

Logical operators:

1. **&&** - logical and
2. **||** - logical or
3. **!** – logical not

&& , **||** used to combine two or more expressions.

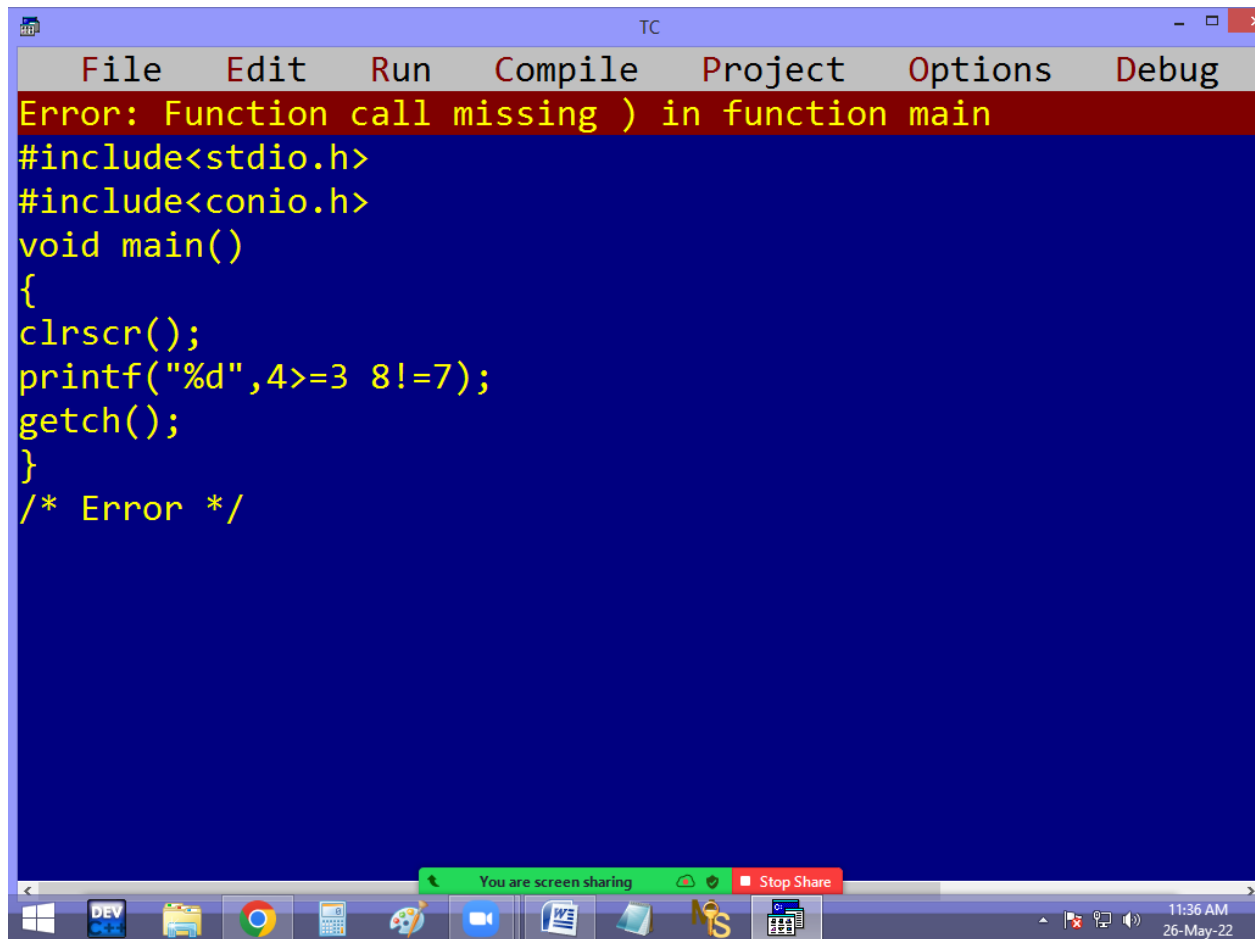
! operator for negation. i.e. true become false and false become true.

Operator	Expression1	Expression2	Result
&&	1	1	1
	1	0	0
	0	1	0
	0	0	0
	1	1	1
	1	0	1
	0	1	1
	0	0	0

