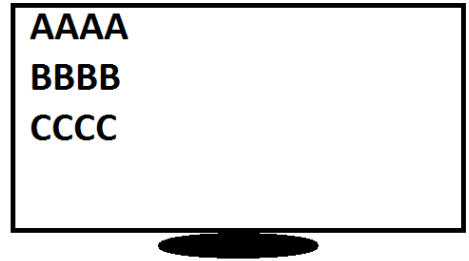


```
TC
File Edit Run Compile Project Options Debug Break/watch
Line 13 Col 18 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int nr,nc,r,c;
clrscr();
printf("Enter no of rows and columns "); scanf("%d %d",&nr,&nc);
for(r=1;r<=nr;r++)
{
for(c=1; c<=nc; c++ )
{
printf("%2c",64+r);
}
printf("\n");
}
getch();
}
```

Enter no of rows and columns 10 20

```
A A A A A A A A A A A A A A A A A A A A
B B B B B B B B B B B B B B B B B B B B
C C C C C C C C C C C C C C C C C C C C
D D D D D D D D D D D D D D D D D D D D
E E E E E E E E E E E E E E E E E E E E
F F F F F F F F F F F F F F F F F F F F
G G G G G G G G G G G G G G G G G G G G
H H H H H H H H H H H H H H H H H H H H
I I I I I I I I I I I I I I I I I I I I
J J J J J J J J J J J J J J J J J J J J
```

```
for( r=1; r<=3; r++)  
{  
  for( c=1; c<=4; c++ )  
  {  
    p("%2c", 64+r);  
  }  
  p("\n");  
}
```



```
TC
File Edit Run Compile Project Options Debug Break/watch
Line 12 Col 18 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int nr,nc,r,c;
clrscr();
printf("Enter no of rows and columns "); scanf("%d %d",&nr,&nc);
for(r=1;r<=nr;r++)
{
for(c=1; c<=nc; c++ )
{
printf("%2c",64+c);
}
printf("\n");
}
getch();
}
```

Enter no of rows and columns 10 26

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

```
TC
File Edit Run Compile Project Options Debug Break/watch
Line 12 Col 55 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int nr,nc,r,c;
clrscr();
printf("Enter no of rows and columns "); scanf("%d %d",&nr,&nc);
for(r=1;r<=nr;r++)
{
for(c=1; c<=nc; c++ )
{
if(c%2==0)printf("%2c",96+c); else printf("%2c",64+c);_
}
printf("\n");
}
getch();
}
```

Enter no of rows and columns 10 26

```
A b C d E f G h I j K l M n O p Q r S t U v W x Y z
A b C d E f G h I j K l M n O p Q r S t U v W x Y z
A b C d E f G h I j K l M n O p Q r S t U v W x Y z
A b C d E f G h I j K l M n O p Q r S t U v W x Y z
A b C d E f G h I j K l M n O p Q r S t U v W x Y z
A b C d E f G h I j K l M n O p Q r S t U v W x Y z
A b C d E f G h I j K l M n O p Q r S t U v W x Y z
A b C d E f G h I j K l M n O p Q r S t U v W x Y z
A b C d E f G h I j K l M n O p Q r S t U v W x Y z
A b C d E f G h I j K l M n O p Q r S t U v W x Y z
```

Activate Windows  
Go to PC settings to activate Windows.

```
TC
File Edit Run Compile Project Options Debug Break/watch
Line 12 Col 53 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int nr,nc,r,c;
clrscr();
printf("Enter no of rows and columns "); scanf("%d %d",&nr,&nc);
for(r=1;r<=nr;r++)
{
for(c=1; c<=nc; c++ )
{
if(r%2==0)printf("%2c",96+r); else printf("%2c",64+r);
}
printf("\n");
}
getch();
}
```

Enter no of rows and columns 10 10

```
A A A A A A A A A A
b b b b b b b b b b
C C C C C C C C C C
d d d d d d d d d d
E E E E E E E E E E
f f f f f f f f f f
G G G G G G G G G G
h h h h h h h h h h
I I I I I I I I I I
j j j j j j j j j j
```

Activate Windows  
Go to PC settings to activate Windows.

