

## Logical operators:

&& - and

|| - or

! – not

&&, || are used to combine two or more expressions in to a single expression.

! operator used for negation. i.e. true becomes false and false become true.

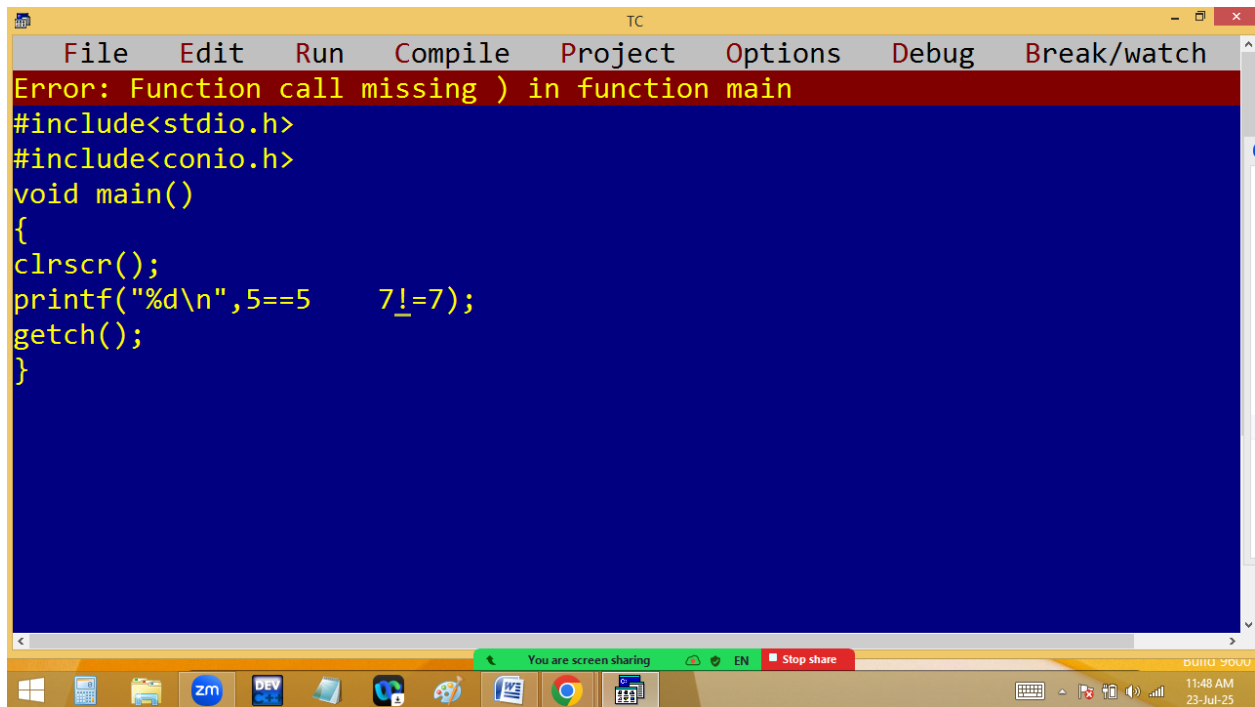
**Note:** In C & C++ other than 0 anything is 1 i.e. true.

## Truth tables:

Operator	Expression1	Expression2	Result
&& - and	1	1	1
	1	0	0
	0	1	0
	0	0	0
- or	1	1	1
	1	0	1
	0	1	1
	0	0	0

!true = false

!false = true



The screenshot shows the Turbo C++ (TC) IDE interface. The menu bar includes File, Edit, Run, Compile, Project, Options, Debug, and Break/watch. A red error message banner at the top reads: "Error: Function call missing ) in function main". The code editor contains the following C code:

```
#include<stdio.h>
#include<conio.h>
void main()
{
clrscr();
printf("%d\n",5==5    7!=7);
getch();
}
```

The Windows taskbar at the bottom shows various icons, including the Start button, taskbar search, and several application icons. A status bar at the bottom right indicates the time as 11:48 AM on 23-Jul-25.

**Note:**

In || operation when left expression is true, then right expression not checked.

In && operation when left expression is false, then right expression not checked.