!true = false

!false = true

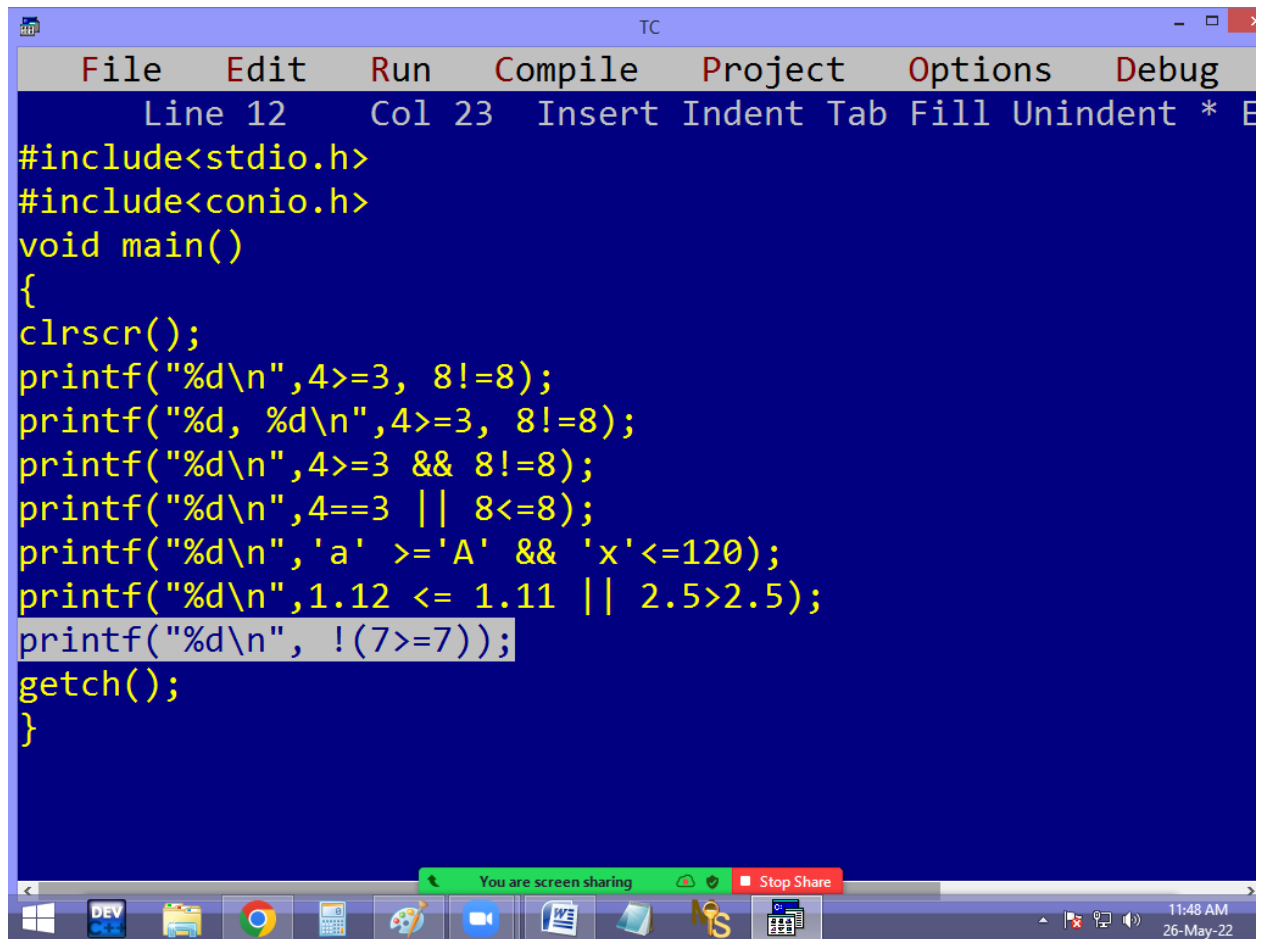
Note: In C compiler other than 0 anything is 1 i.e. true.



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". A red error message banner at the top of the editor area states: "Error: Function call missing) in function main". The code in the editor is as follows:

```
#include<stdio.h>
#include<conio.h>
void main()
{
clrscr();
printf("%d",4>=3 8!=7);
getch();
}
/* Error */
```

At the bottom of the screen, there is a Windows taskbar with various application icons. A green notification bar above the taskbar says "You are screen sharing" with a "Stop Share" button. The system clock in the bottom right corner shows "11:36 AM" and "26-May-22".



```
TC
File Edit Run Compile Project Options Debug
Line 12 Col 23 Insert Indent Tab Fill Unindent * E
#include<stdio.h>
#include<conio.h>
void main()
{
clrscr();
printf("%d\n",4>=3, 8!=8);
printf("%d, %d\n",4>=3, 8!=8);
printf("%d\n",4>=3 && 8!=8);
printf("%d\n",4==3 || 8<=8);
printf("%d\n",'a' >='A' && 'x'<=120);
printf("%d\n",1.12 <= 1.11 || 2.5>2.5);
printf("%d\n", !(7>=7));
getch();
}
```

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11:48 AM
26-May-22

```

TC
1
1, 0
0
1
1
0
0
0

```

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$$\begin{array}{r} 4 >= 3 \quad \&\& \quad 8 != 8 \\ 1 \quad \&\& \quad 0 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 4 == 3 \quad || \quad 8 <= 8 \\ 0 \quad || \quad 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 'a' > 'A' \quad \&\& \quad 'x' == 120 \\ 97 > 65 \quad 120 == 120 \\ 1 \quad \&\& \quad 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 1.12 < 1.11 \quad || \quad 2.5 > 2.5 \\ 0 \quad || \quad 0 \\ \hline 0 \end{array}$$

