

The image shows a screenshot of a Turbo C++ (TC) IDE window. The window has a yellow title bar with the text "TC" and standard window controls. The menu bar includes "File", "Edit", "Run", "Compile", "Project", "Options", and "Debug". Below the menu bar, a status bar shows "Line 13", "Col 14", and a list of keyboard shortcuts: "Insert", "Indent", "Tab", "Fill", "Unindent", "*", and "E". The main editing area has a blue background and contains the following C code in yellow text:

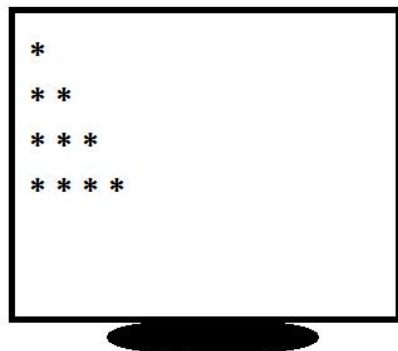
```
#include<stdio.h>
#include<conio.h>
void main()
{
int n,r,c;
clrscr();
printf("Enter no of rows ");
scanf("%d",&n);
for( r=1; r<=n; r++ )
{
for( c=1; c<=r; c++ )
{
printf("* ");_
}
printf("\n");
}
getch();
}
```

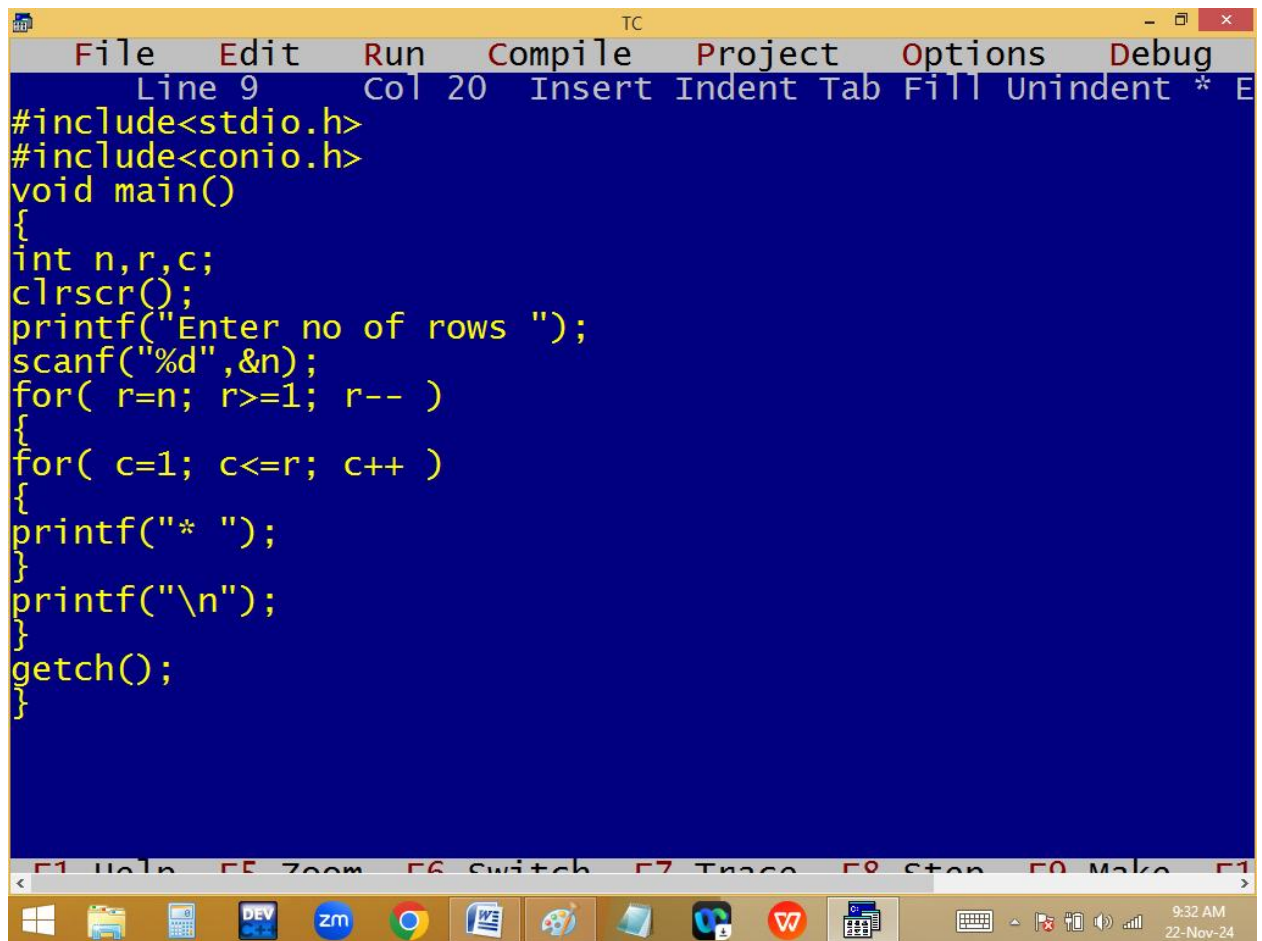
At the bottom of the window, there is a toolbar with icons for various functions and a status bar showing the time "9:29 AM" and date "22-Nov-24".

```
TC
Enter no of rows 5
*
* *
* * *
* * * *
* * * * *
```

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

<u>r</u>	<u>c</u>	<u>c = 1 to r</u>
1	1	to 1
2	1	to 2
3	1	to 3
4	1	to 4





The image shows a screenshot of a Turbo C++ (TC) IDE window. The title bar reads "TC". The menu bar includes "File", "Edit", "Run", "Compile", "Project", "Options", and "Debug". Below the menu bar, a status bar shows "Line 9", "Col 20", and a list of editing commands: "Insert", "Indent", "Tab", "Fill", "Unindent", "*", and "E". The main editing area has a dark blue background with yellow text. The code is a C program that prompts the user for the number of rows and prints a star pattern. The code is as follows:

```
#include<stdio.h>
#include<conio.h>
void main()
{
    int n,r,c;
    clrscr();
    printf("Enter no of rows ");
    scanf("%d",&n);
    for( r=n; r>=1; r-- )
    {
        for( c=1; c<=r; c++ )
        {
            printf("* ");
        }
        printf("\n");
    }
    getch();
}
```

At the bottom of the window, there is a toolbar with icons for various functions and a status bar showing the time "9:32 AM" and date "22-Nov-24".

```

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