The screenshot displays the Turbo C++ (TC) IDE. The top window shows the source code of a C program. The code includes `<stdio.h>` and `<conio.h>`, and defines a `main` function. Inside `main`, it calls `clrscr()` to clear the screen, followed by several `printf` statements that output the results of various logical expressions. The expressions involve the `==`, `!=`, `||`, `!`, `&&`, `>=`, and `<=` operators. The bottom window shows the output of the program, which consists of the results of these expressions: 1, 0, 1, 0, 0, 1, 0, 1.

```
TC
File Edit Run Compile Project Options Debug Break/watch
Line 13 Col 21 Insert Indent Tab Fill Unindent * E:11AM.C
#include<stdio.h>
#include<conio.h>
void main()
{
clrscr();
printf("%d\n",5==5 , 7!=7);
printf("%d, %d\n",5==5 , 7!=7);
printf("%d\n",5==5 || 7!=7);
printf("%d\n",5!=5 || 7!=7);
printf("%d\n",5!=5 && 7==7);
printf("%d\n",5>=5 && 7<=7);
printf("%d\n" , !(5>=5) );
printf("%d\n" , !(5!=5) );
getch();
}
```

1  
1, 0  
1  
0  
0  
1  
0  
1

**Note:**

**&& operator got the first priority.**

The image shows a screenshot of a Turbo C++ (TC) IDE. The top window displays a C program with the following code:

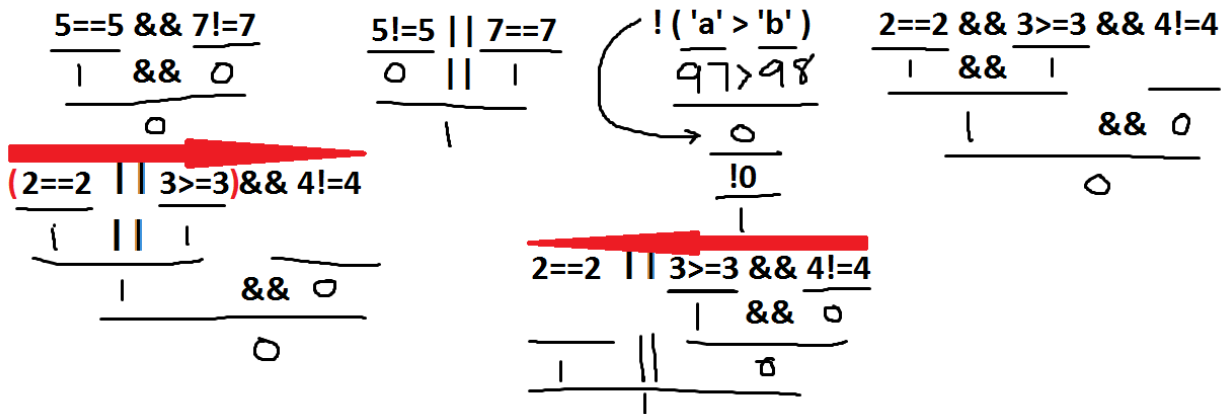
```
File Edit Run Compile Project Options Debug Break/watch
Line 11 Col 29 Insert Indent Tab Fill Unindent * E:11AM.C
#include<stdio.h>
#include<conio.h>
void main()
{
clrscr();
printf("%d\n",5==5 && 7!=7);
printf("%d\n",5!=5 || 7==7);
printf("%d\n",!('a' > 'b' ));
printf("%d\n",2==2 && 3>=3 && 4!=4);
printf("%d\n",2==2 || 3>=3 && 4!=4);
printf("%d\n",(2==2 || 3>=3) && 4!=4);

getch();
}
```

The bottom window shows the output of the program, which consists of seven lines of the number 0, corresponding to the seven printf statements in the code above.

```
0
1
1
0
1
0
0
```

The Windows taskbar at the bottom of the screen shows the time as 12:11 PM on 23-Jul-25. A green notification bar at the top of the taskbar indicates "You are screen sharing" with a "Stop share" button.



```
TC
File Edit Run Compile Project Options Debug Break/watch
Line 11 Col 1 Insert Indent Tab Fill Unindent * E:11AM.C
#include<stdio.h>
#include<conio.h>
void main()
{
clrscr();
printf("%d\n",4 && -4);
printf("%d\n",'a' || 'b');
printf("%d\n", 0 || '0');
printf("%d\n", 5.5 && 9);
printf("%d\n", !5.5 && 9);
getch();
}
```