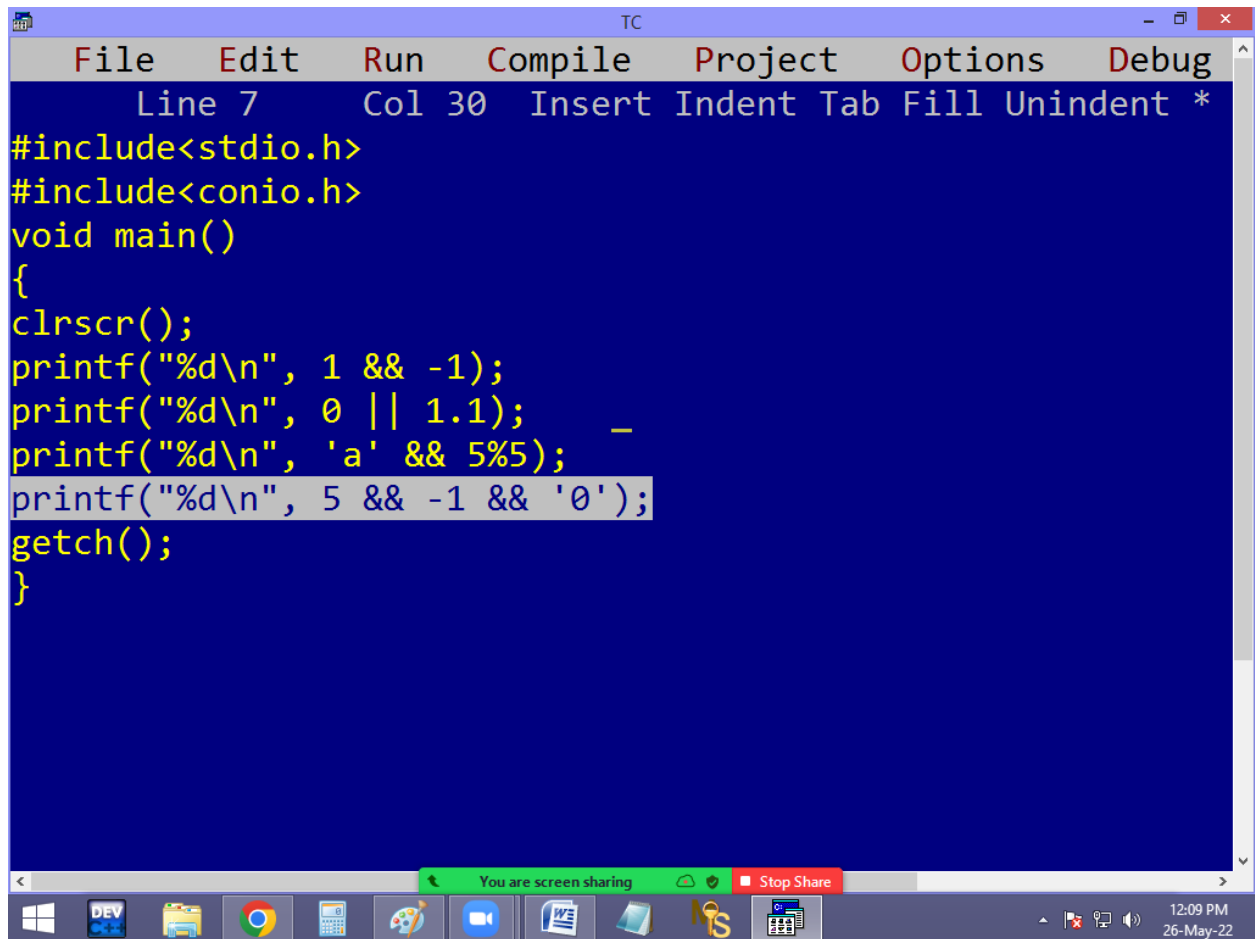
$$\begin{array}{r} !(7 >= 7) \\ 1 \\ \hline 0 \end{array}$$

```
TC
File Edit Run Compile Project Options Debug
Line 10 Col 25 Insert Indent Tab Fill Unindent *
#include<stdio.h>
#include<conio.h>
void main()
{
clrscr();
printf("%d\n", 5>=5 && 6!=4 && -9 <= -1);
printf("%d\n", 5>=5 || 6!=4 && -9 >= -1);
printf("%d\n", (5>=5 || 6!=4) && -9 >= -1);
printf("%d\n", 5 > 4 > 3);
printf("%d\n", 5 > 4 > 0);
getch();
}
```