```

```

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

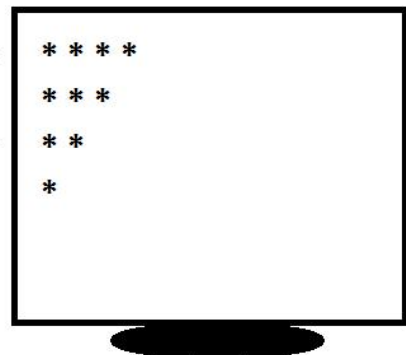
```

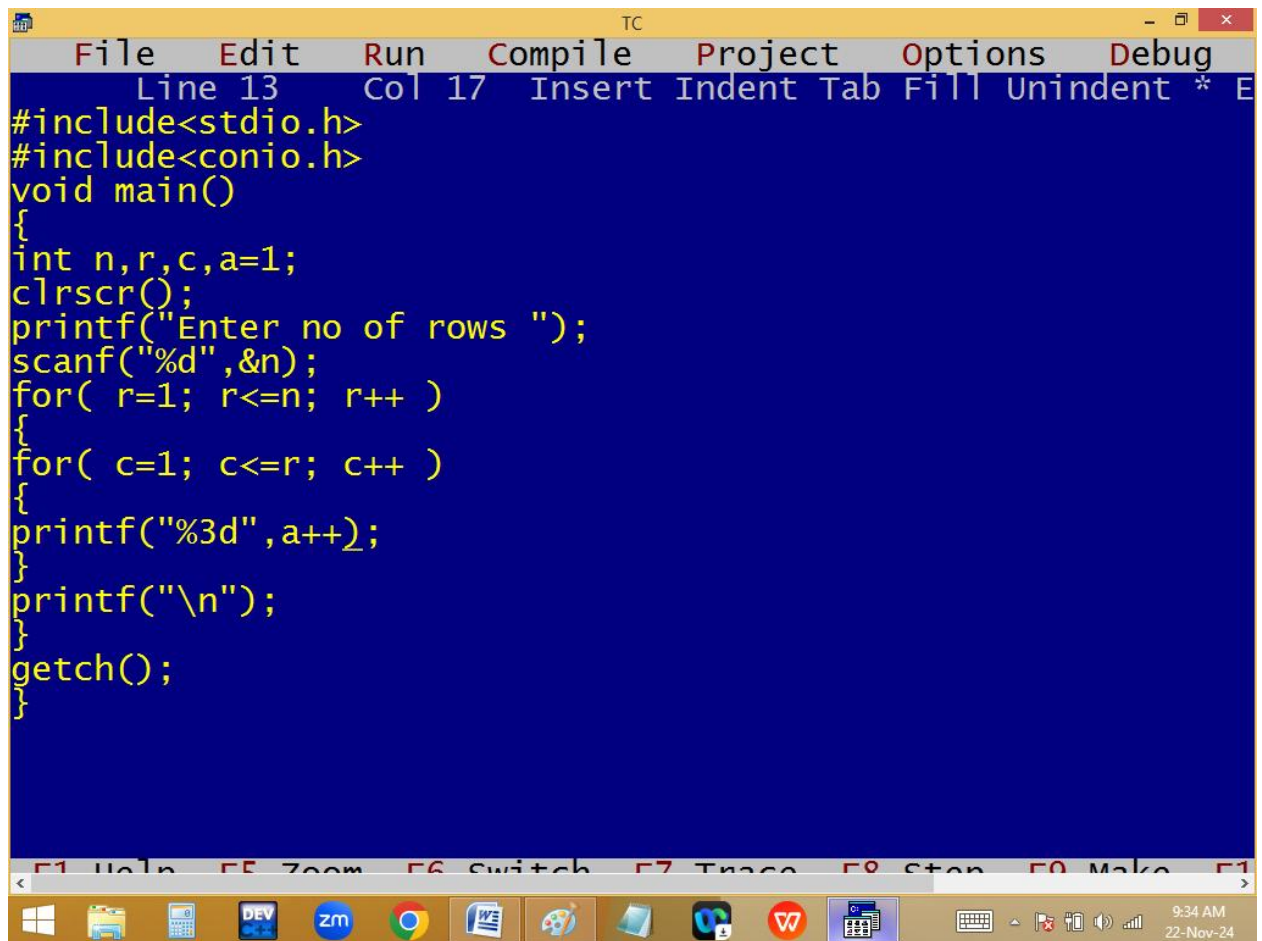
$\frac{n}{4}$	\rightarrow	$\frac{r--}{4}$	$\frac{c = 1 \text{ to } r}{1 \text{ to } 4}$
		3	1 to 3
		2	1 to 2
		1	1 to 1

```

1 - * * * *
2 - * * *
3 - * *
4 - *