1  
1  
1  
1  
0

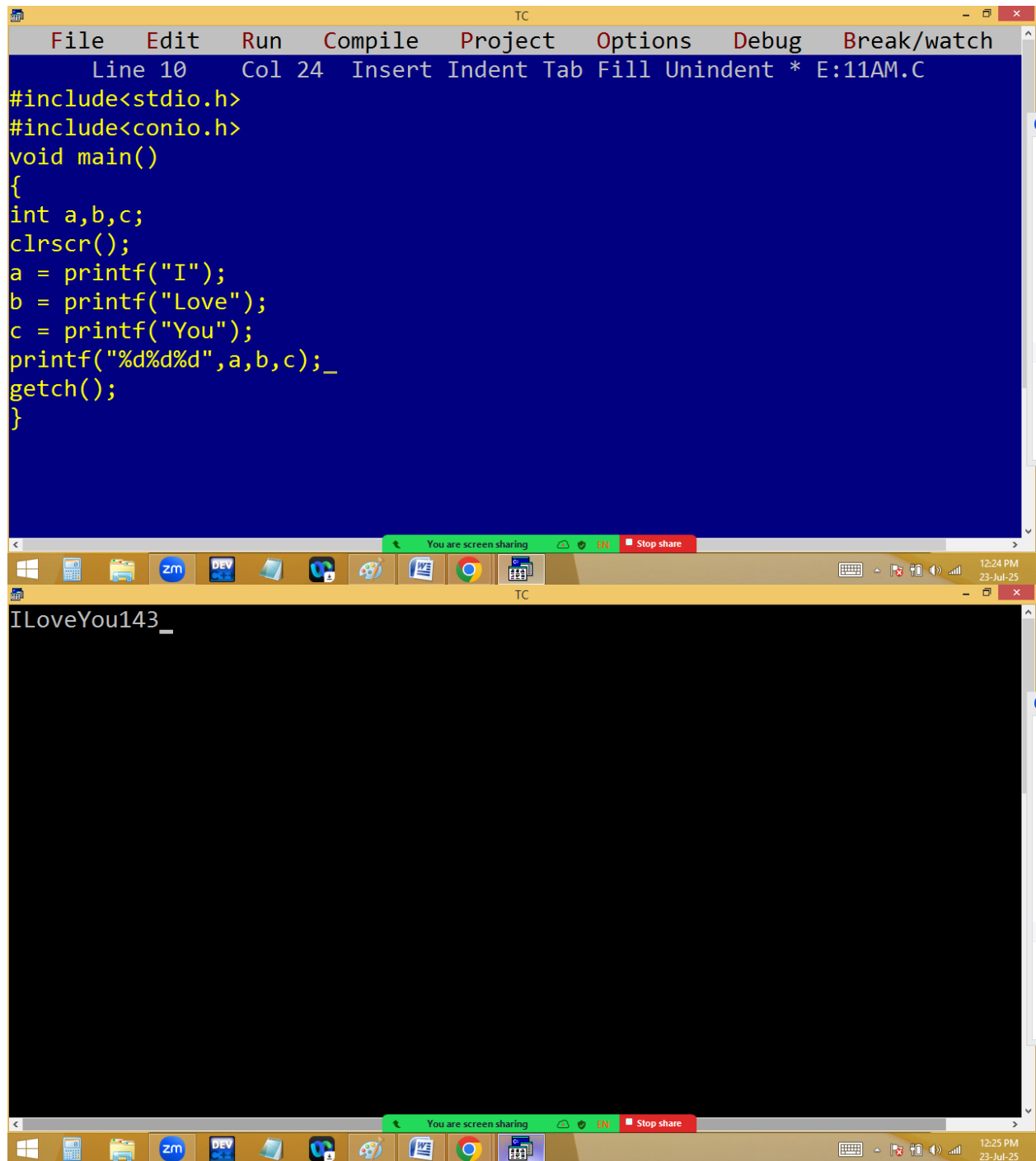
$$\begin{array}{r} 4 \ \&\& \ -4 \\ \hline 1 \ \&\& \ 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 'a' \ || \ 'b' \\ \hline 97 \end{array} \quad \times$$