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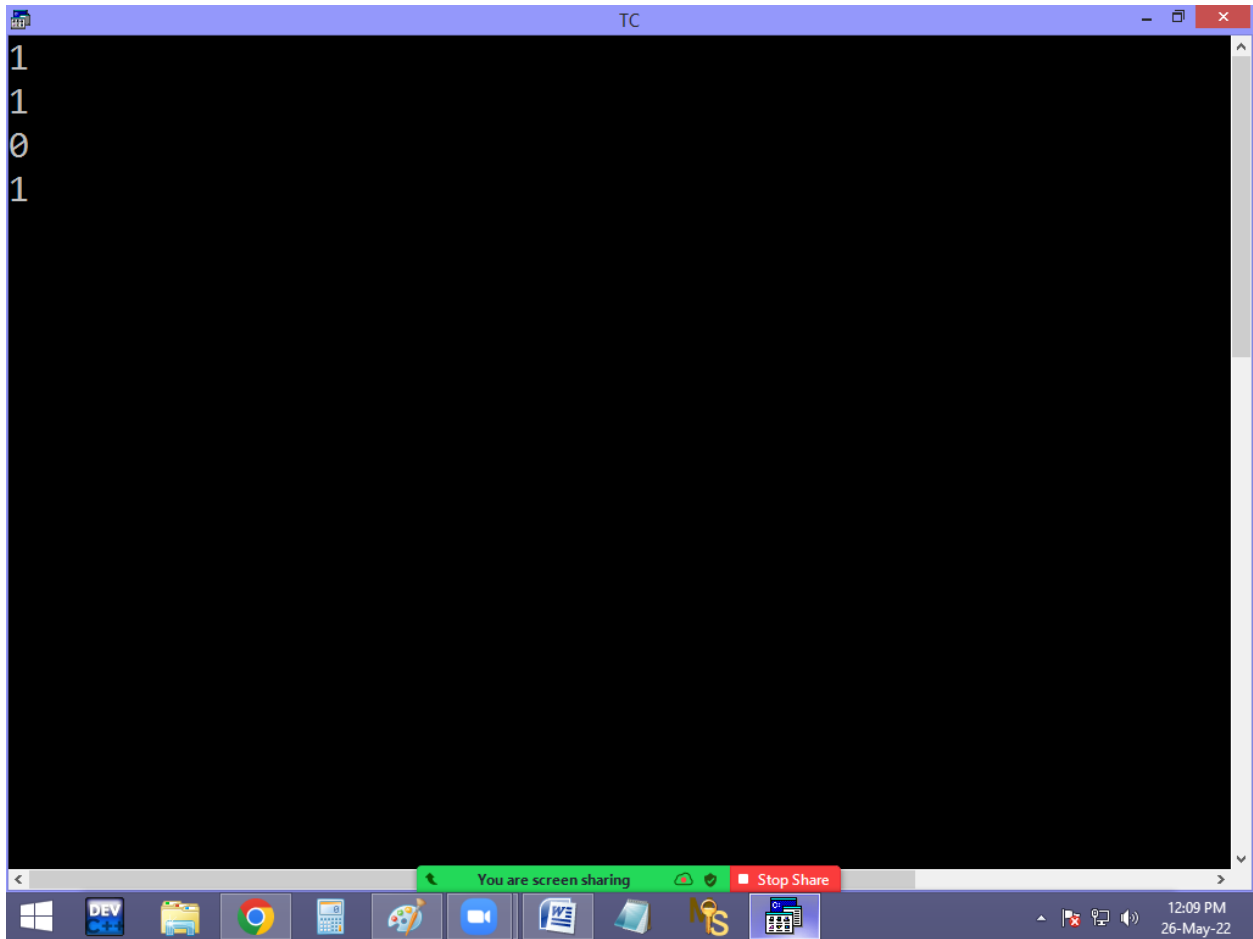
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```
TC
File Edit Run Compile Project Options Debug
Line 7 Col 30 Insert Indent Tab Fill Unindent *
#include<stdio.h>
#include<conio.h>
void main()
{
clrscr();
printf("%d\n", 1 && -1);
printf("%d\n", 0 || 1.1);
printf("%d\n", 'a' && 5%5);
printf("%d\n", 5 && -1 && '0');
getch();
}
```

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$$\begin{array}{r}
 \downarrow \quad 88 \quad -1 \\
 \hline
 1 \quad 88 \quad 1 \\
 \hline
 1
 \end{array}$$

$$\begin{array}{r}
 0 \quad || \quad 1.1 \\
 \hline
 0 \quad || \quad 1 \\
 \hline
 1
 \end{array}$$

$$\begin{array}{r}
 'a' \quad 88 \quad 57.5 \\
 \hline
 97 \\
 \hline
 1 \quad 88 \quad 0 \\
 \hline
 0
 \end{array}$$

$$\begin{array}{r}
 588 - 188 '0' \\
 \hline
 1 \quad 88 \quad 1 \quad \quad \quad 48 \\
 \hline
 1 \quad 88 \quad 1 \\
 \hline
 1
 \end{array}$$

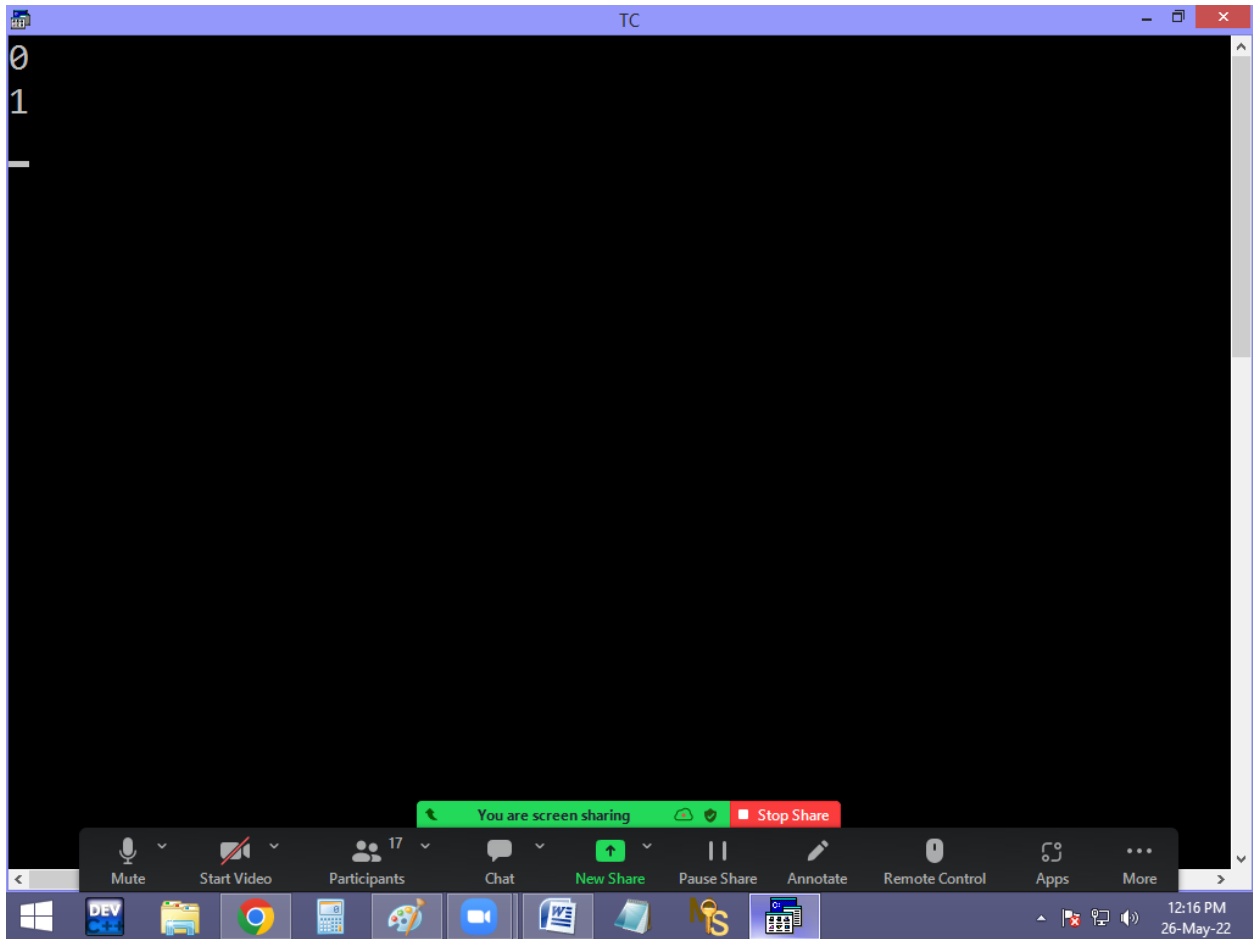


