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();
}
```

```
Enter n value 4
Factorial=24_
```

```
TC                                                    _ □ ✕

Enter n value 7
Factorial=5040_
```
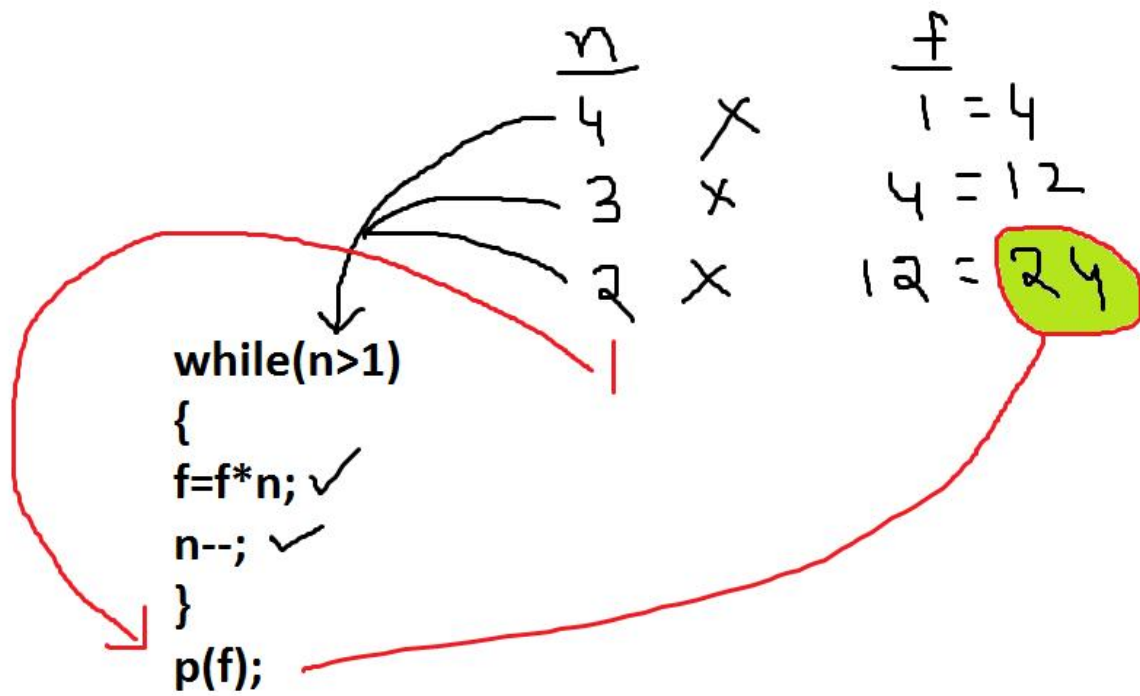
```
TC                                                    _ □ ✕

Enter n value 8
Factorial=-25216_
```

```c
#include<stdio.h>
#include<conio.h>
void main()
{
int n; long int f=1;
clrscr();
printf("Enter n value "); scanf("%d",&n);
while(n>1)
{
f=f*n;
n--;
}
printf("Factorial=%ld",f);
getch();
}
```

```
Enter n value 8
Factorial=40320
```

$$\frac{n}{4} \quad X \qquad \frac{f}{1} = 4$$

$$3 \quad X \qquad 4 = 12$$

$$2 \quad X \qquad 12 = 24$$

```
while(n>1)
{
f=f*n; ✓
n--; ✓
}
p(f);
```

Finding power using user defined program

```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();
}
```
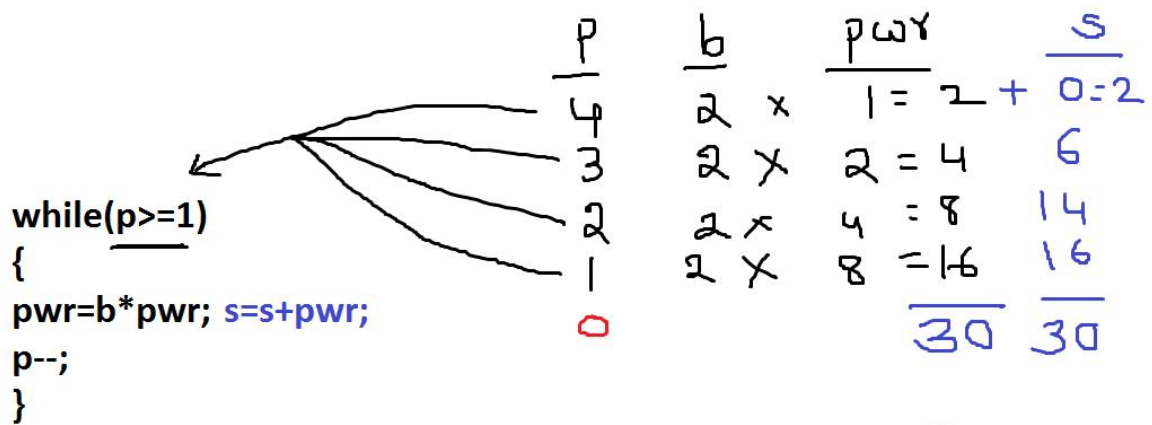
```
Enter base, power values 2 4
Power=16
```