$$\begin{array}{r} 0 \ || \ '0' \\ \hline 0 \ \ \ 48 \\ 0 \ || \ 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 5.5 \ \&\& \ 9 \\ \hline 1 \ \&\& \ 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} ! \ 5.5 \ \&\& \ 9 \\ \hline 1 \\ \hline !1 \\ \hline 0 \end{array} \quad \times$$



The image shows a screenshot of a Turbo C++ (TC) IDE. The top window displays a C program with the following code:

```
File Edit Run Compile Project Options Debug Break/watch
Line 10 Col 24 Insert Indent Tab Fill Unindent * E:11AM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int a,b,c;
clrscr();
a = printf("I");
b = printf("Love");
c = printf("You");
printf("%d%d%d",a,b,c);_
getch();
}
```

The bottom window shows the output of the program, which is "ILoveYou143\_". The taskbar at the bottom indicates the system time is 12:24 PM on 23-Jul-25. A green status bar at the top of the bottom window reads "You are screen sharing".

**Note:** Printf prints the content and return the no of characters.

The image shows a screenshot of a Turbo C++ (TC) IDE window. The top window displays a C program with the following code:

```
File Edit Run Compile Project Options Debug Break/watch
Line 9 Col 18 Insert Indent Tab Fill Unindent * E:11AM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int a,b,c;
clrscr();
a = printf("I\t");
b = printf("Love\t");
c = printf("You\t");
printf("%d%d%d",a,b,c);
getch();
}
```

The bottom window shows the output of the program, which is a single line of text: "I Love You 254\_". The output is displayed on a black background with white text. The status bar at the bottom of the IDE indicates "You are screen sharing" and "Stop share". The taskbar at the bottom of the screen shows various application icons, including the Windows Start button, File Explorer, and several open applications like Zoom, DEV C++, and Google Chrome. The system clock in the bottom right corner shows the time as 12:27 PM on 23-Jul-25.



The image shows a Zoom screen sharing session. The top window is the Turbo C++ (TC) IDE, and the bottom window is the Zoom interface.

**Turbo C++ IDE Window:**

- Menu bar: File, Edit, Run, Compile, Project, Options, Debug, Break/watch
- Status bar: Line 8, Col 9, Insert, Indent, Tab, Fill, Unindent, \* E:11AM.C
- Code:

```
#include<stdio.h>
#include<conio.h>
void main()
{
int a,b,c;
clrscr();
a = printf("I\t");
b = a + printf("Love\t");
c = a+b*printf("You\t");
printf("%d%d%d",a,b,c);
getch();
}
```

**Zoom Window:**

- Output: I Love You 2730
- Toolbar: Mute, Start Video, Participants (56), Chat, Q&A, New share, Pause Share, Annotate, Slide Control, Apps, More
- Status bar: 12:30 PM, 23-Jul-25

$$a = 2 \checkmark$$

$$b = a + 5 = 7 \checkmark$$

$$c = a + \underline{b} * \underline{\text{You} \backslash t}$$

$$\begin{array}{r} 7 \times 4 \\ \hline 2 + 28 = 30 \checkmark \end{array}$$

The image shows a screenshot of the Turbo C++ (TC) IDE. The top window displays a C program with the following code:

```
File Edit Run Compile Project Options Debug Break/watch
Line 9 Col 6 Insert Indent Tab Fill Unindent * E:11AM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int a=25,b=7,c=20;
clrscr();
a = !printf("I\t");
b = !a + printf("Love\t");
c = !a+b*printf("You\t");
printf("%d%d%d",a,b,c);
getch();
}
```