```
TC
File Edit Run Compile Project Options Debug
Line 7 Col 23 Insert Indent Tab Fill Unindent *
#include<stdio.h>
#include<conio.h>
void main()
{
clrscr();
printf("%d\\n", 5>=1 && !5 && !0);
printf("%d\\n", !(5>=1));
getch();
}
```

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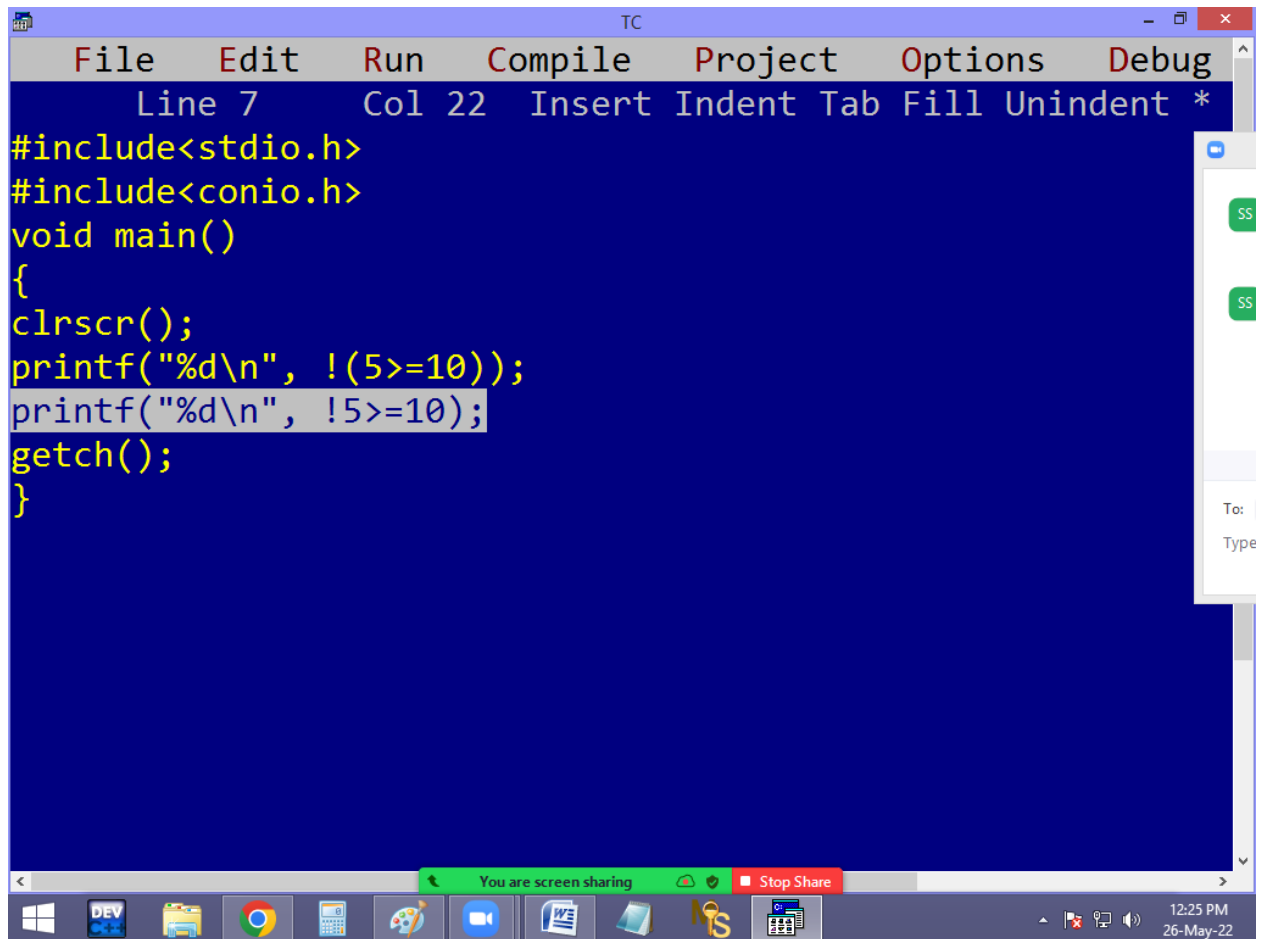
12:15 PM 26-May-22



$$\begin{array}{r}
 5 \geq 1 \ \&\& \ 5 \ \&\& \ 0 \\