```
TC
Enter base, power values 100 3
Power=1000000_
```
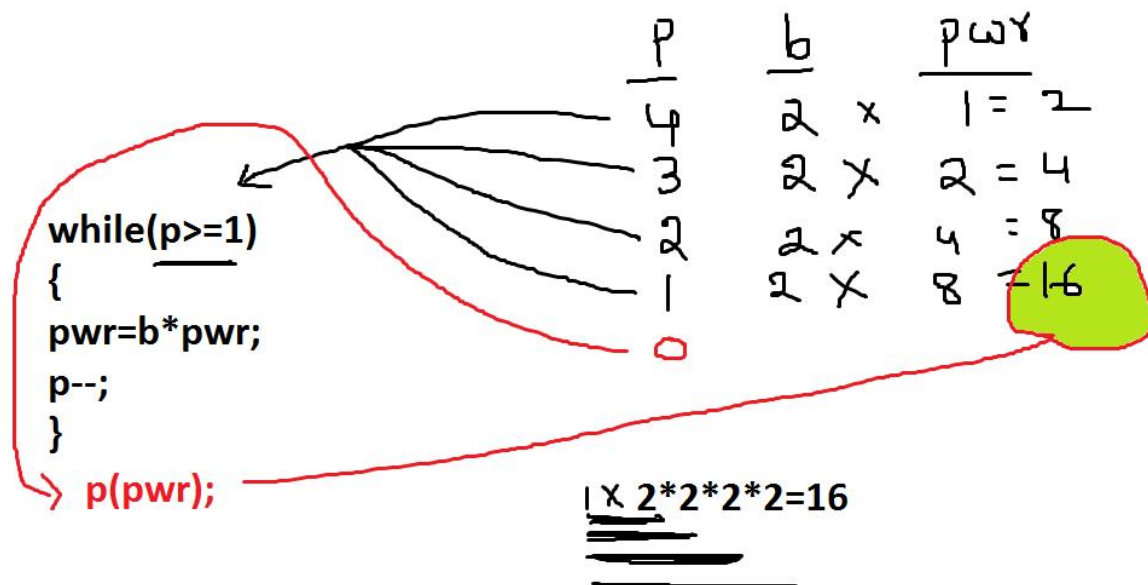
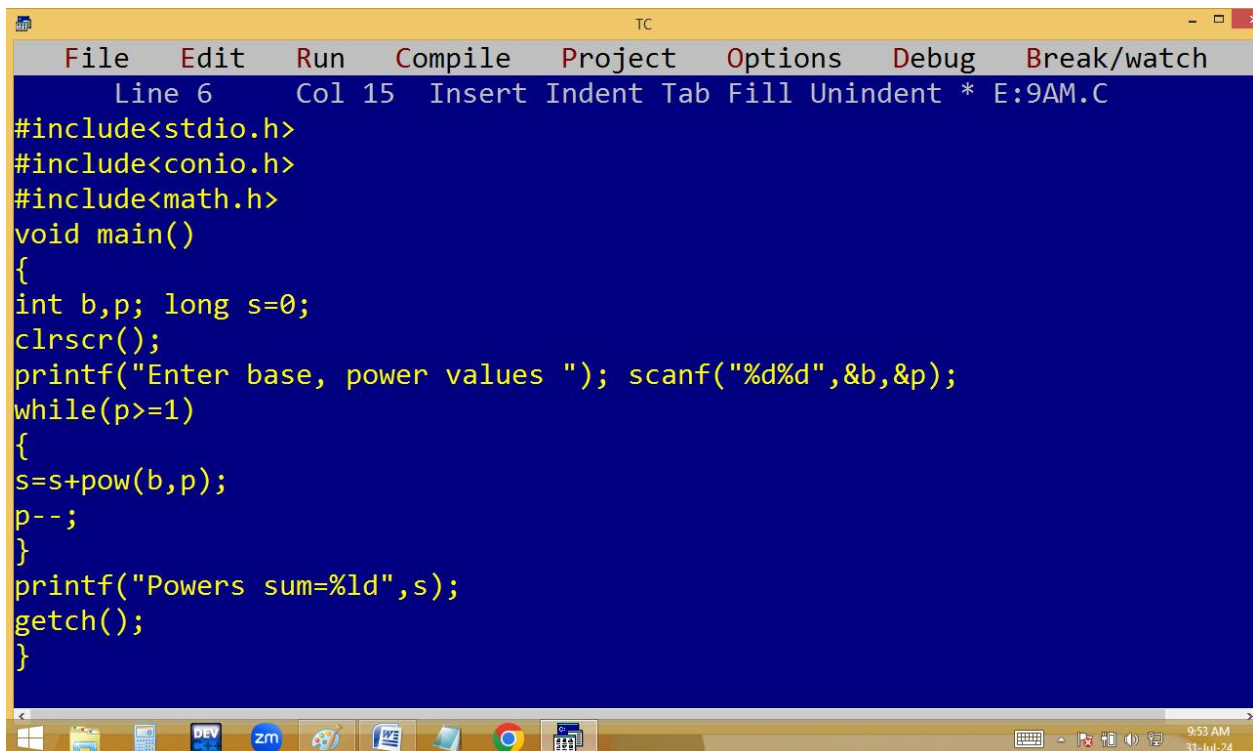$$\frac{P}{\begin{matrix}4\\3\\2\\1\\0\end{matrix}} \qquad \frac{b}{\begin{matrix}2\\2\\2\\2\end{matrix}} \qquad \frac{pwr}{\begin{matrix}\times & 1 = 2\\ \times & 2 = 4\\ \times & 4 = 8\\ \times & 8 = 16\end{matrix}}$$

```
while(p>=1)
{
pwr=b*pwr;
p--;
}
  p(pwr);
```

1 × 2*2*2*2=16

Find powers sum:

```c
#include<stdio.h>
#include<conio.h>
void main()
{
int b,p; long pwr=1,s=0;
clrscr();
printf("Enter base, power values "); scanf("%d%d",&b,&p);
while(p>=1)
{
pwr=pwr*b;s=s+pwr;
p--;
}
printf("Powers sum=%ld",s);
getch();
}
```
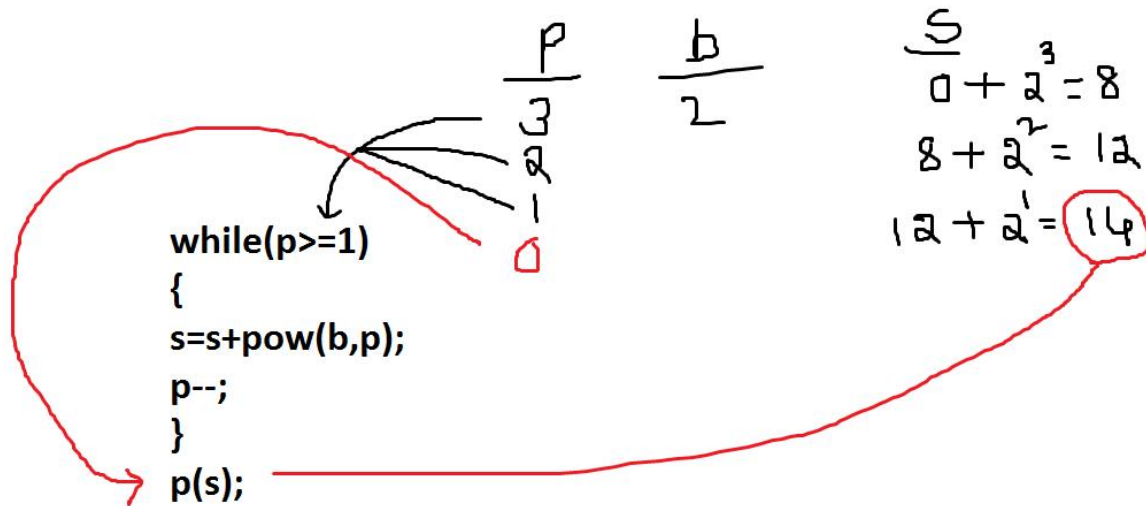
```
Enter base, power values 2 4
Powers sum=30
```

```
while(p>=1)
{
pwr=b*pwr; s=s+pwr;
p--;
}
```

p	b	pwr	s
4	2 ×	1 = 2	+ 0:2
3	2 ×	2 = 4	6
2	2 ×	4 = 8	14
1	2 ×	8 = 16	16
0		30	30

$$2^4 = 0 + 2^1 + 2^2 + 2^3 + 2^4 = 30$$
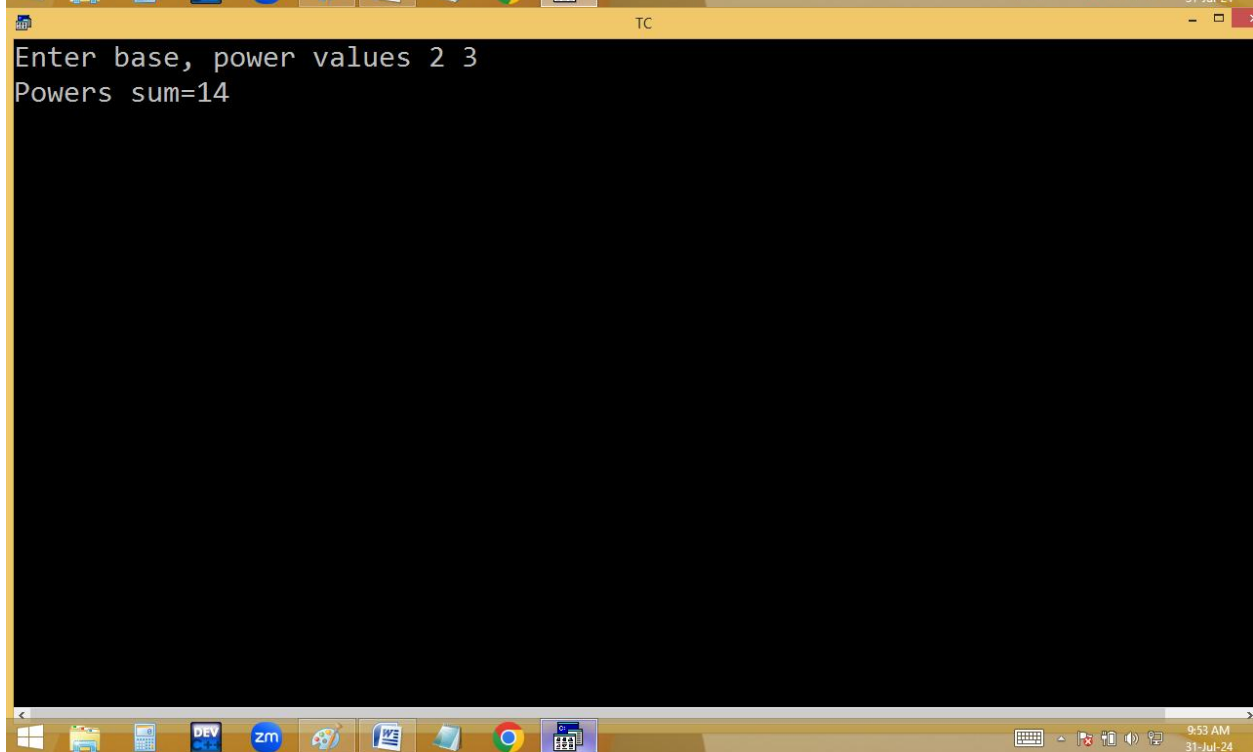
Using predefined function:

```c
#include<stdio.h>
#include<conio.h>
#include<math.h>
void main()
{
int b,p; long s=0;
clrscr();
printf("Enter base, power values "); scanf("%d%d",&b,&p);
while(p>=1)
{
s=s+pow(b,p);
p--;
}
printf("Powers sum=%ld",s);
getch();
}
```

```
Enter base, power values 2 3
Powers sum=14
```

$$\frac{p}{3} \qquad \frac{b}{2} \qquad \frac{s}{}$$

$$0 + 2^3 = 8$$

$$8 + 2^2 = 12$$

$$12 + 2^1 = \boxed{14}$$

```
while(p>=1)
{
s=s+pow(b,p);
p--;
}
p(s);
```

Finding no of digits in given no:

Eg: 2067 ➜ 4 digit no

```c
#include<stdio.h>
#include<conio.h>
void main()
{
long n; int c=0;
clrscr();
printf("Enter the value "); scanf("%ld",&n);
while(n!=0)
{
c++;
n=n/10;
}
printf("No of digits=%d",c);
getch();
}
```
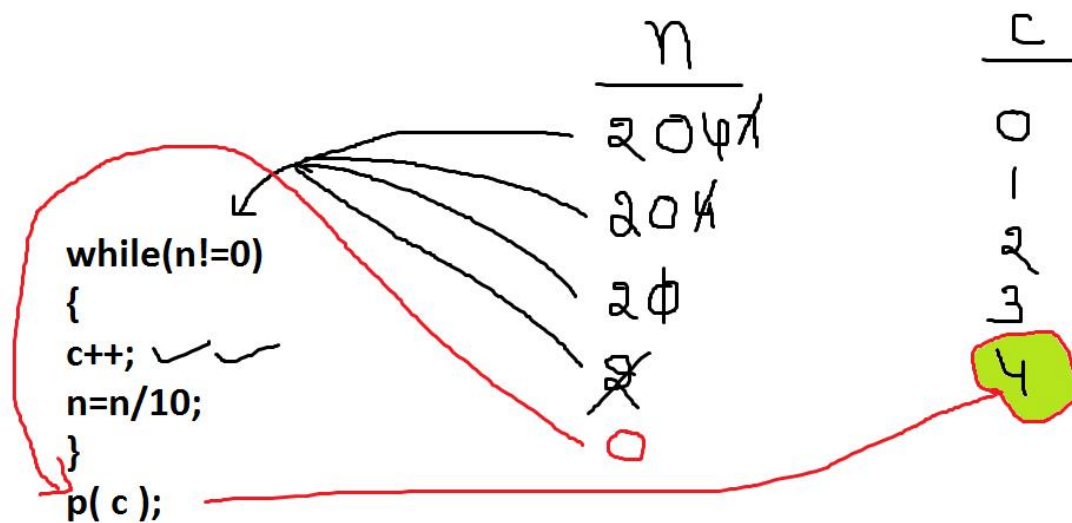
```
Enter the value 2047
No of digits=4
```

```
Enter the value 9
No of digits=1
```

```
Enter the value -123567
No of digits=6
```

```c
#include<stdio.h>
#include<conio.h>
void main()
{
long n; int c=0;
clrscr();
printf("Enter the value "); scanf("%ld",&n);
while(n)
{
c++;
n=n/10;
}
printf("No of digits=%d",c);
getch();
}
```

TC

```
Enter the value 5465469
No of digits=7
```

```
TC                                                                    _ □ ✕
Enter the value -34
No of digits=2
```

$$\dfrac{n}{\qquad}$$

2047

2047

204

20

3

0

$$\dfrac{c}{\qquad}$$

0

1

2

3

4

```
while(n!=0)
{
c++;
n=n/10;
}
p( c );
```

Note: Any no/10 removes the last digit.

while (

$$\frac{n}{\cancel{3} \cancel{4}}$$

{

C++

n=n/10;

}

$$\frac{c}{o} - 2$$