The screenshot displays the Turbo C++ (TC) environment. The top menu bar includes File, Edit, Run, Compile, Project, Options, Debug, and Break/watch. Below it, the status bar shows "Line 12 Col 1 Insert Indent Tab Fill Unindent \* E:2PM.C".

The source code being edited is as follows:

```
#include<stdio.h>
#include<conio.h>
void main()
{
int nr,nc,r,c;
clrscr();
printf("Enter no of rows and columns "); scanf("%d %d",&nr,&nc);
for(r=1;r<=nr;r++)
{char L='a', U='A';
for(c=1; c<=nc; c++ )
{
if(c%2==0)printf("%2c",L++); else printf("%2c",U++);
}
printf("\n");
}
getch();
}
```

An "Activate Windows" watermark is visible in the bottom right corner of the editor window.

The taskbar at the bottom contains icons for various applications, including Chrome, VLC media player, Paint, WordPad, DEV-C++, Zoom, and Calculator. The system clock indicates the time is 2:34 PM on 20-Sep-23.

A second instance of the TC window is shown below the first one. Its title bar says "TC". It has received user input: "Enter no of rows and columns 10 20". The output area shows a 10x20 grid of lowercase letters, alternating between pairs of uppercase and lowercase letters (e.g., A a B b C c D d ... J j), printed two characters per line.

```
TC
File Edit Run Compile Project Options Debug Break/watch
Line 1 Col 1 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int nr,nc,r,c;
char L='a', U='A';
clrscr();
printf("Enter no of rows and columns "); scanf("%d %d",&nr,&nc);
for(r=1;r<=nr;r++)
{
for(c=1; c<=nc; c++ )
{
if(r%2==0)printf("%2c",L); else printf("%2c",U);
}
printf("\n");if(r%2==0)L++; else U++;
}
}
```

Enter no of rows and columns 10 20

```
A A A A A A A A A A A A A A A A A A A A
a a a a a a a a a a a a a a a a a a a a
B B B B B B B B B B B B B B B B B B B B
b b b b b b b b b b b b b b b b b b b b
C C C C C C C C C C C C C C C C C C C C
c c c c c c c c c c c c c c c c c c c c
D D D D D D D D D D D D D D D D D D D D
d d d d d d d d d d d d d d d d d d d d
E E E E E E E E E E E E E E E E E E E E
e e e e e e e e e e e e e e e e e e e e
```

```
TC
File Edit Run Compile Project Options Debug Break/watch
Line 16 Col 1 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int n,r,c;
clrscr();
printf("Enter no of rows "); scanf("%d",&n);
for(r=1;r<=n;r++)
{
for(c=1; c<=n; c++ )
{
if(c<=n-r)printf("%3d",1); else printf("%3d",r);
}
printf("\n");
}
getch();
}
```

Enter no of rows 10

```
1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 2 2
1 1 1 1 1 1 1 3 3 3
1 1 1 1 1 1 4 4 4 4
1 1 1 1 1 5 5 5 5 5
1 1 1 1 6 6 6 6 6 6
1 1 1 7 7 7 7 7 7 7
1 1 8 8 8 8 8 8 8 8
1 9 9 9 9 9 9 9 9 9
10 10 10 10 10 10 10 10 10 10
```



```
for( r=1; r<=4; r++)
```

```
{
```

```
for(c=1; c<=4; c++)
```

```
{
```

```
if(c<=n-r)p(1); else p(r);
```

```
}
```

```
p("\n");
```

```
}
```