The bottom window shows the output of the program:

```
I Love You 0625
```

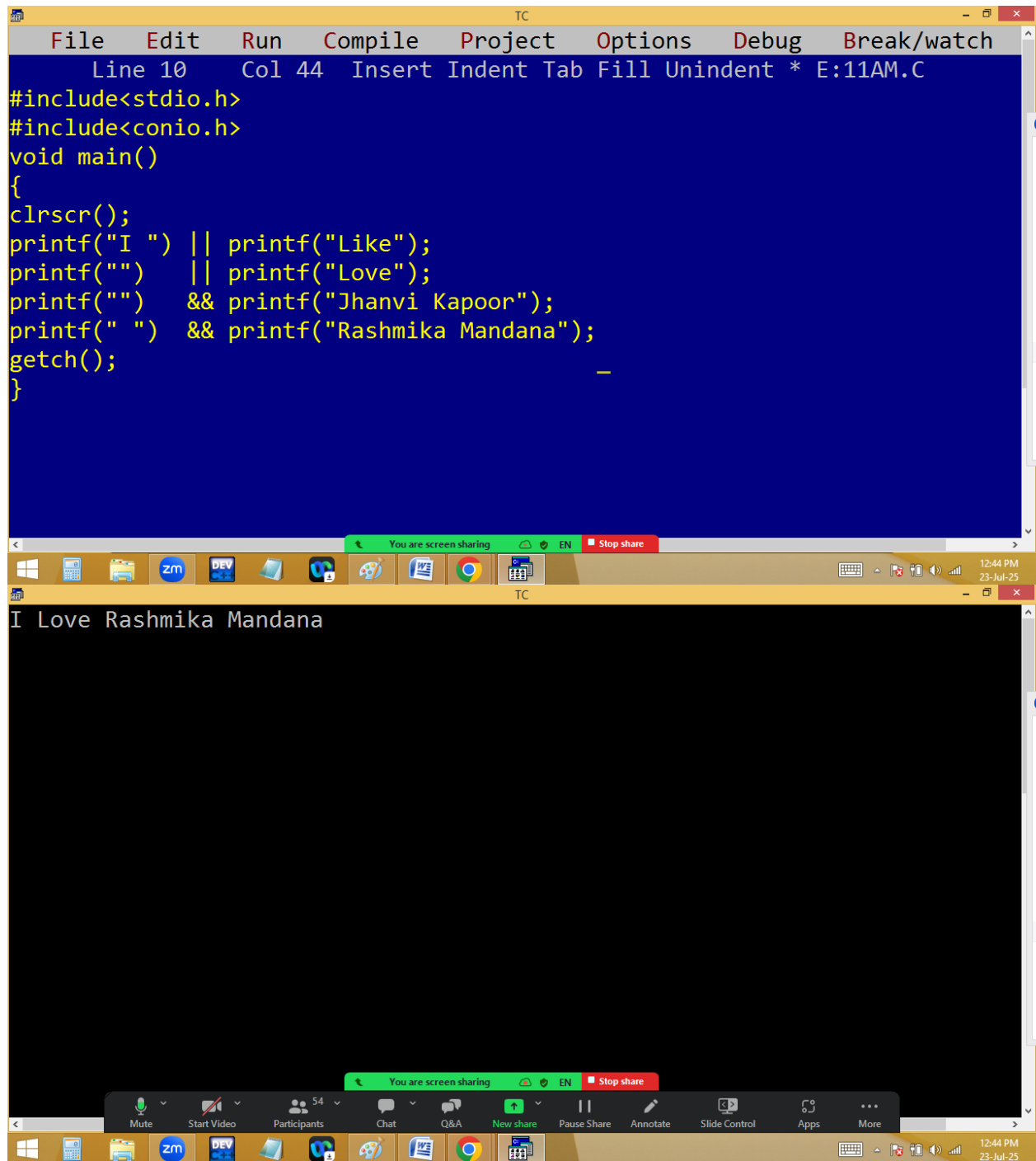
The Windows taskbar at the bottom includes icons for various applications and the system clock, which shows 12:33 PM on 23-Jul-25. A green notification bar at the top of the taskbar indicates "You are screen sharing".