 \hline
 1 \ \&\& \ 0 \\
 \hline
 0 \ \&\& \ 1 \\
 \hline
 0
 \end{array}$$

~~$$\begin{array}{r}
 \cancel{!(5 \geq 1)} \\
 \hline
 \cancel{1} \\
 \hline
 \cancel{!1} \\
 \hline
 \cancel{0} \\
 \hline
 \cancel{0} \\
 \hline
 \cancel{1}
 \end{array}$$~~

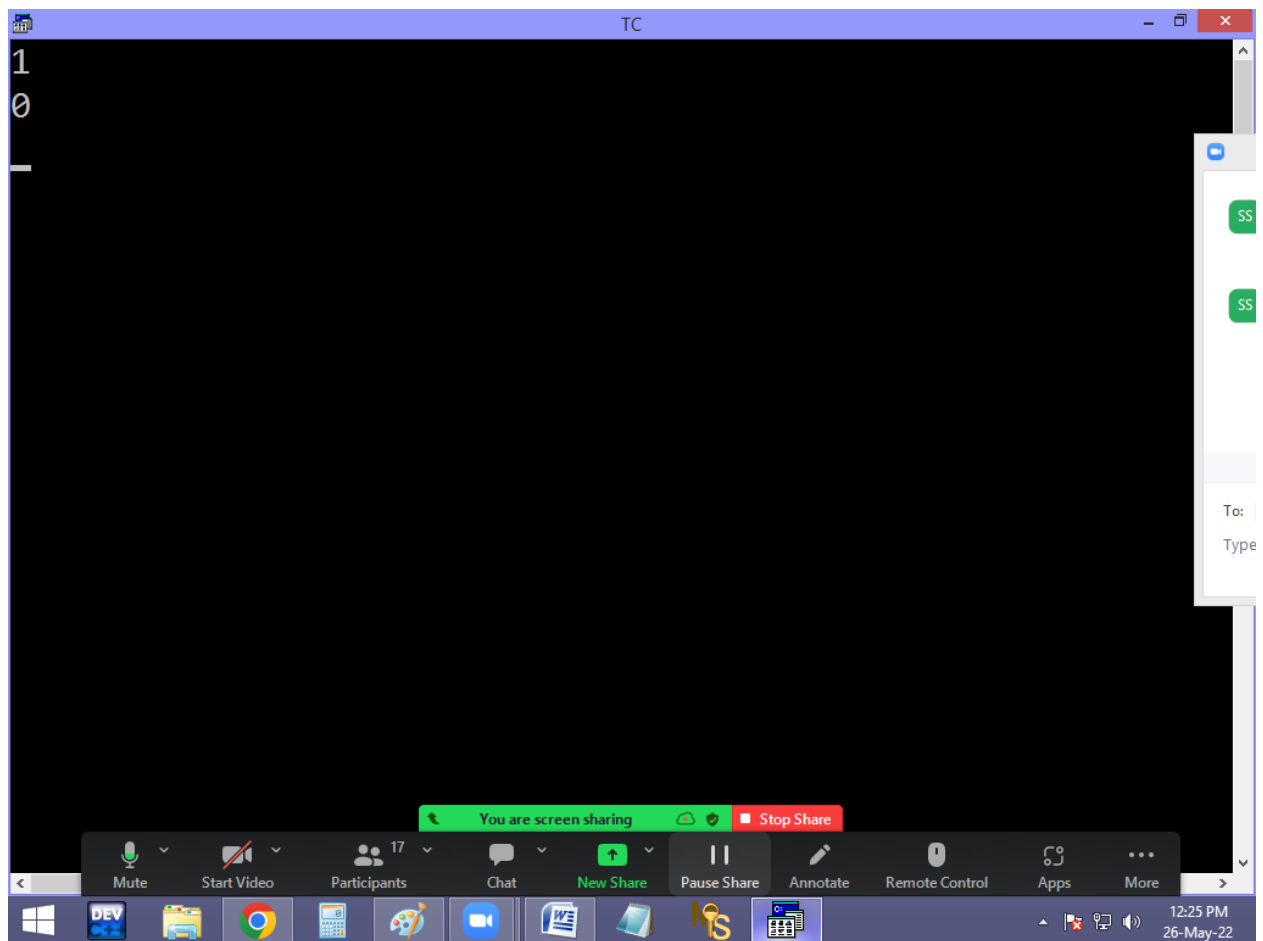
$$\begin{array}{r}
 !(5 \geq 1) \\
 \hline
 0 \geq 1 \\
 \hline
 0 \\
 \hline
 0 \\
 \hline
 1
 \end{array}$$