```
Enter the value 0
No of digits=0
```
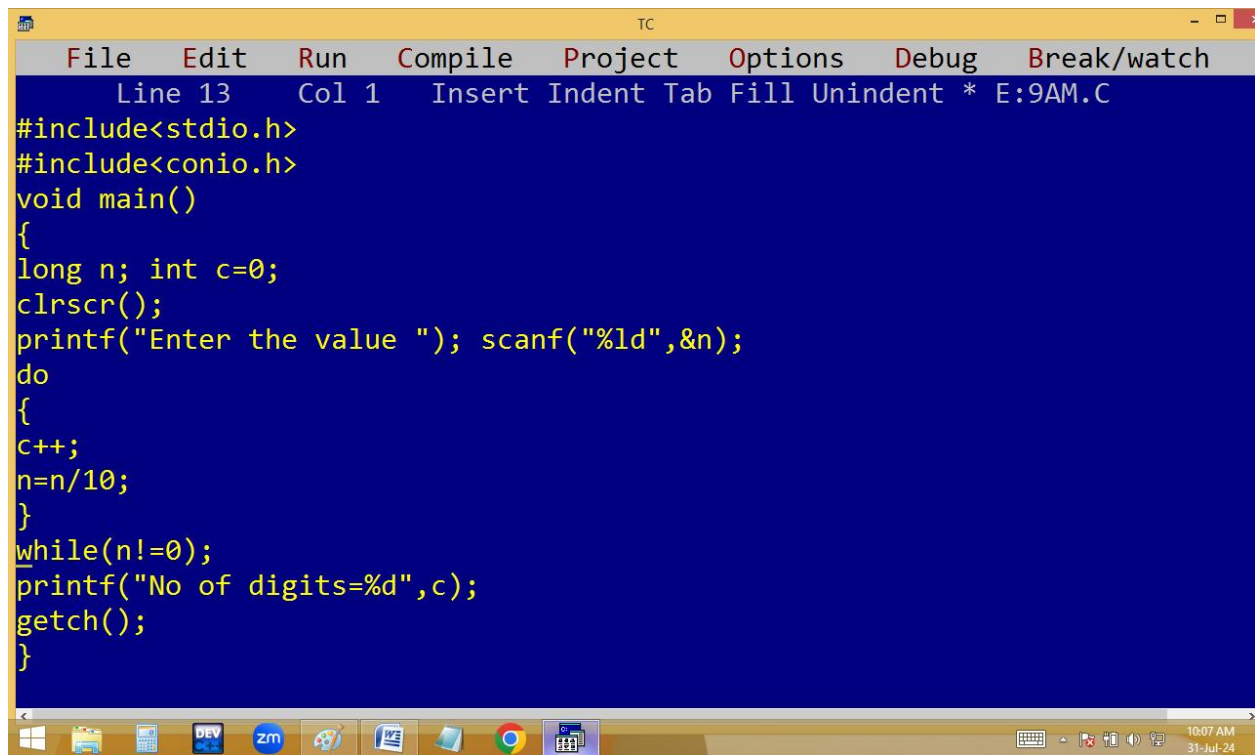
do .. while:

- It is an exit control loop. i.e. in a do while the condition is tested at last.
- Here do , while are the keywords.
- It is also used to repeat a program several times based on a condition.
- In a do while, do block statements are executed first and later while condition is tested. If the while condition is true then once again the do block statements are repeated. Like this the process is continued until the while condition becomes false.
- In do while, the while should be end with semicolon (;) .

- **Regardless of while condition, the do statements are executed at least one time. Due to this sometimes we are getting unwanted results [garbage values].**
- **Use do while whenever it is compulsory because of in do while the program is controlled at the bottom / last.**
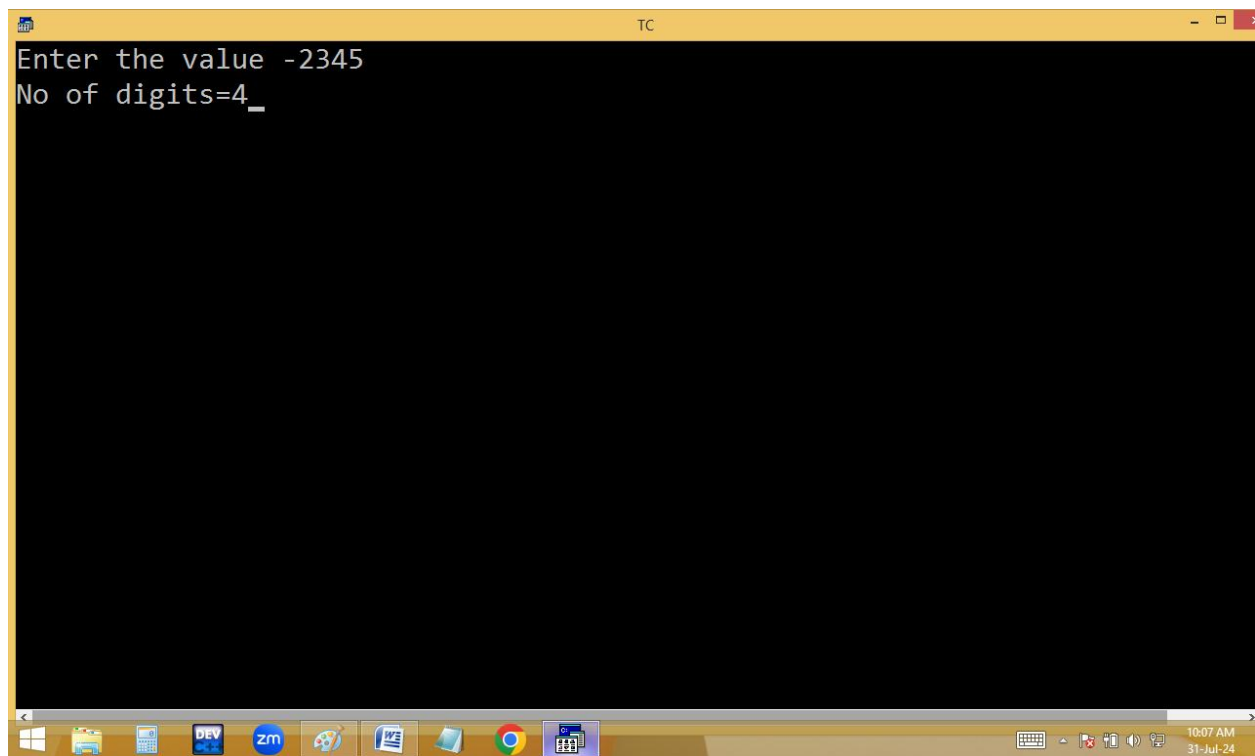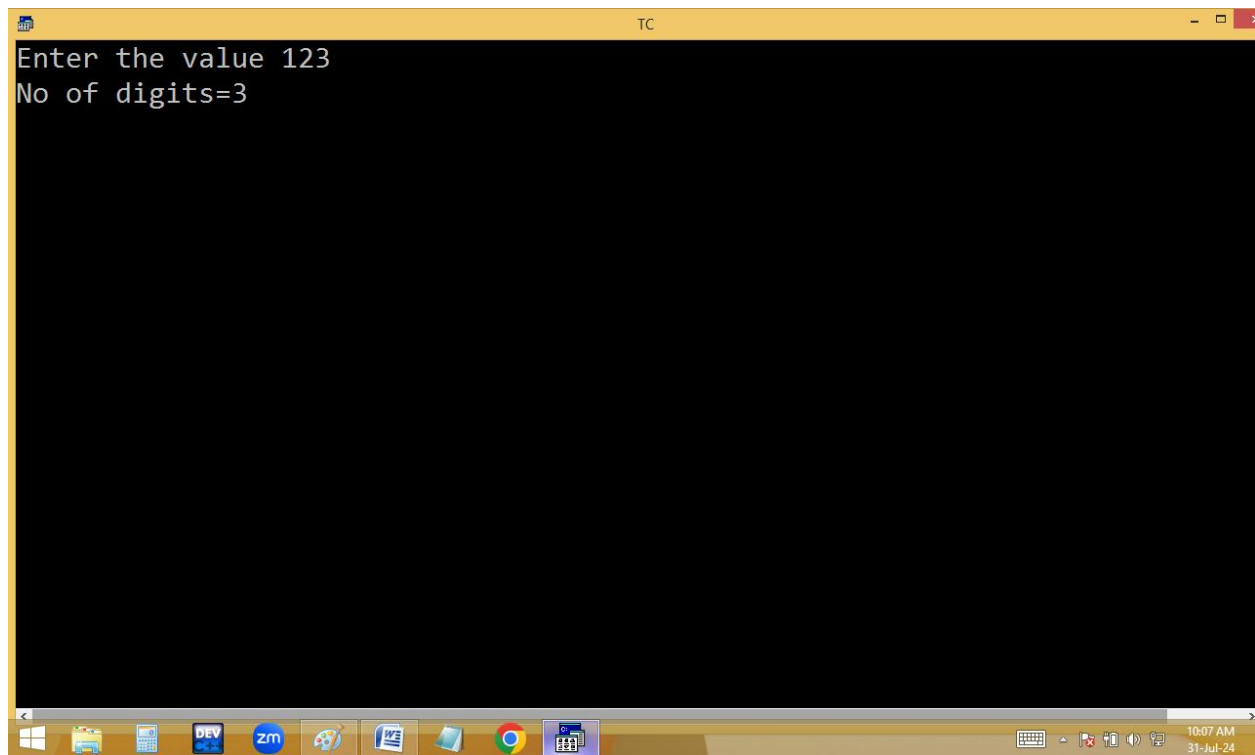
```
-------;
-------;
do
{
    statement 1;
    statement 2;
    -------;
    -------;
    statement N;
}
while( condition );
-------;        false
-------;
```

true

flow chart

start

statements

condition

true

false

stop
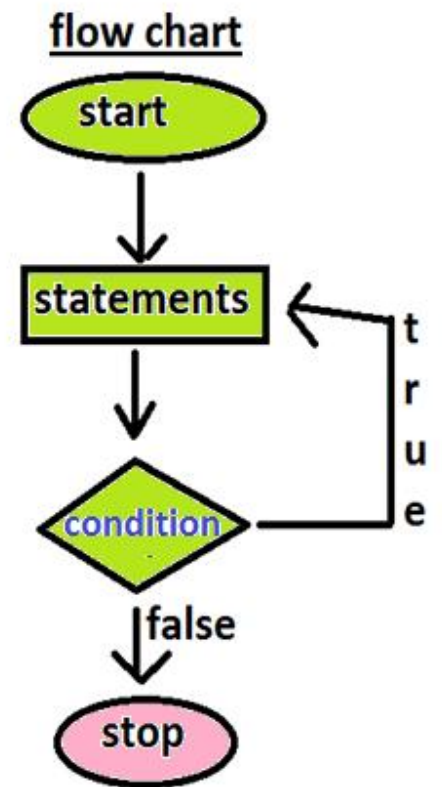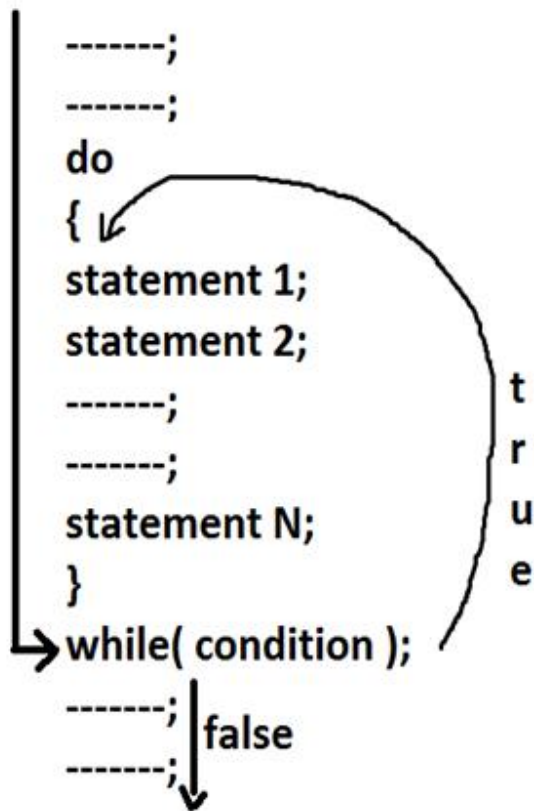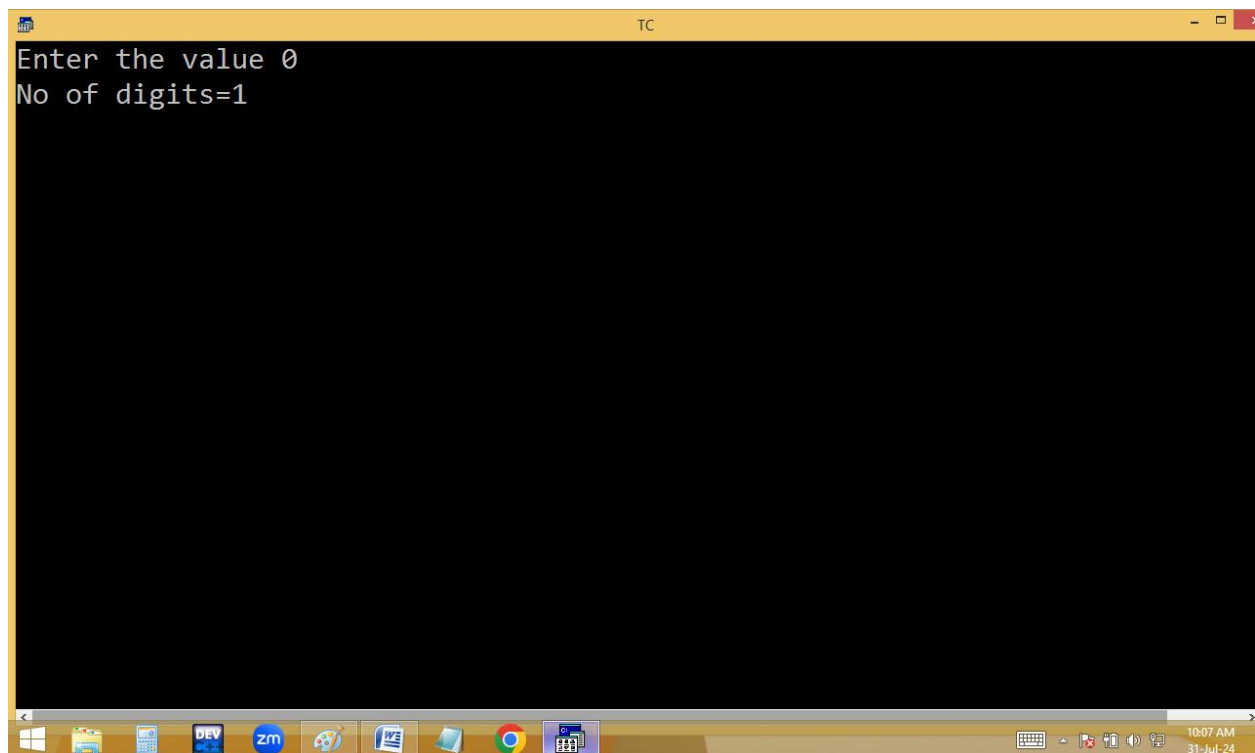
Finding no of digits using do..while:

```c
#include<stdio.h>
#include<conio.h>
void main()
{
long n; int c=0;
clrscr();
printf("Enter the value "); scanf("%ld",&n);
do
{
c++;
n=n/10;
}
while(n!=0);
printf("No of digits=%d",c);
getch();
}
```
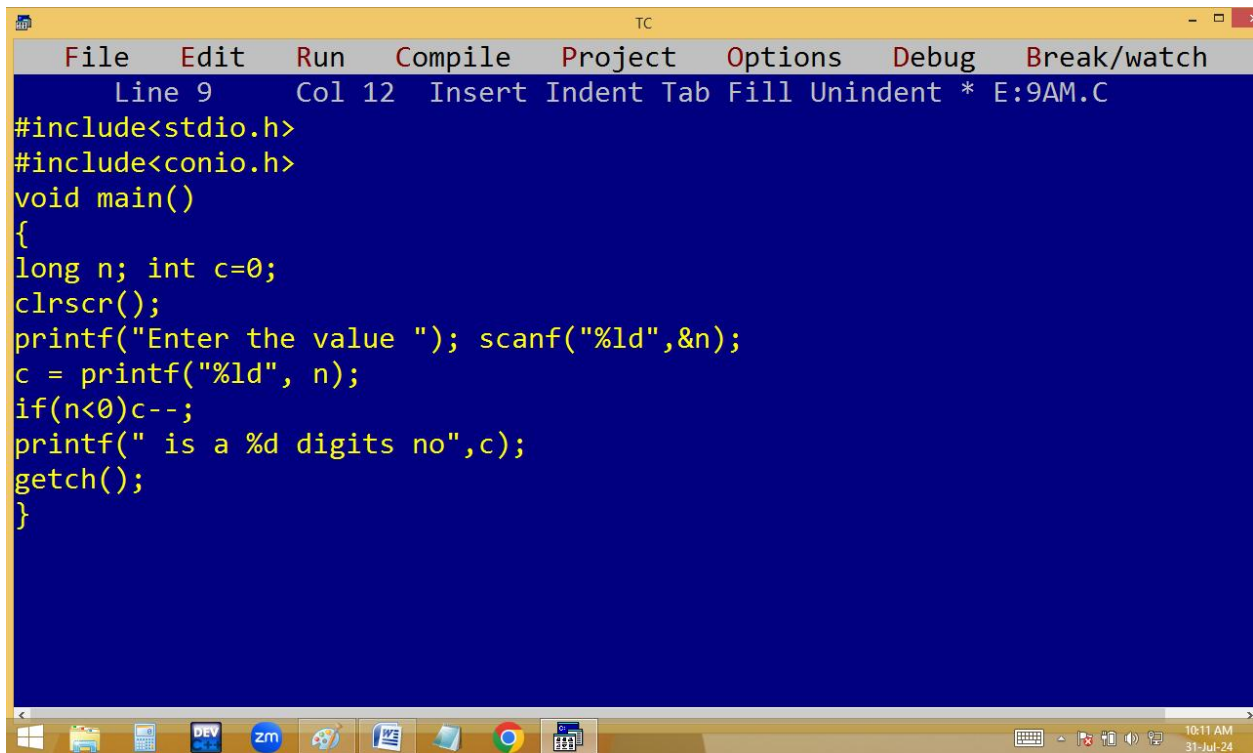
```
Enter the value 0
No of digits=1
```