$$\frac{n}{4} - \frac{1}{1} = 3$$

$$4 - 2 = 2$$

$$4 - 3 = 1$$

$$4 - 4 = 0$$

$$\frac{1}{1}$$

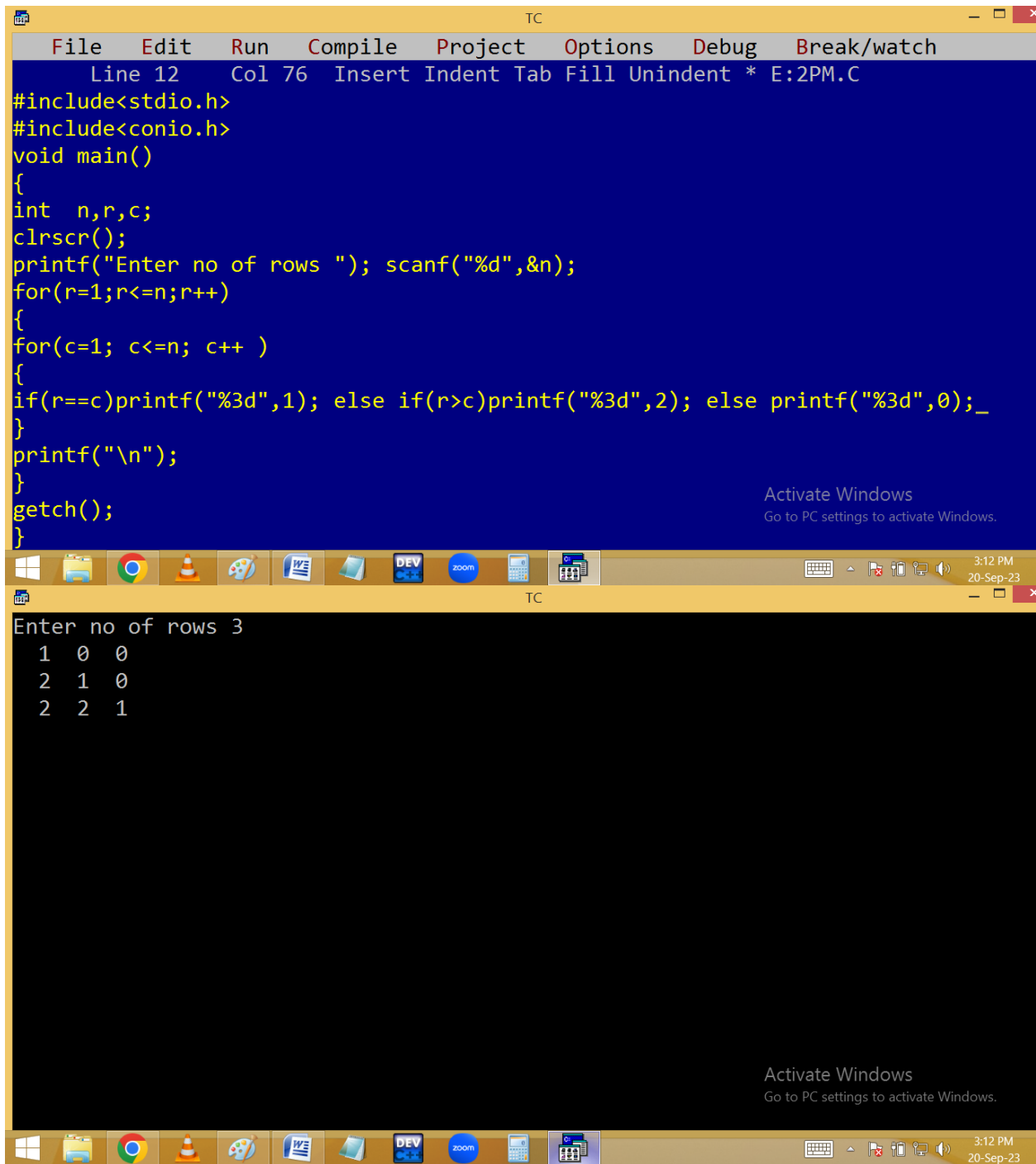
$$\frac{1}{2}$$

$$\frac{1}{3}$$

$$\frac{1}{4}$$

```
1111
1122
1333
4444
```

$$\frac{c}{123} <= \frac{n-1}{4-1}$$



The image shows two windows of the Turbo C++ (TC) IDE. The top window is the source code editor, and the bottom window is the output console.