```



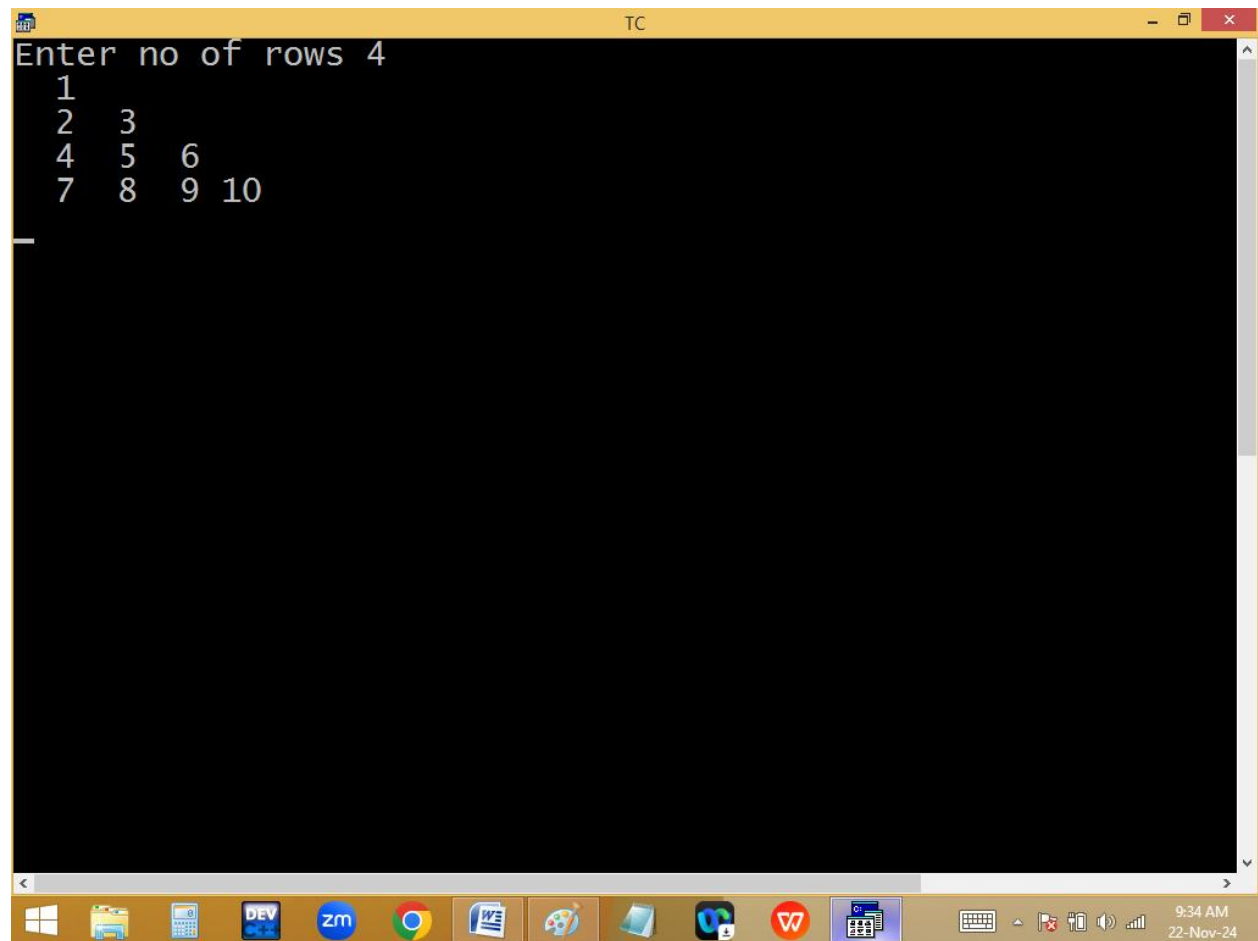


The image shows a screenshot of a Turbo C++ (TC) IDE window. The title bar reads "TC". The menu bar includes "File", "Edit", "Run", "Compile", "Project", "Options", and "Debug". The status bar at the top indicates "Line 13", "Col 17", and lists keyboard shortcuts: "Insert", "Indent", "Tab", "Fill", "Unindent", "*", and "E". The main editing area has a dark blue background with yellow text. It contains a C program that prompts the user for the number of rows and prints a lower triangular pattern of asterisks. The code is as follows:

```
#include<stdio.h>
#include<conio.h>
void main()
{
    int n,r,c,a=1;
    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();
}
```

Below the code editor, there is a toolbar with function key shortcuts: F1 Help, F5 Zoom, F6 Switch, F7 Trace, F8 Stop, F9 Make, and F10. The Windows taskbar is visible at the bottom, showing various application icons and the system clock displaying "9:34 AM" and "22-Nov-24".

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

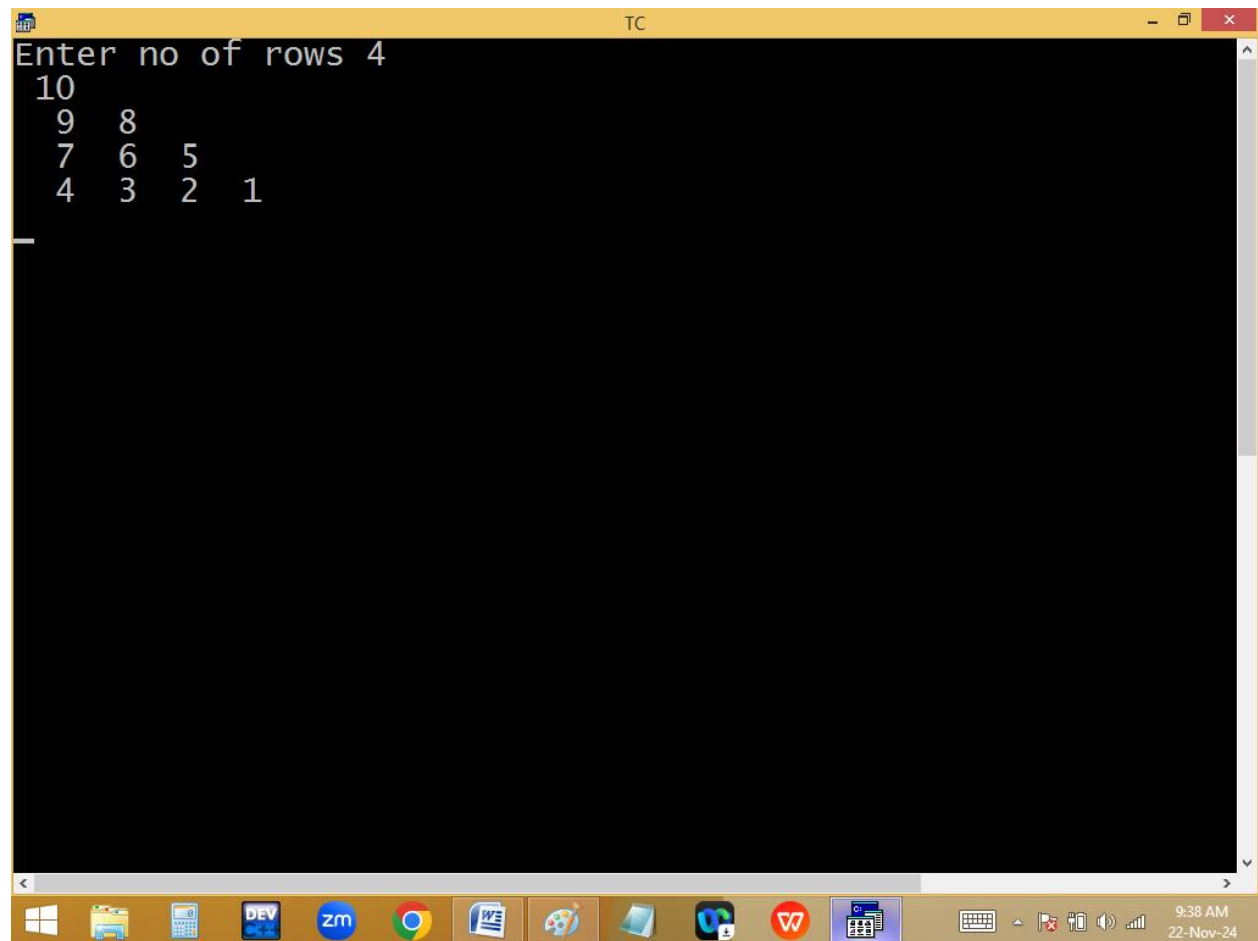


```
TC
File Edit Run Compile Project Options Debug
Line 13 Col 17 Insert Indent Tab Fill Unindent * E
#include<stdio.h>
#include<conio.h>
void main()
{
int n,r,c,a;
clrscr();
printf("Enter no of rows ");
scanf("%d",&n); a=n*(n+1)/2;
for( r=1; r<=n; r++ )
{
for( c=1; c<=r; c++ )
{
printf("%3d",a--);
}
printf("\n");
}
getch();
}
```