```
TC                                                    _  □  ✕

Enter the value 123
No of digits=3
```

```
TC                                                    _  □  ✕

Enter the value -2345
No of digits=4_
```
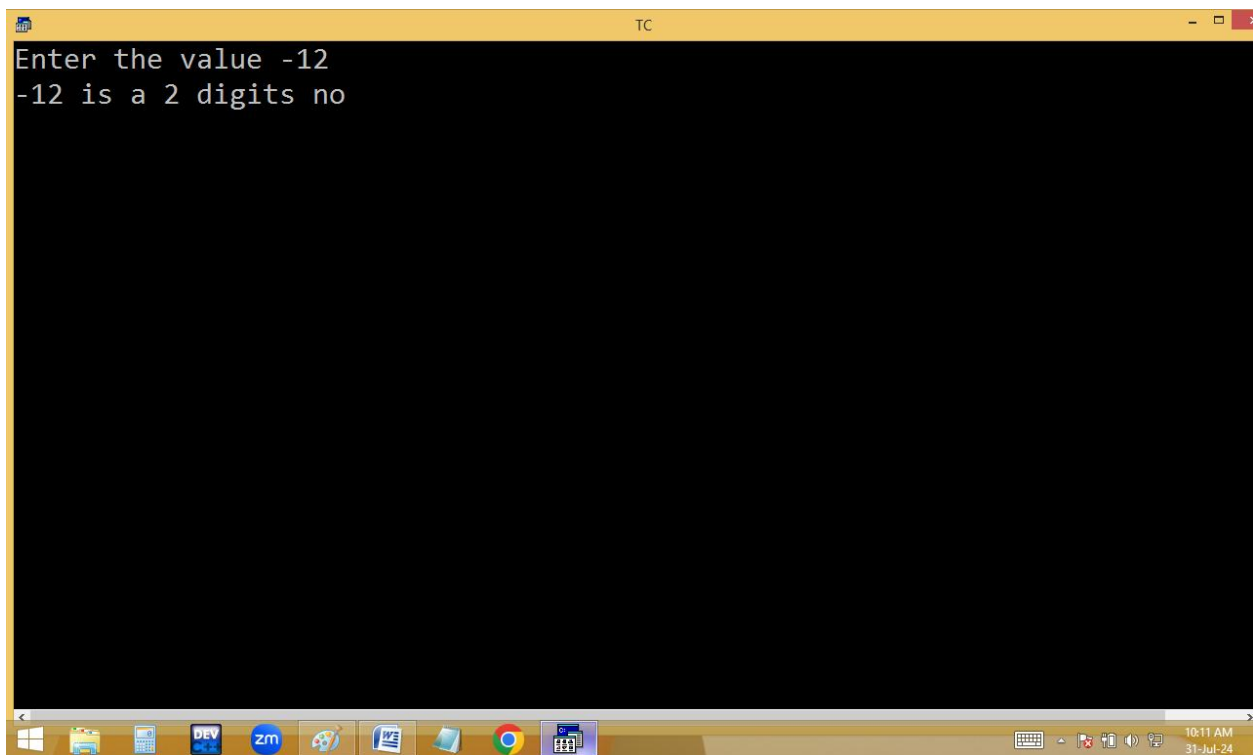
Without using loop/goto label:
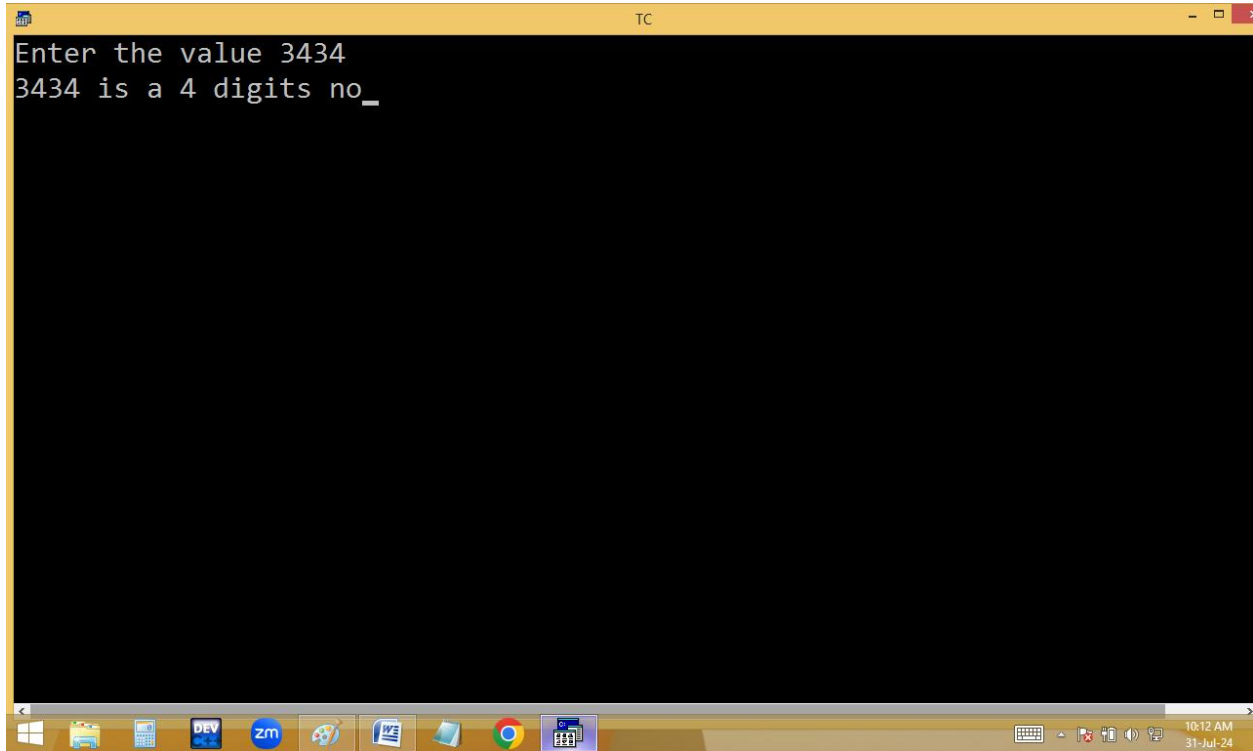
```
#include<stdio.h>
#include<conio.h>
void main()
{
long n; int c=0;
clrscr();
printf("Enter the value "); scanf("%ld",&n);
c = printf("%ld", n);
if(n<0)c--;
printf(" is a %d digits no",c);
getch();
}
```
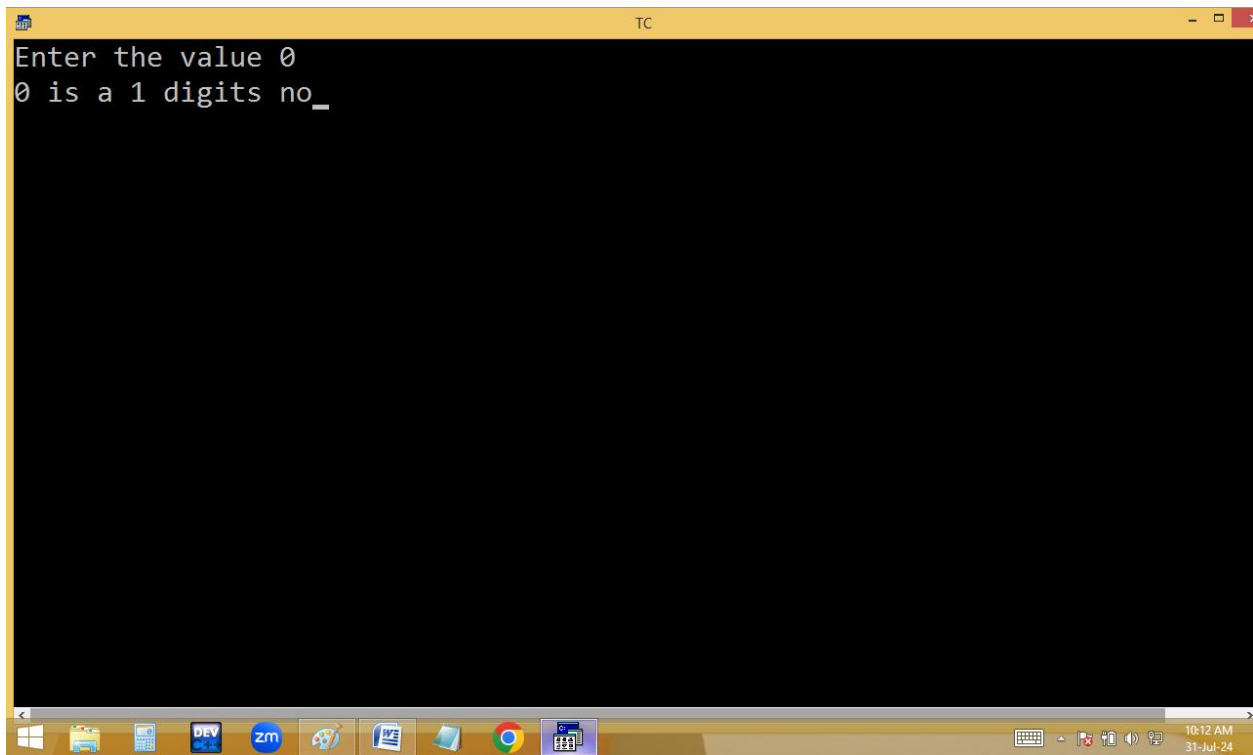
```
Enter the value -12
-12 is a 2 digits no
```