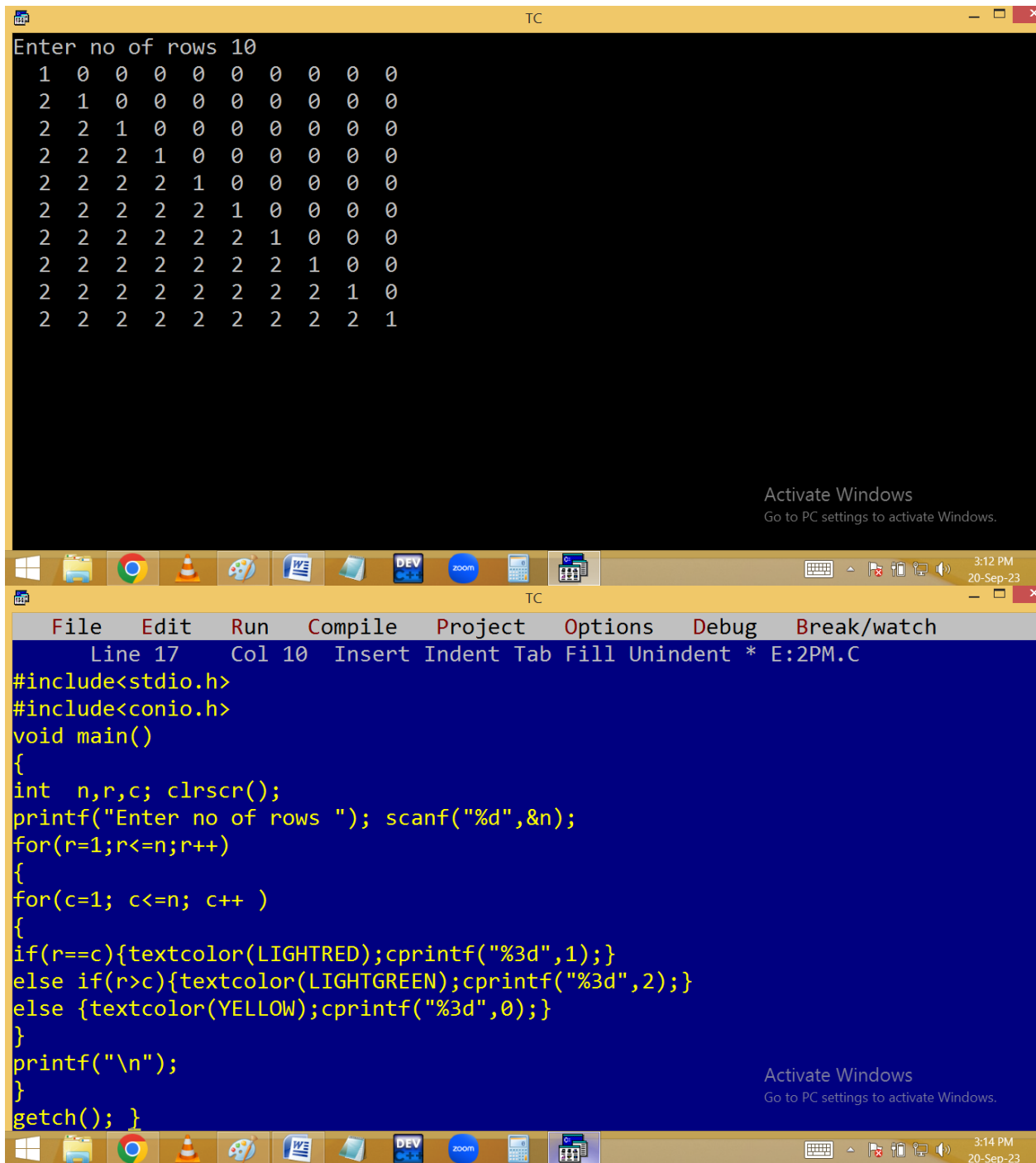
**Top Window (Source Code):**

```
TC
File Edit Run Compile Project Options Debug Break/watch
Line 12 Col 76 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
    int n,r,c;
    clrscr();
    printf("Enter no of rows "); scanf("%d",&n);
    for(r=1;r<=n;r++)
    {
        for(c=1; c<=n; c++ )
        {
            if(r==c)printf("%3d",1); else if(r>c)printf("%3d",2); else printf("%3d",0);_
        }
        printf("\n");
    }
    getch();
}
```

**Bottom Window (Output):**

```
TC
Enter no of rows 3
1 0 0
2 1 0
2 2 1
```

Both windows include a taskbar at the bottom with various application icons and a system tray showing the time as 3:12 PM on 20-Sep-23. An "Activate Windows" watermark is visible in the bottom right of each window.



The image shows a Turbo C++ (TC) IDE with two windows. The top window displays the output of a program that prints a 10x10 grid of numbers. The bottom window shows the source code of the program.