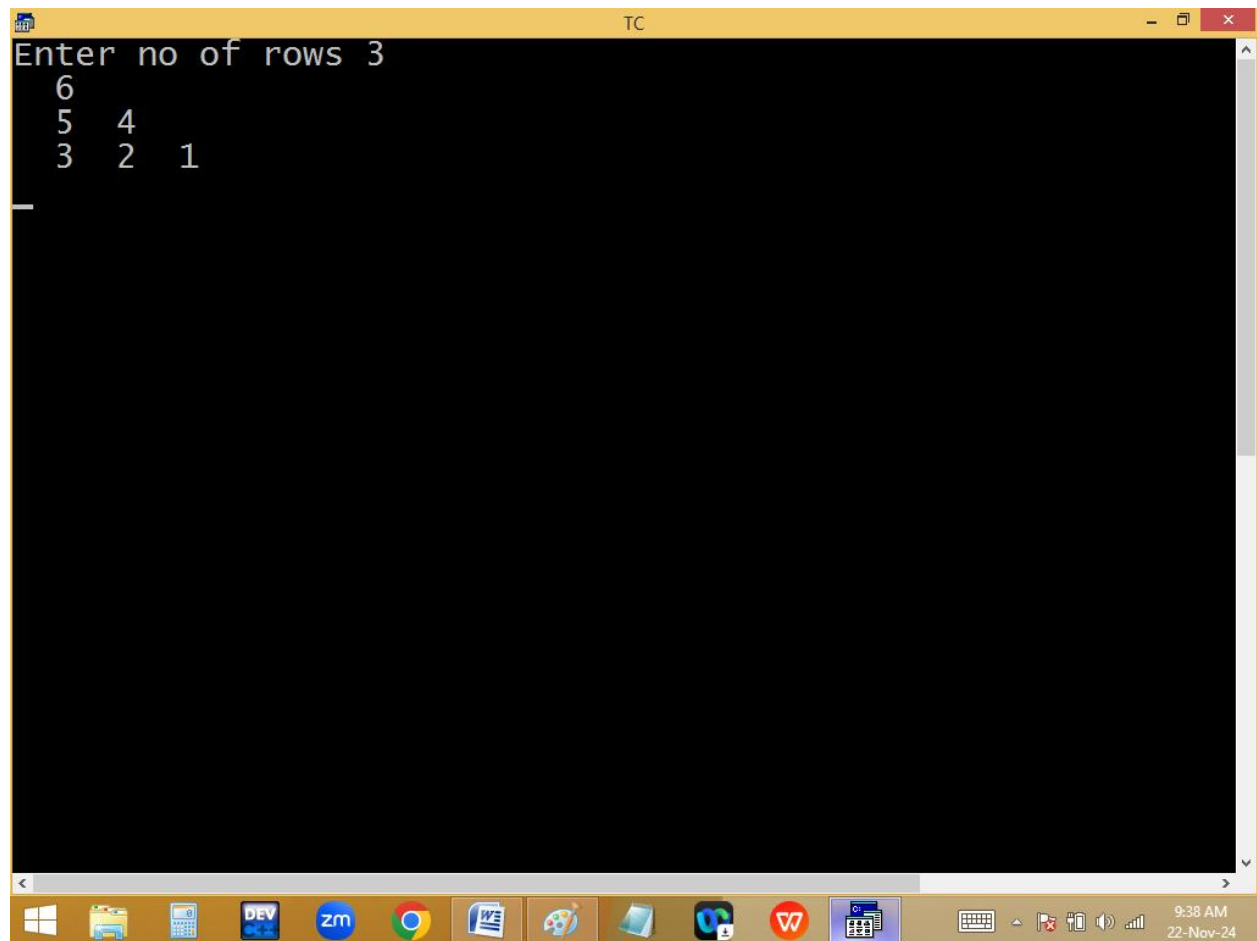
F1 Help F5 Zoom F6 Switch F7 Trace F8 Stop F9 Make F10

9:38 AM
22-Nov-24

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




```
TC
Enter no of rows 3
6
5 4
3 2 1
```



```

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

```

```

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

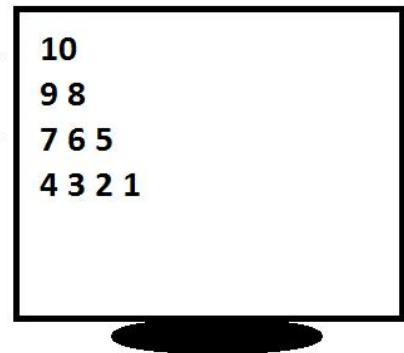
```