```
Enter the value 3434
3434 is a 4 digits no_
```

```
Enter the value 0
0 is a 1 digits no_
```

```
Enter the value 8
8 is a 1 digits no
```

$$\frac{n}{275}$$

c = p(275);
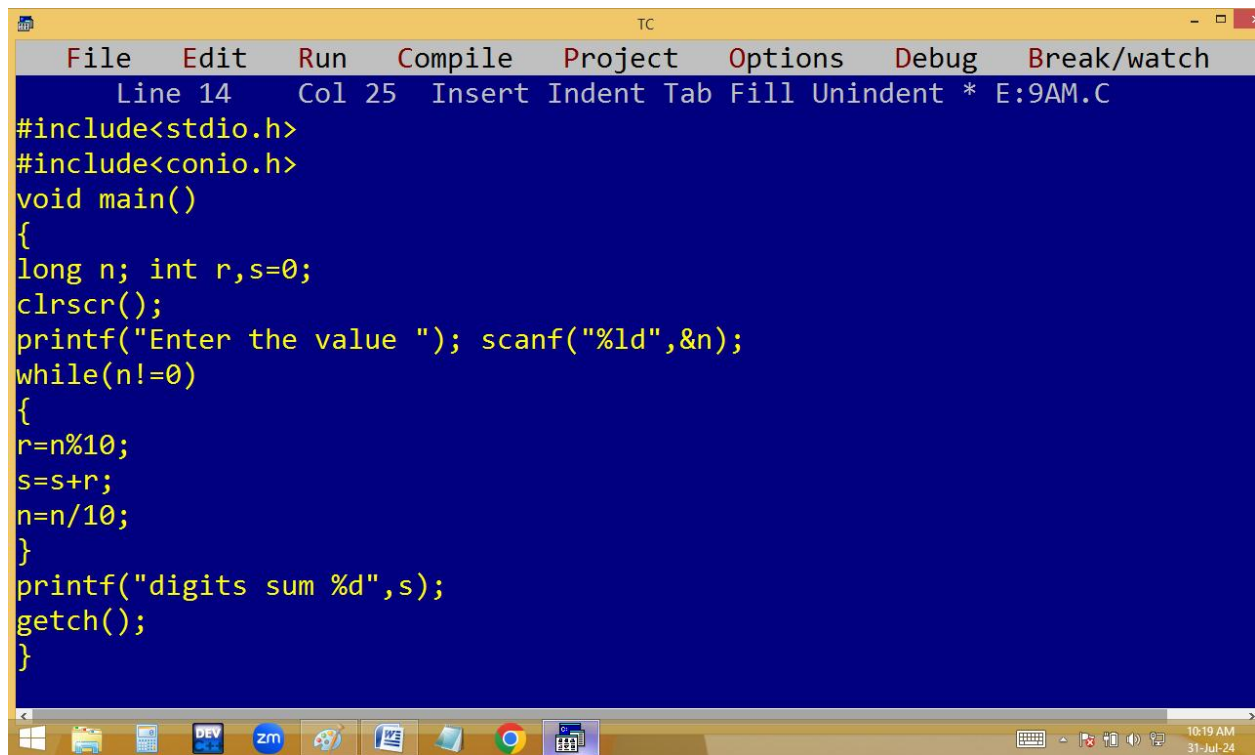
3

p(" is a %d digits no",c);
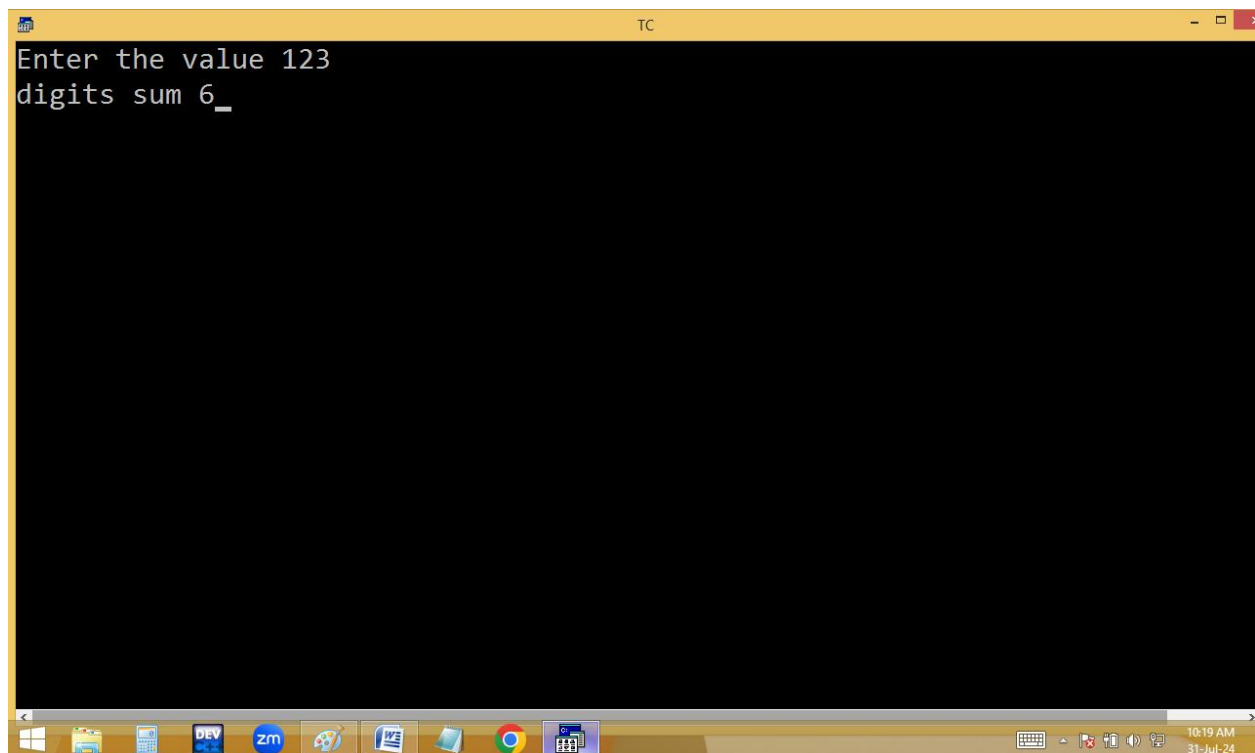
275   is a 3 digits no

Finding digits sum:

Eg: 123 ➜ 1+2+3=6