**Top Window Output:**

```
Enter no of rows 10
1 0 0 0 0 0 0 0 0 0
2 1 0 0 0 0 0 0 0 0
2 2 1 0 0 0 0 0 0 0
2 2 2 1 0 0 0 0 0 0
2 2 2 2 1 0 0 0 0 0
2 2 2 2 2 1 0 0 0 0
2 2 2 2 2 2 1 0 0 0
2 2 2 2 2 2 2 1 0 0
2 2 2 2 2 2 2 2 1 0
2 2 2 2 2 2 2 2 2 1
```

**Bottom Window Source Code:**

```
File Edit Run Compile Project Options Debug Break/watch
Line 17 Col 10 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int n,r,c; clrscr();
printf("Enter no of rows "); scanf("%d",&n);
for(r=1;r<=n;r++)
{
for(c=1; c<=n; c++ )
{
if(r==c){textcolor(LIGHTRED);cprintf("%3d",1);}
else if(r>c){textcolor(LIGHTGREEN);cprintf("%3d",2);}
else {textcolor(YELLOW);cprintf("%3d",0);}
}
printf("\n");
}
getch(); }
```

```
TC
Enter no of rows 10
1 0 0 0 0 0 0 0 0 0
2 1 0 0 0 0 0 0 0 0
2 2 1 0 0 0 0 0 0 0
2 2 2 1 0 0 0 0 0 0
2 2 2 2 1 0 0 0 0 0
2 2 2 2 2 1 0 0 0 0
2 2 2 2 2 2 1 0 0 0
2 2 2 2 2 2 2 1 0 0
2 2 2 2 2 2 2 2 1 0
2 2 2 2 2 2 2 2 2 1
```

Activate Windows  
Go to PC settings to activate Windows.

3:14 PM  
20-Sep-23

```
for( r=1; r<=4; r++)  
{  
  for(c=1; c<=4; c++)  
  {  
    if(r==c)p(1); else if(r>c) p(2); else p(0);  
  }  
  p("\n");  
}
```

1 <sub>1,1</sub>	0 <sub>1,2</sub>	0 <sub>1,3</sub>
2 <sub>2,1</sub>	1 <sub>2,2</sub>	0 <sub>2,3</sub>
2 <sub>3,1</sub>	2 <sub>3,2</sub>	1 <sub>3,3</sub>

The image shows two screenshots of the Turbo C++ (TC) IDE. The top screenshot displays the source code for a C program that prints a 10x10 asterisk pattern. The code is as follows:

```
Line 16 Col 1 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int n,r,c; clrscr();
printf("Enter no of rows "); scanf("%d",&n);
for(r=1;r<=n;r++)
{
for(c=1; c<=r; c++ )
{
printf("*");
}
printf("\n");
}
getch();
}
```

The bottom screenshot shows the execution of the program. The user has entered 10 for the number of rows, and the program has printed a 10x10 asterisk pattern:

```
Enter no of rows 10
*
**
***
****
*****
*****
*****
*****
*****
*****
*****
*****
```

Both screenshots show the TC window with a yellow title bar and a menu bar (File, Edit, Run, Compile, Project, Options, Debug, Break/watch). The status bar at the bottom indicates the time as 3:19 PM on 20-Sep-23.

```

for(r=1;r<=4;r++)
{
for(c=1;c<=r;c++)
{
p("*");
}
p("\n");
}

```

r	c	c=1 to r
1	1	1 to 1 = 1 →
2	1 to 2 = 2 →	
3	1 to 3 = 3 →	
4	1 to 4 = 4 →	

```

*
**
***
****

```

**Floyd's Triangle:**

The image shows a screenshot of the Turbo C++ (TC) IDE. The top window displays the source code for a C program named E:2PM.C. The code is as follows:

```
Line 11 Col 11 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int a=1, n,r,c; clrscr();
printf("Enter no of rows "); scanf("%d",&n);
for(r=1;r<=n;r++)
{
for(c=1; c<=r; c++ )
{
printf("%3d",a++);
}
printf("\n");
}
getch();
}
```

The bottom window shows the program's execution. It prompts the user to "Enter no of rows 10". The output is a 10x10 grid of numbers, where each row contains consecutive integers starting from the previous row's last number. The numbers are formatted with a width of 3 characters.

```
Enter no of rows 10
 1
 2 3
 4 5 6
 7 8 9 10
11 12 13 14 15
16 17 18 19 20 21
22 23 24 25 26 27 28
29 30 31 32 33 34 35 36
37 38 39 40 41 42 43 44 45
46 47 48 49 50 51 52 53 54 55
```

Both windows include a taskbar at the bottom with various application icons and a system tray showing the time as 3:21 PM on 20-Sep-23. An "Activate Windows" watermark is visible in the bottom right corner of each window.

The image shows a screenshot of the Turbo C++ (TC) IDE. The top window displays the source code for a C program. The code includes headers for `stdio.h` and `conio.h`, and defines a `main` function. Inside `main`, it declares variables `a`, `n`, `r`, and `c`. It uses `clrscr()` to clear the screen, `printf` to prompt the user for the number of rows, and `scanf` to read the input. A nested loop structure is used to calculate the sum of numbers in each row and print them in a triangular format. The bottom window shows the program's execution, where the user has entered 3 rows, resulting in the output: 6, 5 4, 3 2 1. The Windows taskbar at the bottom indicates the date and time as 3:27 PM on 20-Sep-23.

```
File Edit Run Compile Project Options Debug Break/watch
Line 12 Col 17 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int a=1, n,r,c; clrscr();
printf("Enter no of rows "); scanf("%d",&n);
a=n*(n+1)/2;
for(r=1;r<=n;r++)
{
for(c=1; c<=r; c++ )
{
printf("%3d",a--);
}
printf("\n");
}
getch();
}
```

Enter no of rows 3

6

5 4

3 2 1



```
TC
Enter no of rows 4
10
9 8
7 6 5
4 3 2 1
```

Activate Windows  
Go to PC settings to activate Windows.

```
TC
Enter no of rows 10
55
54 53
52 51 50
49 48 47 46
45 44 43 42 41
40 39 38 37 36 35
34 33 32 31 30 29 28
27 26 25 24 23 22 21 20
19 18 17 16 15 14 13 12 11
10 9 8 7 6 5 4 3 2 1
```

Activate Windows  
Go to PC settings to activate Windows.

```

a=n*(n+1)/2;
for(r=1;r<=4;r++)
{
for(c=1;c<=r;c++)
{
p(a--);
}
p("\n");
}

```

r	c	c=1 to r
1	1	1 to 1 = 1
2	1 to 2 = 2	1 to 2 = 2
3	1 to 3 = 3	1 to 3 = 3
4	1 to 4 = 4	1 to 4 = 4