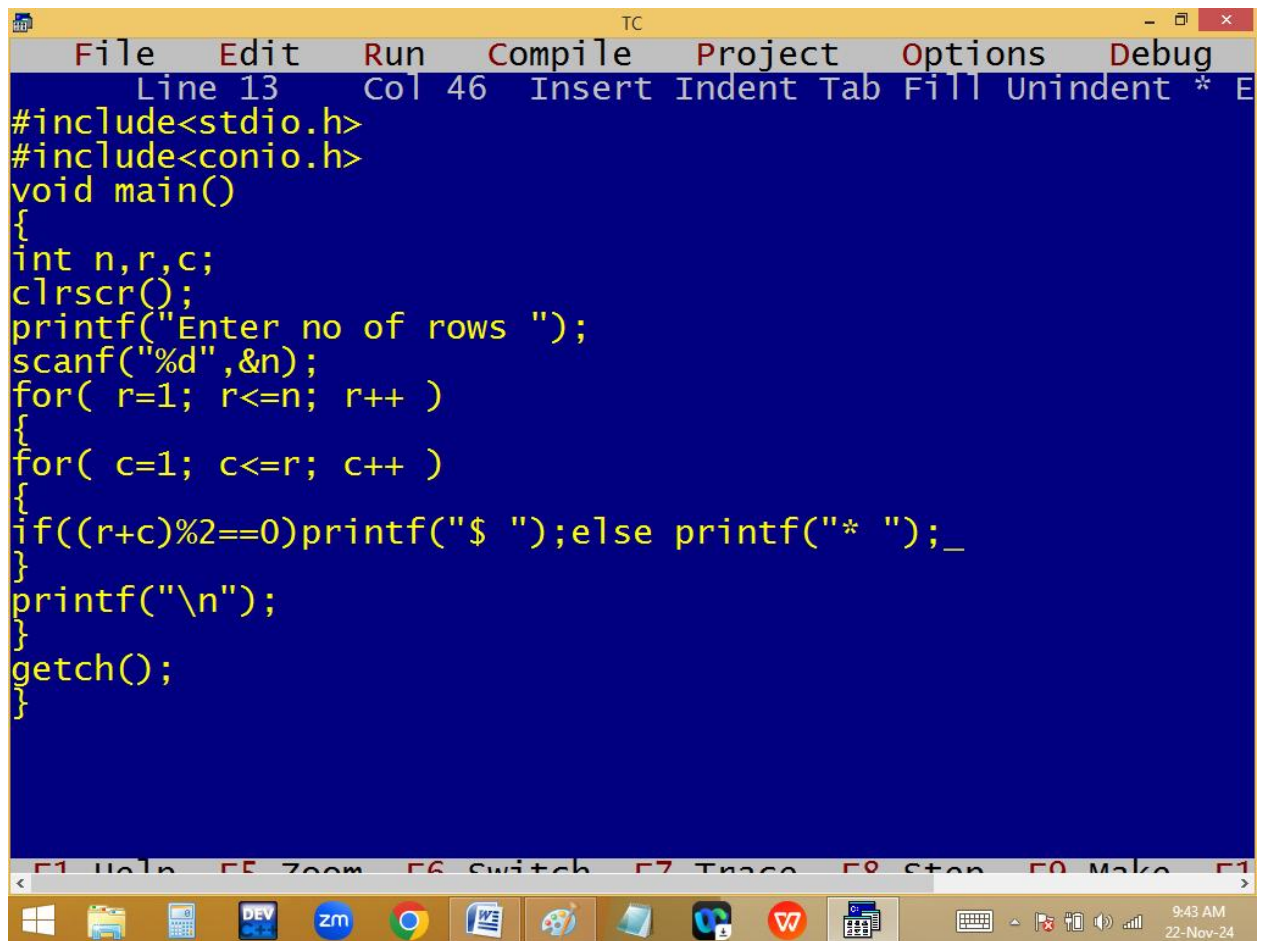
$$a = \frac{n}{4} * (4+1) / 2 = 10$$

$$a = \frac{n}{3} * (3+1) / 2 = 6$$

10
9 8
7 6 5
4 3 2 1

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





The image shows a screenshot of the Turbo C++ (TC) IDE. The window title is "TC". The menu bar includes "File", "Edit", "Run", "Compile", "Project", "Options", and "Debug". The status bar at the top indicates "Line 13", "Col 46", and lists keyboard shortcuts: "Insert", "Indent", "Tab", "Fill", "Unindent", "*", and "E". The code editor contains the following C program:

```
#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++ )
        {
            if((r+c)%2==0)printf("$ ");else printf("* ");_
        }
        printf("\n");
    }
    getch();
}
```

Below the code editor, there is a toolbar with function key shortcuts: F1 Help, F5 Zoom, F6 Switch, F7 Trace, F8 Stop, F9 Make, and F10. The Windows taskbar is visible at the bottom, showing icons for Windows, File Explorer, Calculator, DEV C++, Zoom, Google Chrome, Word, and other applications. The system clock in the bottom right corner shows "9:43 AM" and "22-Nov-24".

```
TC
Enter no of rows 10
$
* $
$ * $
* $ * $
$ * $ * $
* $ * $ * $
$ * $ * $ * $
* $ * $ * $ * $
$ * $ * $ * $ * $
* $ * $ * $ * $ * $
$ * $ * $ * $ * $ * $
```

```

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

```

$\frac{n}{4}$

\$

1+1=2

*

2+1=3

\$

2+2=4

\$

*

\$

3+1=4

3+2=5

3+3=6

*

\$

*


\$

```
TC
File Edit Run Compile Project Options Debug
Line 14 Col 1 Insert Indent Tab Fill Unindent * E
#include<stdio.h>
#include<conio.h>
void main()
{
int n,r,c; char ch='A';
clrscr();
printf("Enter no of rows ");
scanf("%d",&n);
for( r=1; r<=n; r++ )
{
for( c=1; c<=r; c++ )
{
if(r==c||c==1||n==r)printf("%2c",'*');
else printf("%2c",ch++);
}
printf("\n");
}
getch();
}
```

F1 Help F5 Zoom F6 Switch F7 Trace F8 Stop F9 Make F10

9:48 AM
22-Nov-24

```
TC
Enter no of rows 5
*
* *
* A *
* B C *
* * * * *
```



```
TC
File Edit Run Compile Project Options Debug
Line 15 Col 18 Insert Indent Tab Fill Unindent * E
#include<stdio.h>
#include<conio.h>
void main()
{
int n,r,c; char ch='A';
clrscr();
printf("Enter no of rows ");
scanf("%d",&n);
for( r=1; r<=n; r++ )
{
for( c=1; c<=r; c++ )
{
if(r==c||c==1||n==r)printf("%2c",'*');
else printf("%2c",ch++);
if(ch>'Z')ch='A';_
}
printf("\n");
}
getch();
}
```

F1 Help F5 Zoom F6 Switch F7 Trace F8 Stop F9 Make F10

9:50 AM
22-Nov-24


```

Enter no of rows 12
*
* *
* 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 *
* * * * * * * * * *

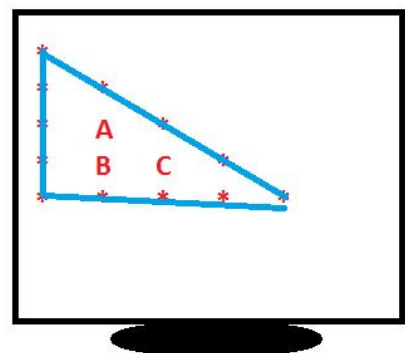
```

```

ch = 'A';
for( r=1; r<=4; r++)
{
for( c=1; c<=r; c++ )
{
if(c==1 || c==r || n==r)p(*); else p( ch++ );
}
p("\n");
}

```

$\frac{n}{4}$



```
TC
File Edit Run Compile Project Options Debug
Line 15 Col 1 Insert Indent Tab Fill Unindent * E
#include<stdio.h>
#include<conio.h>
void main()
{
int n,r,c,e=2,o=1;
clrscr();
printf("Enter no of rows ");
scanf("%d",&n);
for( r=1; r<=n; r++ )
{
for( c=1; c<=r; c++ )
{
if(r%2==0){printf("%3d",e);e+=2;}
else {printf("%3d",o); o+=2;}
}
printf("\n");
}
getch();
}
```