```
TC
File Edit Run Compile Project Options Debug
Line 7 Col 22 Insert Indent Tab Fill Unindent *
#include<stdio.h>
#include<conio.h>
void main()
{
clrscr();
printf("%d\n", !(5>=10));
printf("%d\n", !5>=10);
getch();
}
```

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12:25 PM
26-May-22



$$\begin{array}{r} \text{!(5} \geq 10) \\ \hline 0 \\ \hline 10 \\ \hline 1 \end{array}$$
$$\begin{array}{r} \text{!5} \geq 10 \\ \hline 0 \geq 10 \\ \hline 0 \end{array}$$

Compound assignment / short hand operators: Here we are using assignment operator with the combination of other operators as follows.

`+=, -=, *=, %/, /=, ~=, <<=, >>=,`

Eg. 1

```
int a=10;
```

```
a+=25;
```

i.e. $a = a + 25 \rightarrow a=35$

Eg. 2

```
Int b=100;
```

```
b*=2;
```

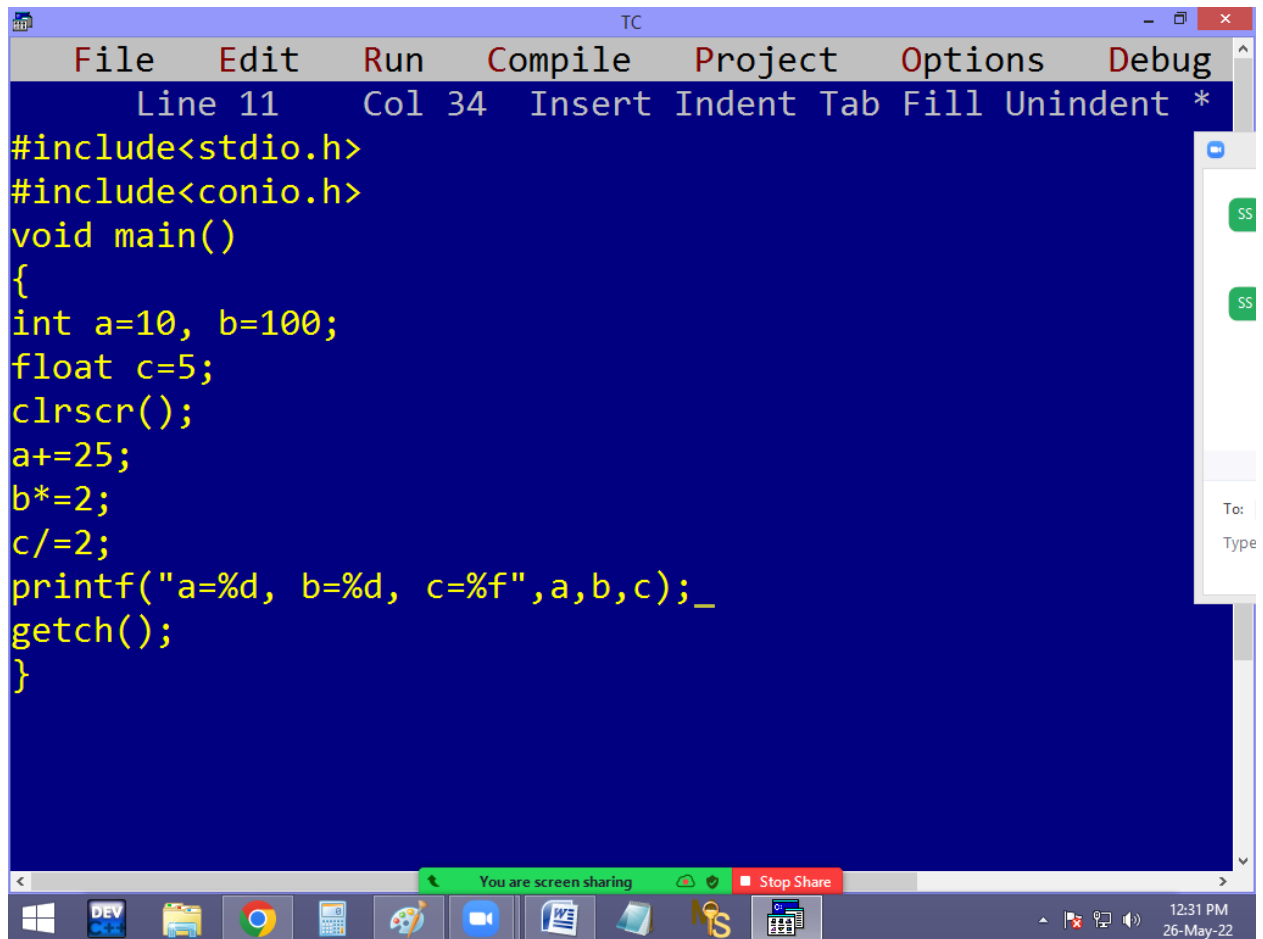
i.e. $b = b * 2 \rightarrow b=200$

Eg. 3