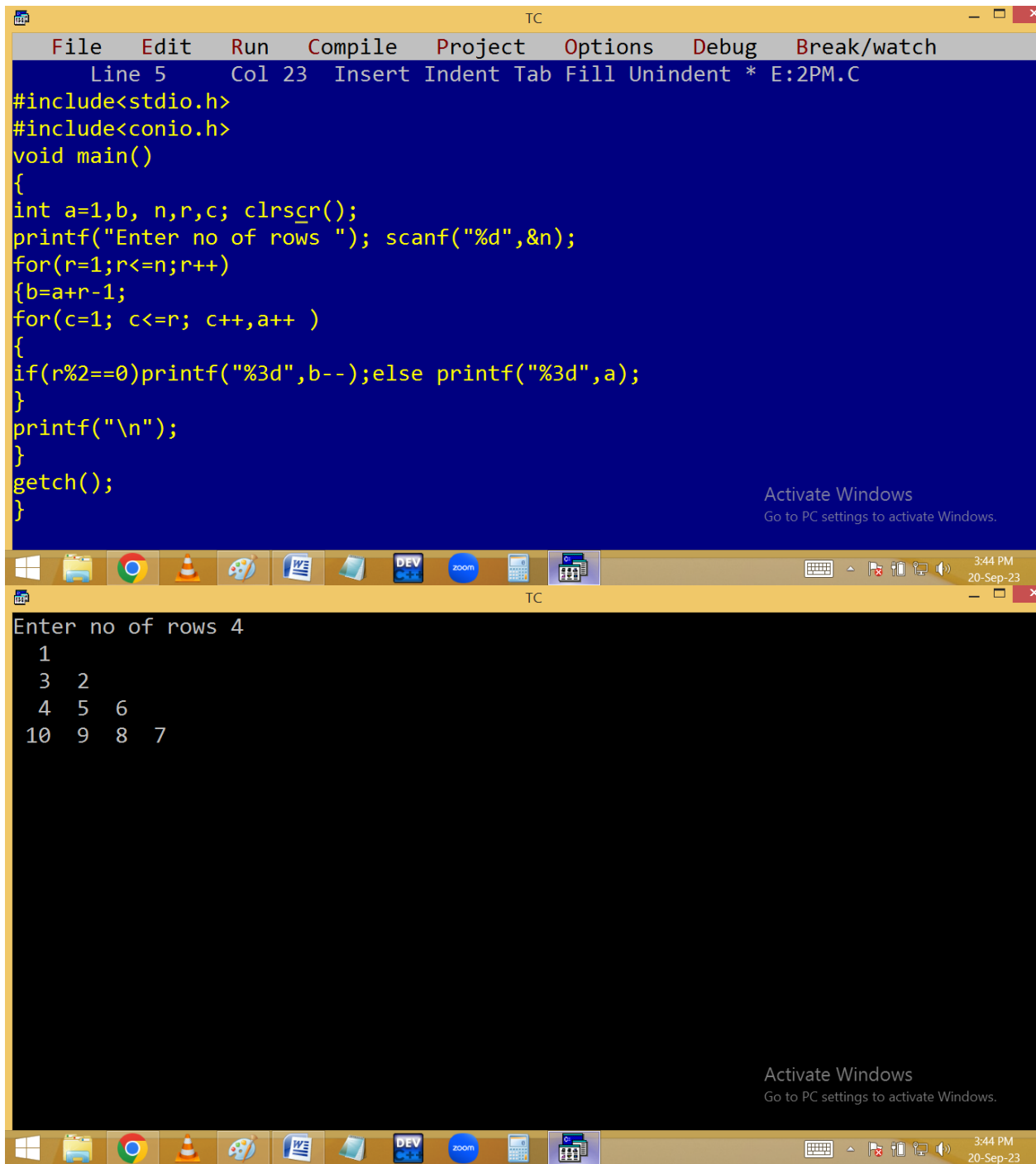
n=3	n=4
6	10
5 4	9 8
3 2 1	7 6 5
	4 3 2 1

$$n=3$$

$$a = 3 \times 4 / 2 = 6$$

$$n=4$$

$$a = 4 \times 5 / 2 = 10$$



```
TC
File Edit Run Compile Project Options Debug Break/watch
Line 5 Col 23 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int a=1,b, n,r,c; clrscr();
printf("Enter no of rows "); scanf("%d",&n);
for(r=1;r<=n;r++)
{b=a+r-1;
for(c=1; c<=r; c++,a++ )
{
if(r%2==0)printf("%3d",b--);else printf("%3d",a);
}
printf("\n");
}
getch();
}
```

Enter no of rows 4

```
1
3 2
4 5 6
10 9 8 7
```

Activate Windows  
Go to PC settings to activate Windows.

```

TC
Enter no of rows 8
1
3 2
4 5 6
10 9 8 7
11 12 13 14 15
21 20 19 18 17 16
22 23 24 25 26 27 28
36 35 34 33 32 31 30 29

```

Activate Windows  
Go to PC settings to activate Windows.

3:44 PM  
20-Sep-23

```

for( r=1; r<=4; r++ )
{
b = a+r-1;
for( c=1; c<=r;c++,a++)
{
if(r%2==0)p(b--); else p(a);
}
p("\n");
}

```

1

$$b = 2 + 2 \text{ row} - 1 = 3$$

Handwritten diagram showing a spiral pattern of numbers 1 through 10, with arrows indicating the direction of the spiral. The numbers are arranged in a grid-like fashion, with the spiral starting at 1 and moving in a clockwise direction.

$$b = 7 + 4 \text{ row} - 1 = 10$$

1  
2 4  
3 5 7  
6 8 10 12

\*  
\* \*  
\* A \*  
\* B C \*  
\* \* \* \* \*

\$

\* \$  
\$ \* \$

\* \$ \* \$

1 2 3 4  
1 2 3  
1 2  
1

4 3 2 1  
3 2 1  
2 1  
1