```c
#include<stdio.h>
#include<conio.h>
void main()
{
long n; int r,s=0;
clrscr();
printf("Enter the value "); scanf("%ld",&n);
while(n!=0)
{
r=n%10;
s=s+r;
n=n/10;
}
printf("digits sum %d",s);
getch();
}
```

```
Enter the value 123
digits sum 6_
```

$$10 \overline{)123}(12 \checkmark$$
$$120$$
$$\overline{3} \checkmark \%$$

n	r	s	
$123\%10 = 3$	$+$	$0 = 3$	
$12\%10 = 2$	$+$	$3 = 5$	
$1\%10 = 1$	$+$	$5 = 6$	
		0	

```
while( n!=0 )
{
r=n%10;
s=s+r;
n=n/10;
}

p(s);
```

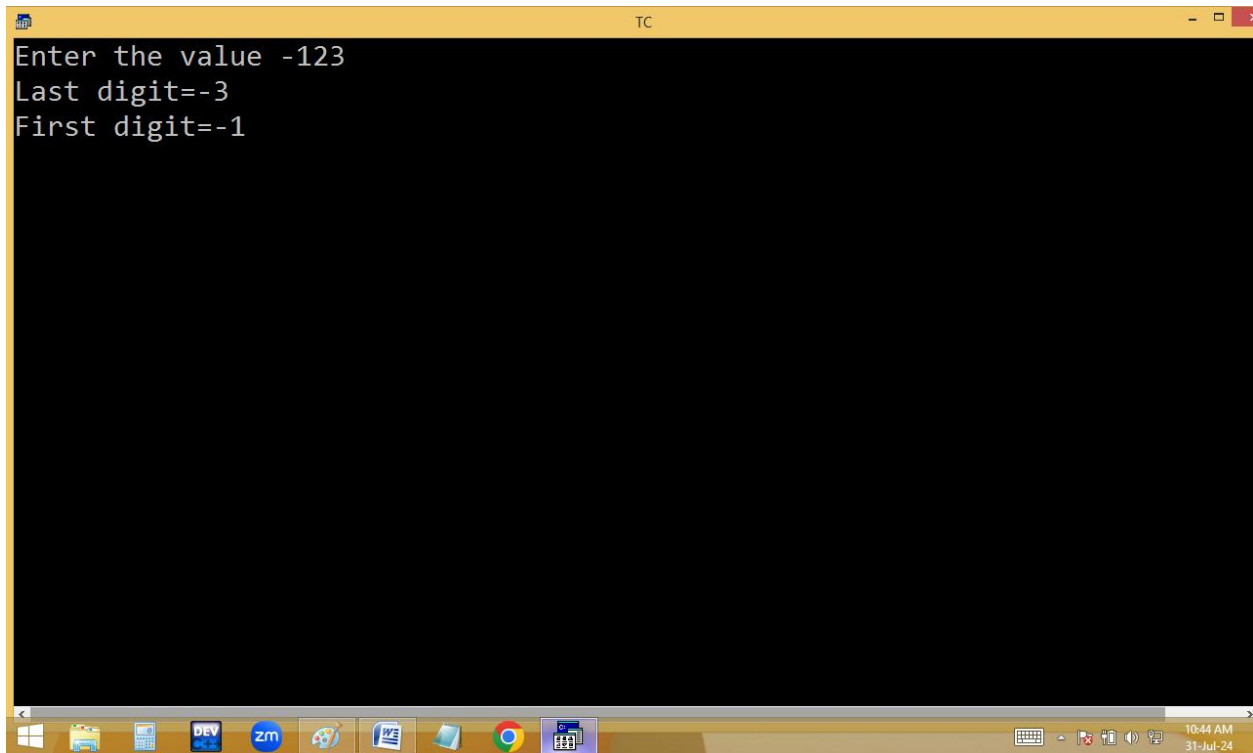**Note: Any no%10 gives last digit** ✓
Any no/10 removes last digit. ✓

Finding first and last digits of given no

2816 ➜ 6 is last digit, 2 is first digit.
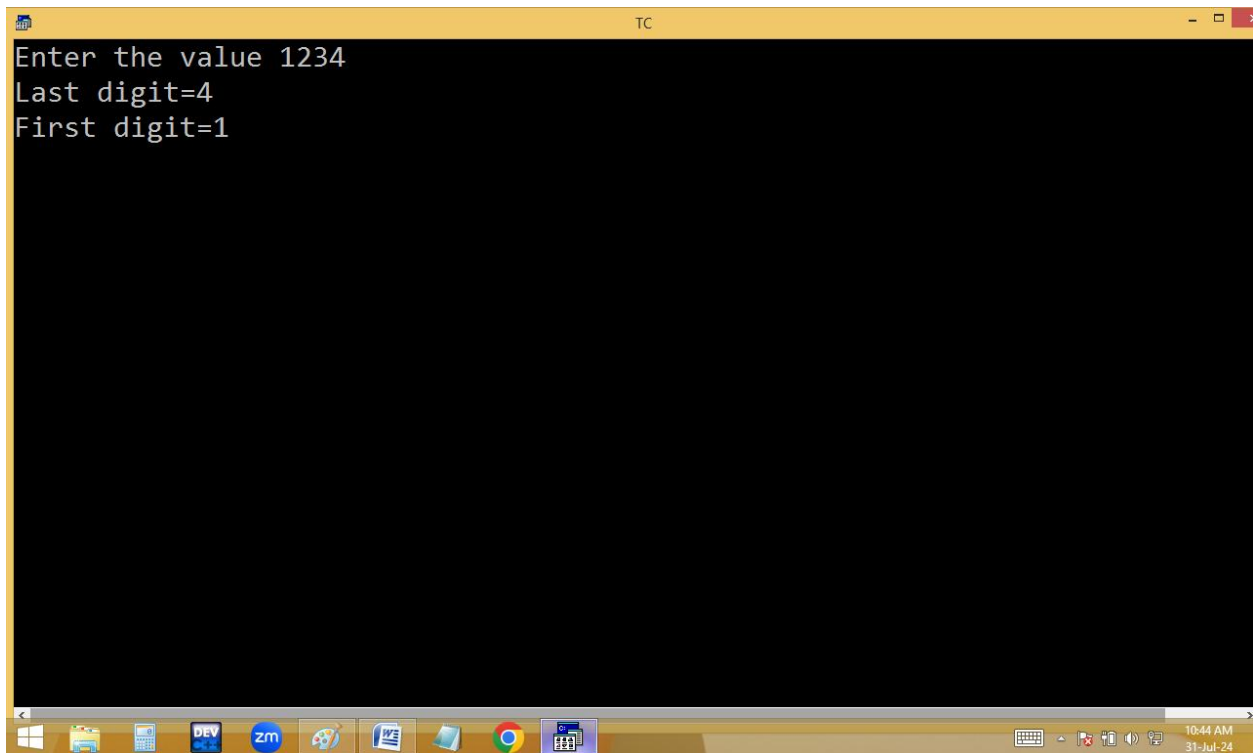
```c
#include<stdio.h>
#include<conio.h>
void main()
{
long n; int r,s=0;
clrscr();
printf("Enter the value "); scanf("%ld",&n);
printf("Last digit=%d\n", n%10);
while(n>9||n<-9)n=n/10;
printf("First digit=%d",n);
getch();
}
```

```
TC

Enter the value -123
Last digit=-3
First digit=-1
```

```
TC

Enter the value 1234
Last digit=4
First digit=1
```

```
TC                                              _ □ ×
Enter the value 0
Last digit=0
First digit=0
```

p("Last digit=%d\n",n%10);

while(n>9) n=n/10;

p("First digit=%d",n);