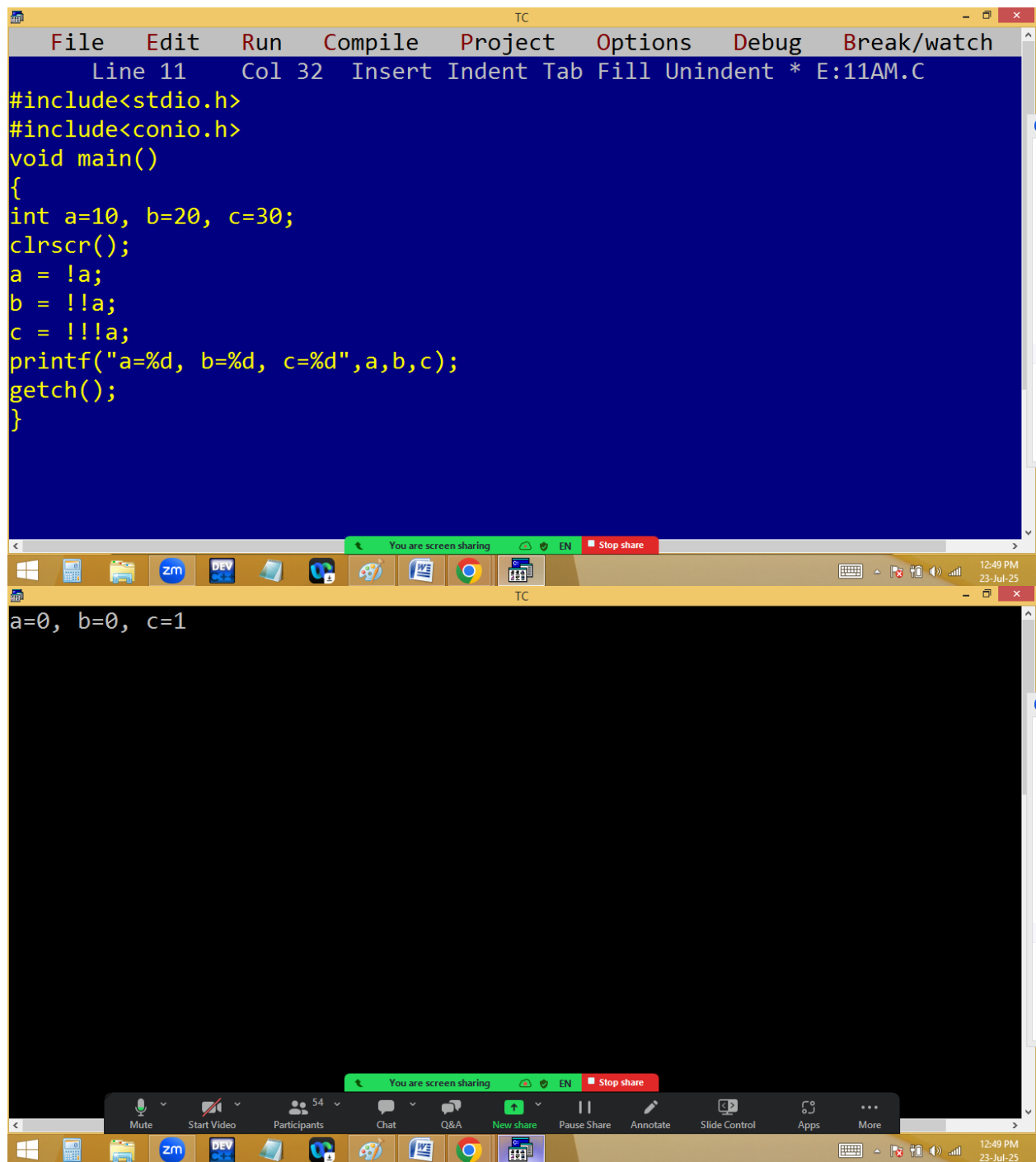
$a = !p("I\t"); \implies !2 = 0$  ✓

$b = !a + p("Love\t");$   
 $1 + 5 = 6$  ✓ ✓

$c = !a + b * p("You\t");$   
 $1 + \frac{6 \times 4}{24} = 25$  ✓ ✓

$\frac{a}{25}$   
 $0$  ✓





~~a=10~~ ✓ ~~b=20~~ ✓ ~~c=30~~ ✓

$a = !a \Rightarrow !10 \Rightarrow 0$

$b = !!!a;$   
0

$c = !!!a;$   
0