```
Float c=5;
```

```
c/=2;
```

i.e. $c=c/2 \rightarrow c=2.500000$

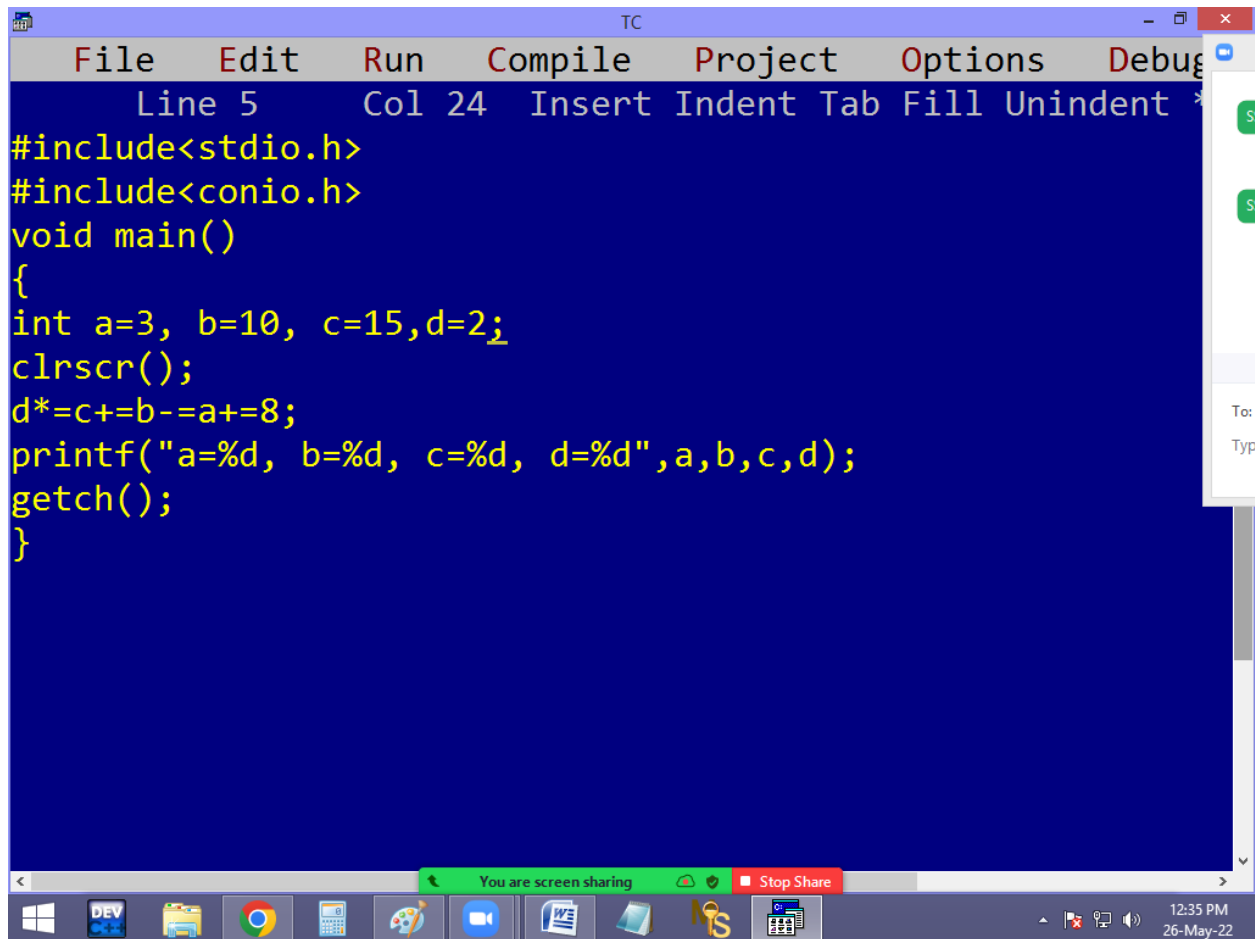


```
File Edit Run Compile Project Options Debug
Line 11 Col 34 Insert Indent Tab Fill Unindent *
#include<stdio.h>
#include<conio.h>
void main()
{
int a=10, b=100;
float c=5;
clrscr();
a+=25;
b*=2;
c/=2;
printf("a=%d, b=%d, c=%f",a,b,c);_
getch();
}
```

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12:31 PM
26-May-22

The screenshot shows a Windows 10 desktop environment. A text editor window titled "TC" is open, displaying the code `a=35, b=200, c=2.500000_`. A green status bar at the bottom of the window indicates "You are screen sharing" with a "Stop Share" button. The Windows taskbar at the bottom contains icons for the Start menu, DEV, File Explorer, Chrome, Calculator, Paint, Teams, Word, PowerPoint, and Excel. The system tray in the bottom right corner shows the time as 12:31 PM on 26-May-22.



```
TC
File Edit Run Compile Project Options Debug
Line 5 Col 24 Insert Indent Tab Fill Unindent
#include<stdio.h>
#include<conio.h>
void main()
{
int a=3, b=10, c=15,d=2;
clrscr();
d*=c+=b-=a+=8;
printf("a=%d, b=%d, c=%d, d=%d",a,b,c,d);
getch();
}
```

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12:35 PM 26-May-22

```
TC
a=11, b=-1, c=14, d=28
```

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12:35 PM
26-May-22

a=3 b=10 c=15 d=2

d*=c+=b-=a+=8;

1. $a+=8$ i.e. $a=a+8 \Rightarrow a=11$ ✓
2. $b-=a$ i.e. $b=b-a \Rightarrow 10-11=-1$ ✓
3. $c+=b \Rightarrow c=c+b \Rightarrow 15+-1=14$ ✓
4. $d*=c \Rightarrow d=d*c \Rightarrow 2 * 14 = 28$ ✓