F1 Help F5 Zoom F6 Switch F7 Trace F8 Stop F9 Make F10

Friday, 22 November, 2024 9:55 AM 22-Nov-24

```
TC
Enter no of rows 10
1
2 4
3 5 7
6 8 10 12
9 11 13 15 17
14 16 18 20 22 24
19 21 23 25 27 29 31
26 28 30 32 34 36 38 40
33 35 37 39 41 43 45 47 49
42 44 46 48 50 52 54 56 58 60
```

`e=2; o=1;`

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

`{`

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

`{`

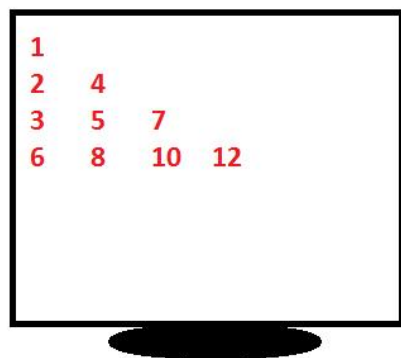
`if(r%2==0) {p(e);e+=2;} else {p(o); o+=2;}`

`}`

`p("\n");`

`}`

$\frac{n}{4}$



```
TC
File Edit Run Compile Project Options Debug
Line 14 Col 20 Insert Indent Tab Fill Unindent * E
#include<stdio.h>
#include<conio.h>
void main()
{
int n,r,c,a=1,b;
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();
}
```

F1 Help F5 Zoom F6 Switch F7 Trace F8 Stop F9 Make F10

10:10 AM
22-Nov-24

```

Enter no of rows 10
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
37 38 39 40 41 42 43 44 45
55 54 53 52 51 50 49 48 47 46

```

$\frac{n}{4}$ $a++$
 1 2 3 4 5 6 7

```

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

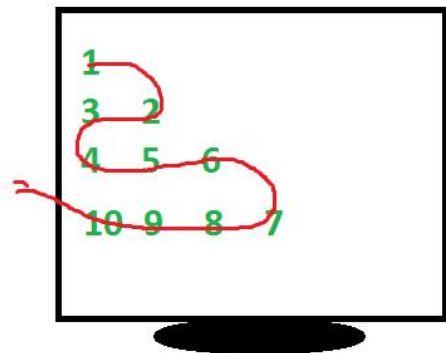
```

$b = \frac{1}{2+2+4-1} =$

1	
3	2
4	5 6

$b = 4+7-1 =$

10	9	8	7
----	---	---	---



```
TC
File Edit Run Compile Project Options Debug
Line 12 Col 20 Insert Indent Tab Fill Unindent * E
#include<stdio.h>
#include<conio.h>
void main()
{
int n,r,c,a,b;
clrscr();
printf("Enter no of rows ");
scanf("%d",&n);
for( r=1; r<=n; r++ )
{
a=n-1; b=a+r;
for( c=1; c<=r; c++)
{
if(c==1)printf("%3d",r); else {printf("%3d",b);a--;b=b+a;}
}
printf("\n");
}
getch();
}
```

F1 Help F5 Zoom F6 Switch F7 Trace F8 Stop F9 Make F10

10:33 AM
22-Nov-24

```

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

```

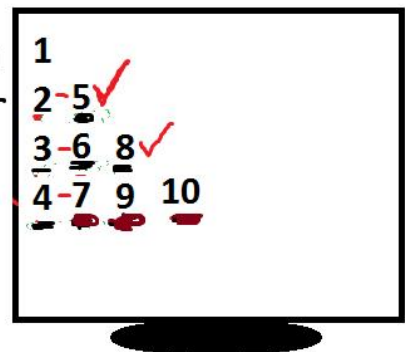
```

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

```

$$\begin{array}{rcl}
 n & a & b \\
 \hline
 4 & 3 & 3+2=5 \\
 & 3 & 3+3=6+2=8 \\
 & 2 & 3+4=7+2=9 \\
 & & 9+1=10
 \end{array}$$

$$\begin{array}{rcl}
 r & a & b \\
 \hline
 4 & 3 & 7 \\
 & 2 & 2+7=9 \\
 & 1 & 1+9=10
 \end{array}$$




```
TC
File Edit Run Compile Project Options Debug
Line 14 Col 1 Insert Indent Tab Fill Unindent * E
#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==r)printf("1 "); else if(r>c)printf("2 ");
else printf("0 ");
}
printf("\n");
}
getch();
}
```

F1 Help F5 Zoom F6 Switch F7 Trace F8 Stop F9 Make F10

10:38 AM
22-Nov-24


```
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
```

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

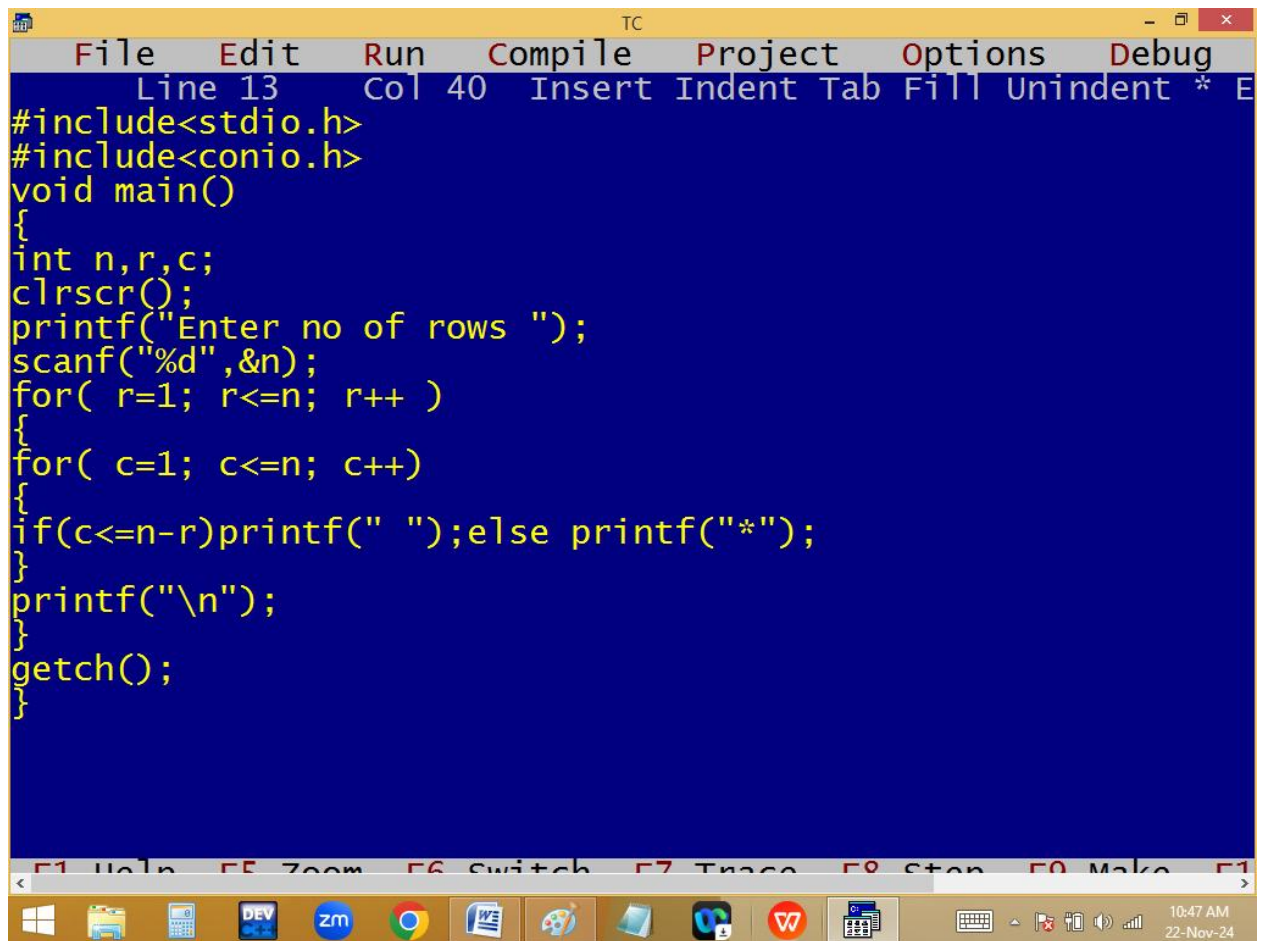
1	0	0
1,1	1,2	1,3
2	1	0
2,1	2,2	2,3
2	2	1
3,1	3,2	3,3

```
TC
File Edit Run Compile Project Options Debug
Line 15 Col 44 Insert Indent Tab Fill Unindent * E
#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==r){textcolor(LIGHTRED);cprintf("1 ");}
else if(r>c){textcolor(YELLOW);cprintf("2 ");}
else {textcolor(LIGHTGREEN);cprintf("0 ");}
}
printf("\n");
}
getch();
}
```

F1 Help F5 Zoom F6 Switch F7 Trace F8 Stop F9 Make F10

10:40 AM
22-Nov-24

```
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
```



The image shows a screenshot of a Turbo C++ (TC) IDE window. The title bar at the top reads "TC". The menu bar includes "File", "Edit", "Run", "Compile", "Project", "Options", and "Debug". Below the menu bar, a status line indicates "Line 13", "Col 40", and lists keyboard shortcuts: "Insert", "Indent", "Tab", "Fill", "Unindent", "*", and "E". The main text area has a blue background and contains the following C code:

```
#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(" ");else printf("*");
        }
        printf("\n");
    }
    getch();
}
```

At the bottom of the window, there is a toolbar with icons for various functions and a status bar. The status bar on the right shows the time "10:47 AM" and the date "22-Nov-24".

```

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

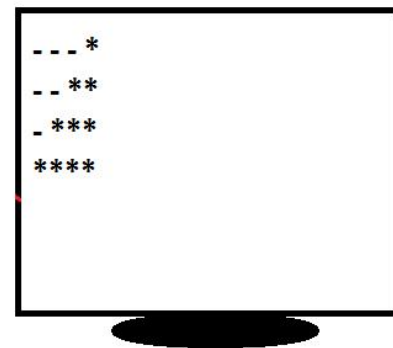
```

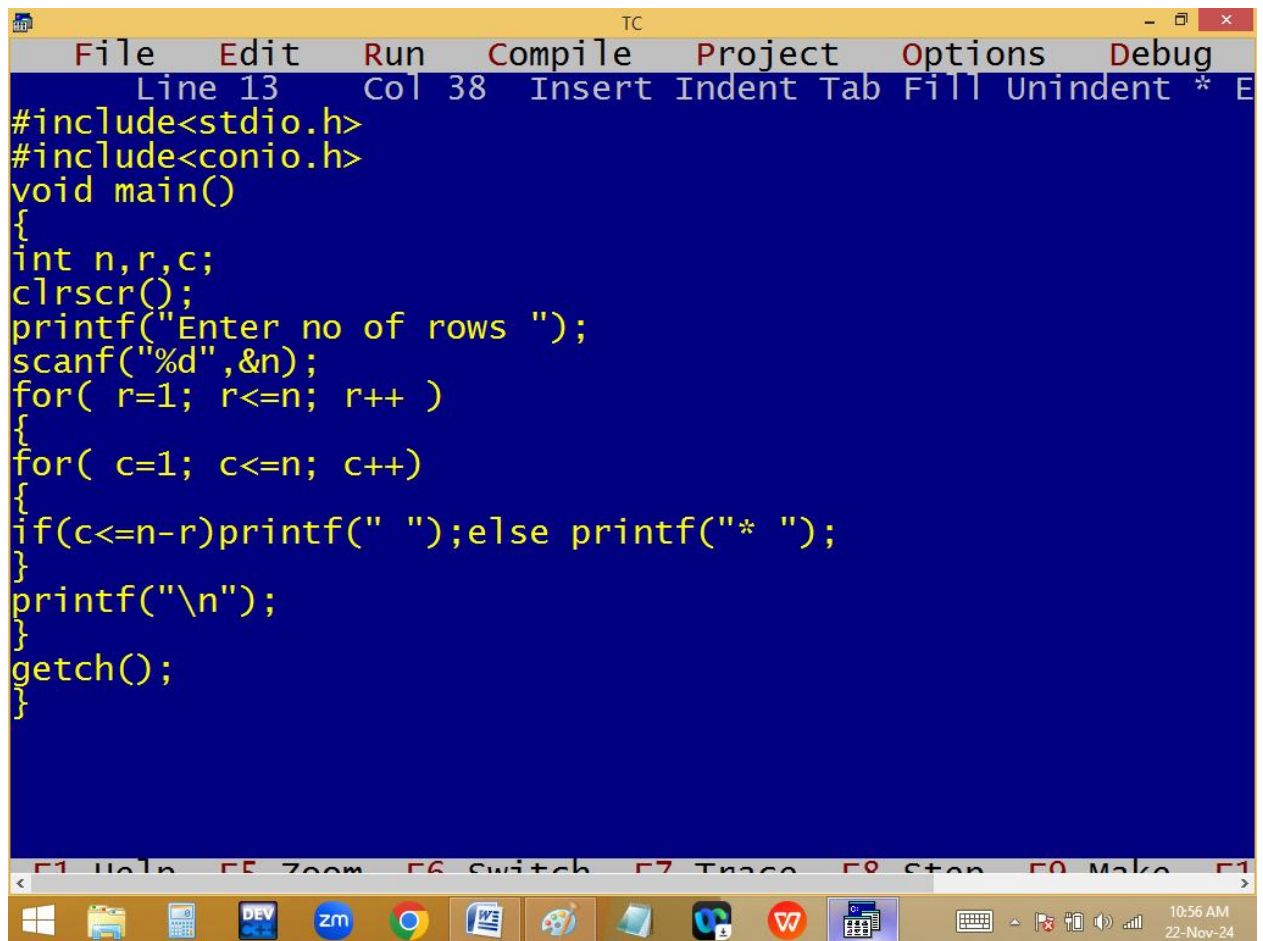
```

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

```

<u>n</u>	<u>i</u>	<u>s</u>	<u>c=1 to i</u>	<u>*</u>
4	1	3	1-1	1
4	2	2	1-2	2
4	3	1	1-3	3
4	4	0	1-4	4

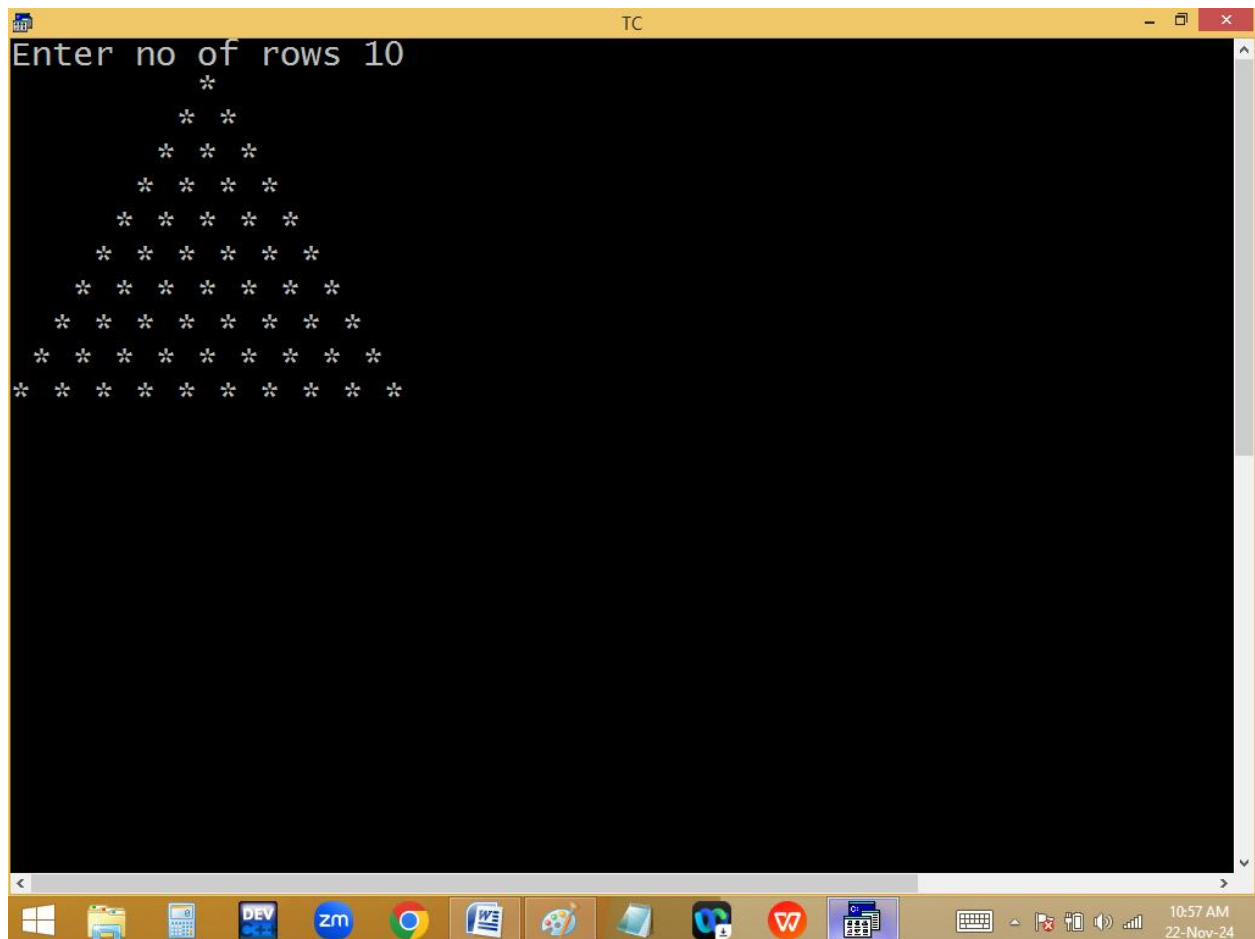




The image shows a screenshot of the Turbo C++ (TC) IDE. The window title is "TC". The menu bar includes File, Edit, Run, Compile, Project, Options, and Debug. The status bar at the top indicates "Line 13 Col 38" and lists keyboard shortcuts: Insert, Indent, Tab, Fill, Unindent, *, and E. The code editor contains the following C program:

```
#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(" ");else printf("* ");
        }
        printf("\n");
    }
    getch();
}
```

Below the code editor, there is a toolbar with function key shortcuts: F1 Help, F5 Zoom, F6 Switch, F7 Trace, F8 Stop, F9 Make, and F10. The Windows taskbar is visible at the bottom, showing various application icons and the system clock displaying 10:56 AM on 22-Nov-24.



```

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

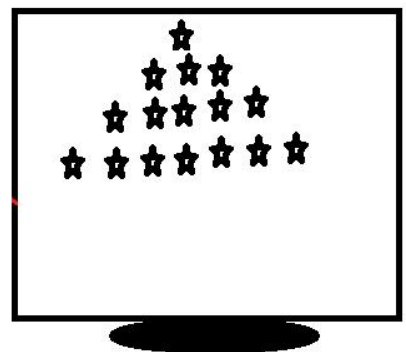
```

<u>n</u>	<u>i</u>	<u>s</u>	<u>c=1 to i</u>	<u>*</u>
4	- 1	= 3	1-1	1
4	- 2	= 2	1-2	2
4	- 3	= 1	1-3	3
4	- 4	= 0	1-4	4


```

      *
     *
    *
   *
  *
 *
*

```



Home work:

