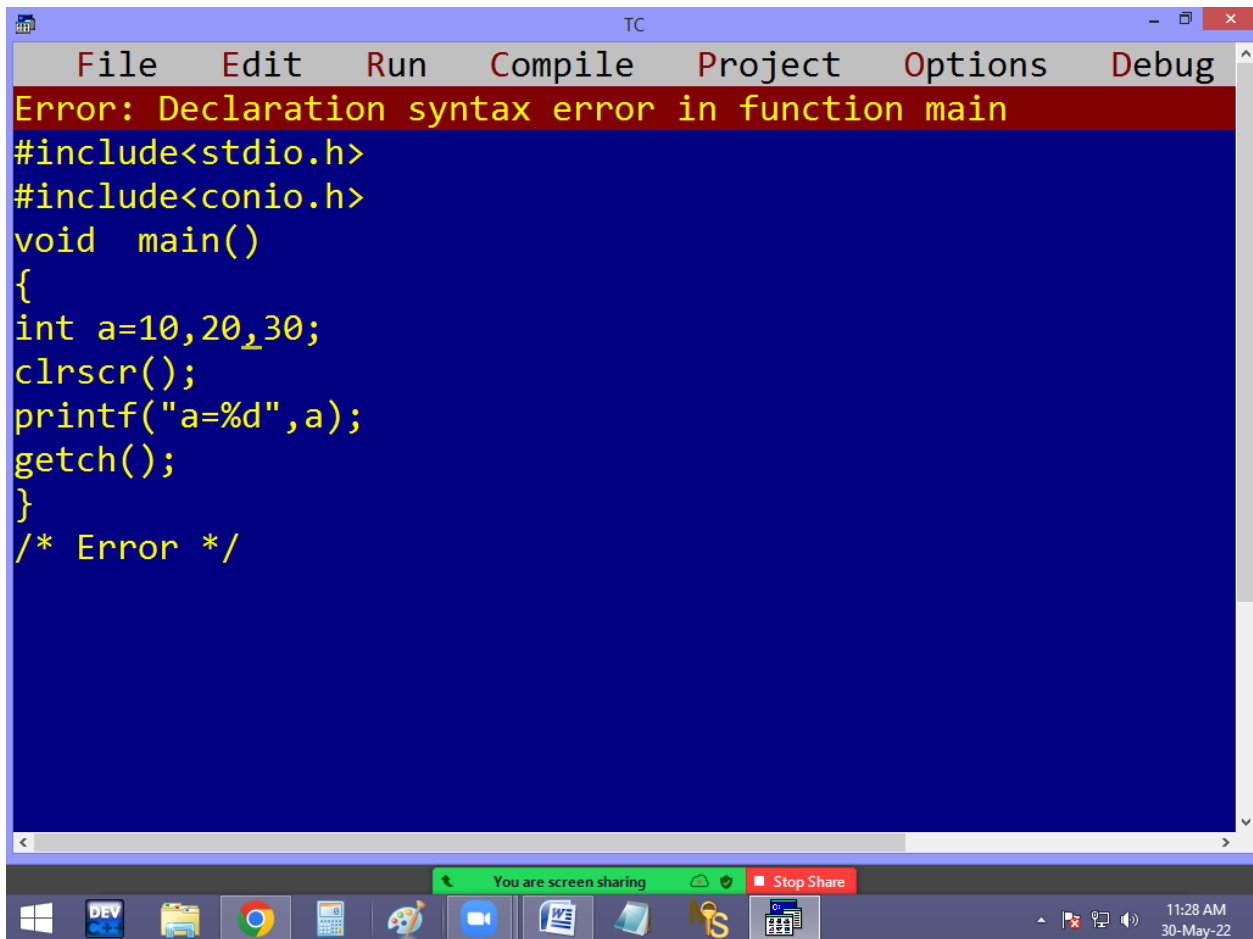


() and , separators:



The image shows a screenshot of the Turbo C++ (TC) IDE. 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 code editor states: "Error: Declaration syntax error in function main". The code in the editor is as follows:

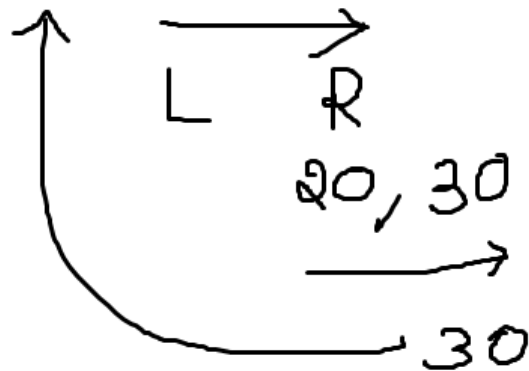
```
#include<stdio.h>
#include<conio.h>
void main()
{
int a=10,20,30;
clrscr();
printf("a=%d",a);
getch();
}
/* Error */
```

The code contains a syntax error in the function declaration of `main()`. The variable `a` is declared inside the function body, which is not allowed in standard C. The error message points to this declaration. At the bottom of the code, there is a comment `/* Error */`.

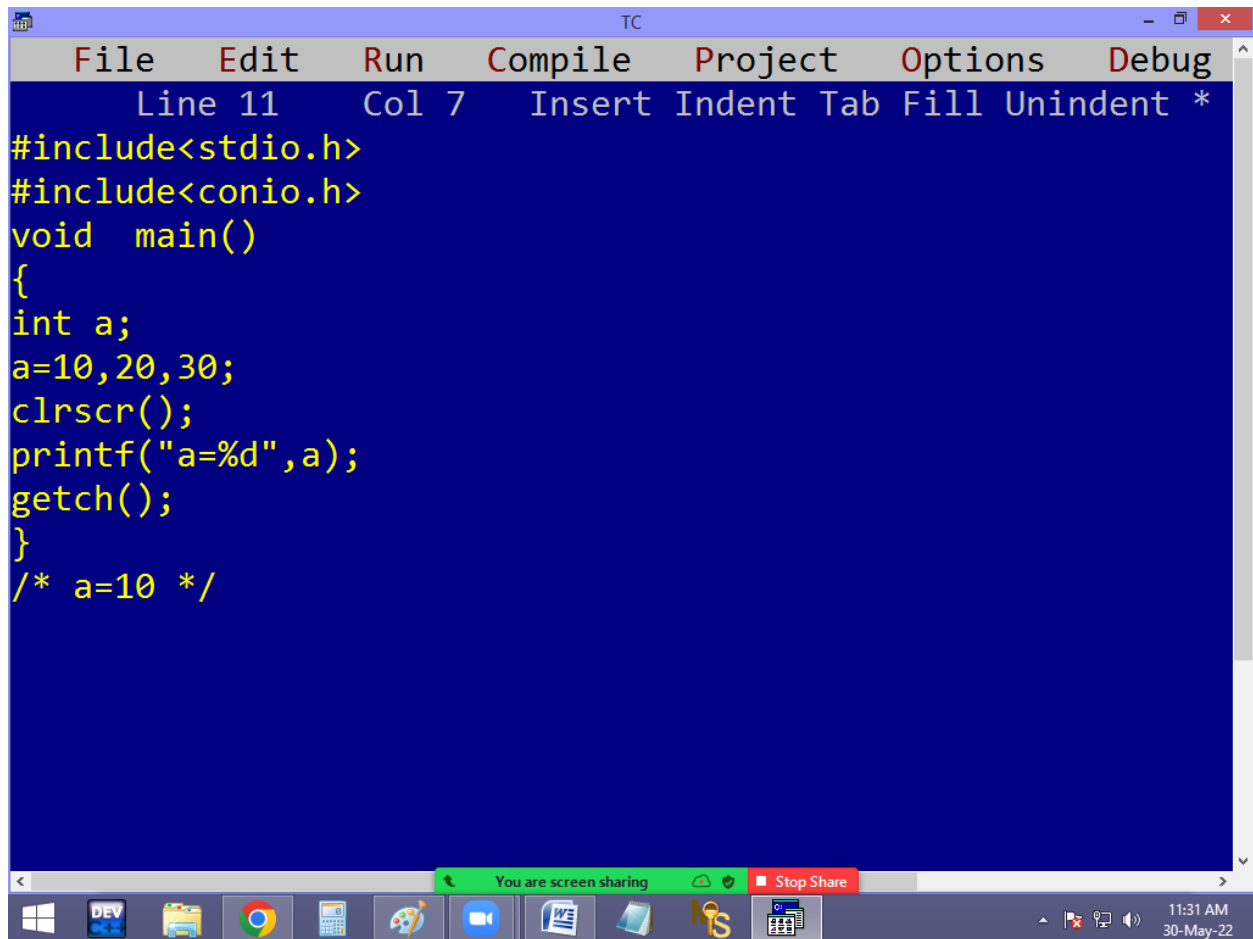
The Windows taskbar is visible at the bottom, showing a green notification bar that says "You are screen sharing" with a "Stop Share" button. The taskbar includes icons for Windows, DEV, File Explorer, Google Chrome, Calculator, Paint, Zoom, Word, and a folder icon. The system clock in the bottom right corner shows "11:28 AM" and "30-May-22".

```
TC
File Edit Run Compile Project Options Debug
Line 10 Col 8 Insert Indent Tab Fill Unindent *
#include<stdio.h>
#include<conio.h>
void main()
{
int a=(10,20,30);
clrscr();
printf("a=%d",a);
getch();
}
/* a=30_*/
```

int a= (10, 20, 30);




~~a=10;~~ ✓
~~a=20;~~ ✓
a=30; ✓
p(a);



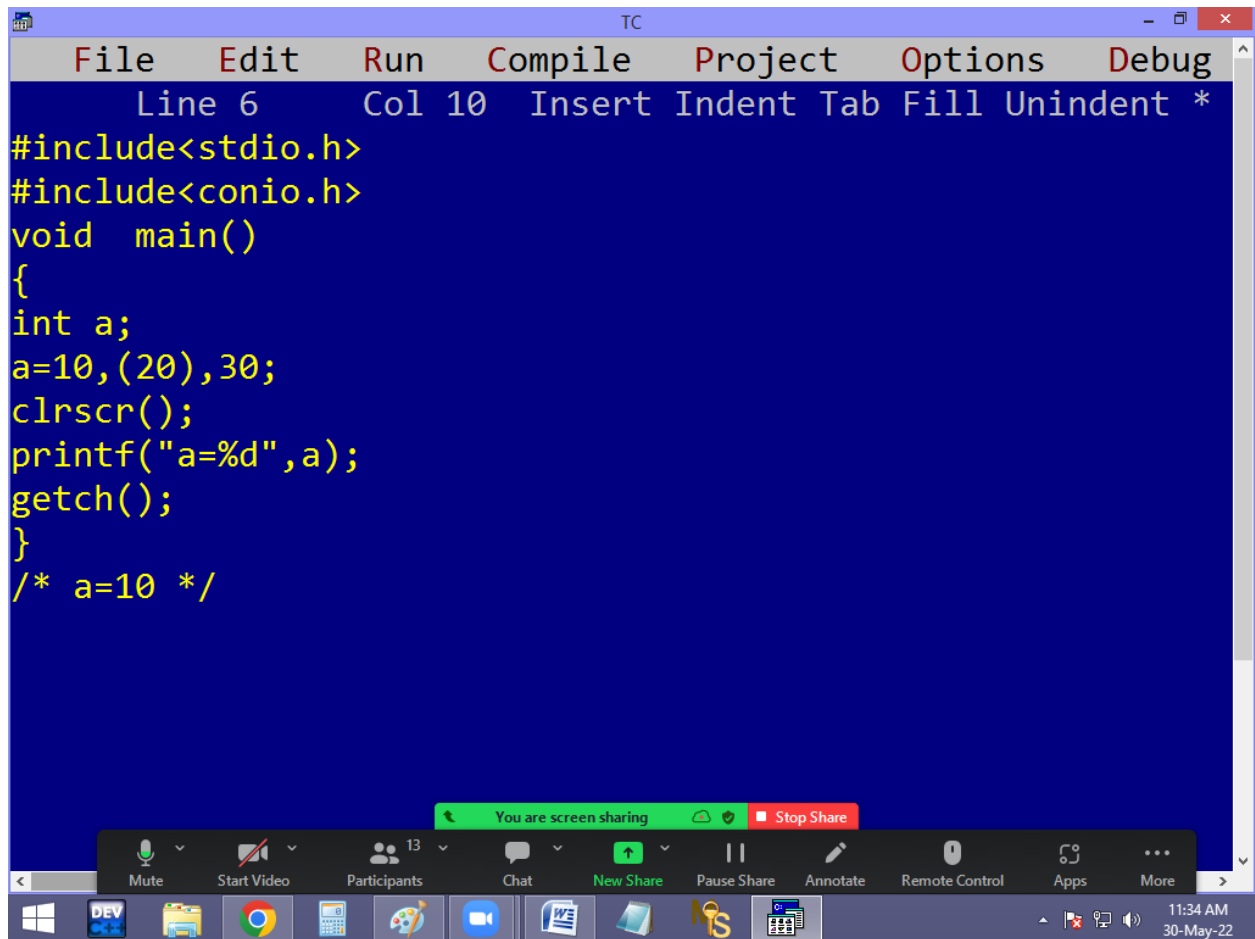
```
TC
File Edit Run Compile Project Options Debug
Line 11 Col 7 Insert Indent Tab Fill Unindent *
#include<stdio.h>
#include<conio.h>
void main()
{
int a;
a=10,20,30;
clrscr();
printf("a=%d",a);
getch();
}
/* a=10 */
```

You are screen sharing Stop Share

11:31 AM 30-May-22


a = 10, 20, 30;

Note: Here = have more priority than , operator.



The screenshot shows a Turbo C++ IDE window titled "TC". The menu bar includes File, Edit, Run, Compile, Project, Options, and Debug. The status bar at the top indicates "Line 6 Col 10 Insert Indent Tab Fill Unindent *". The code in the editor is as follows:

```
#include<stdio.h>
#include<conio.h>
void main()
{
int a;
a=10,(20),30;
clrscr();
printf("a=%d",a);
getch();
}
/* a=10 */
```

At the bottom of the IDE window, there is a green status bar that says "You are screen sharing" and a red "Stop Share" button. Below the IDE window is a Windows taskbar with various application icons and a system tray showing the time as 11:34 AM on 30-May-22.

a = 10 , (20), 30;

a = 10, 20, 30;



```
TC
File Edit Run Compile Project Options Debug
Line 11 Col 7 Insert Indent Tab Fill Unindent *
#include<stdio.h>
#include<conio.h>
void main()
{
int a;
a=(10,20),30;
clrscr();
printf("a=%d",a);
getch();
}
/* a=20 */
```

You are screen sharing Stop Share

11:34 AM 30-May-22

a = (10, 20), 30;

→
a = 20, 30
←

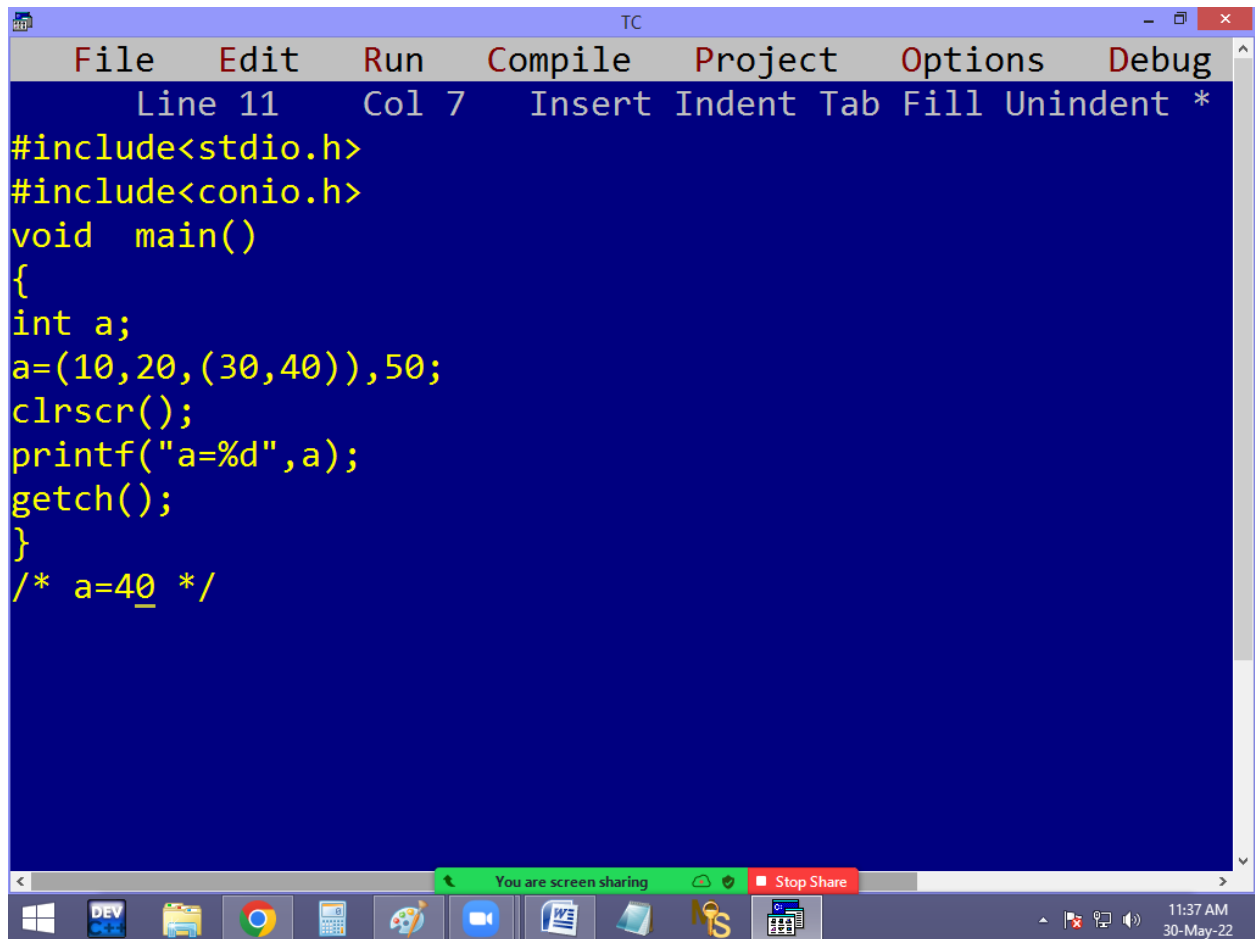
```
TC
File Edit Run Compile Project Options Debug
Line 6 Col 21 Insert Indent Tab Fill Unindent *
#include<stdio.h>
#include<conio.h>
void main()
{
int a;
a=(10,20),(30,40),50;
clrscr();
printf("a=%d",a);
getch();
}
/* a=20 */
```

a = (10,20), (30,40), 50;



20, (30,40), 50;

a = 20, 40, 50;



```
TC
File Edit Run Compile Project Options Debug
Line 11 Col 7 Insert Indent Tab Fill Unindent *
#include<stdio.h>
#include<conio.h>
void main()
{
int a;
a=(10,20,(30,40)),50;
clrscr();
printf("a=%d",a);
getch();
}
/* a=40 */

You are screen sharing Stop Share
11:37 AM
30-May-22
```


`a=(10,20,(30,40),50;`
→
(10, 20, 40), 50
→
20, 40
→
a = 40, 50

sizeof(): It returns the no of bytes taken by a variable / data type / value.

30-5 - Microsoft Word

TC

File Edit Run Compile Project Options Debug Break/watch

Line 3 Col 12 Insert Indent Tab Fill Unindent * E:NONAME.C

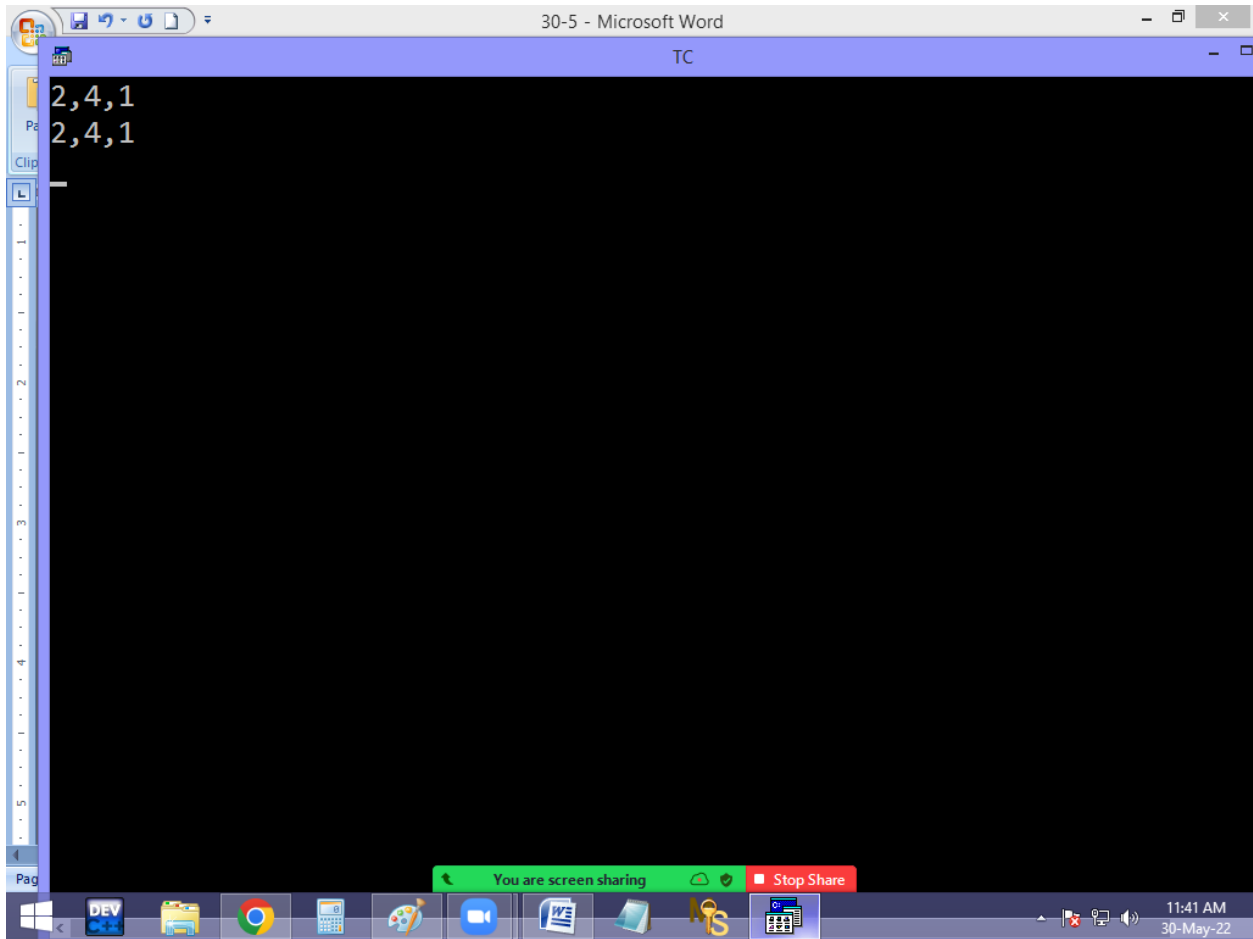
```
#include<stdio.h>
#include<conio.h>
void main()
{
int a; float b; char c;
clrscr();
printf("%d,%d,%d\n",sizeof(a),sizeof(b),sizeof(c));
printf("%d,%d,%d\n",sizeof(int),sizeof(float),sizeof(char));
getch();
}
```

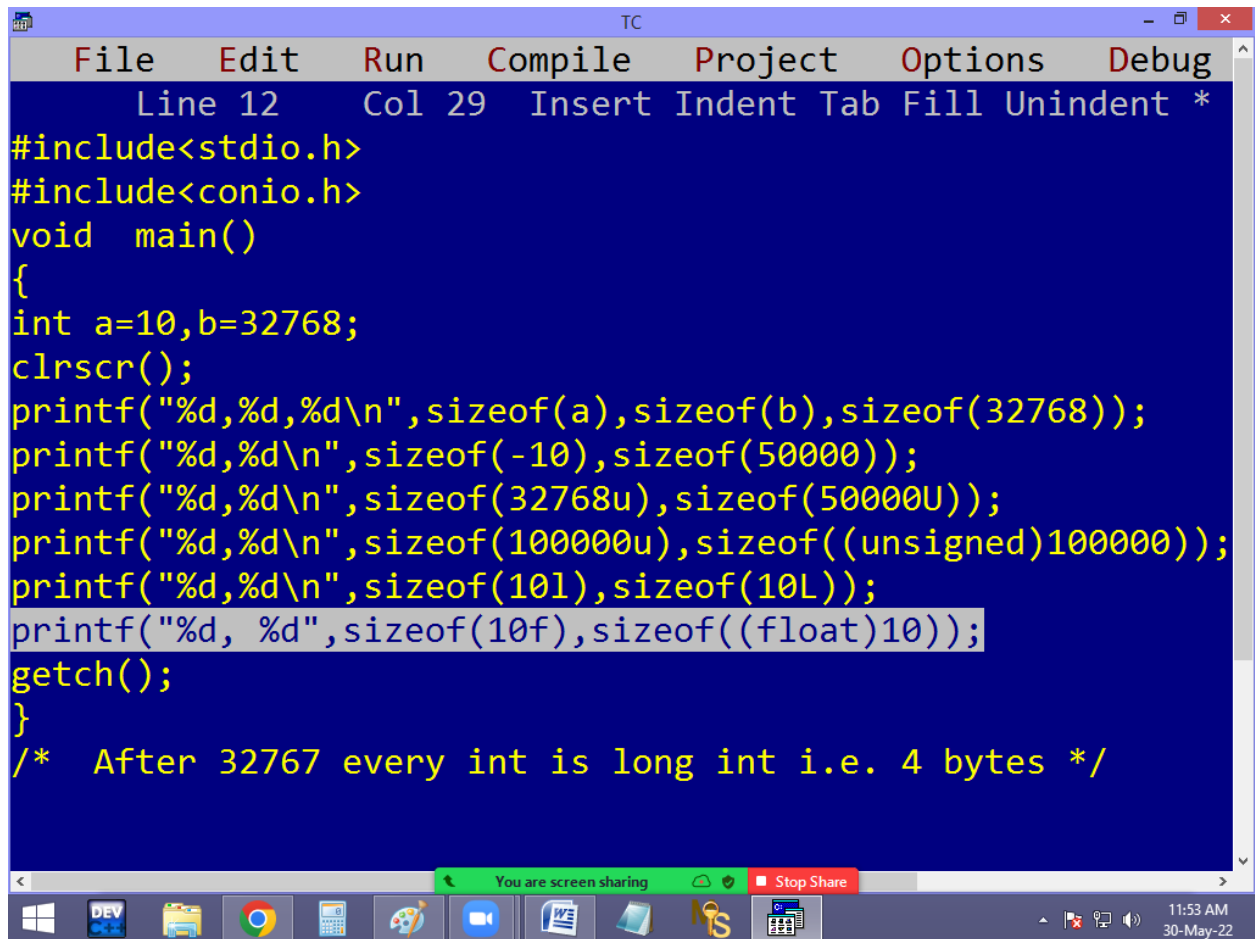
You are screen sharing

Stop Share

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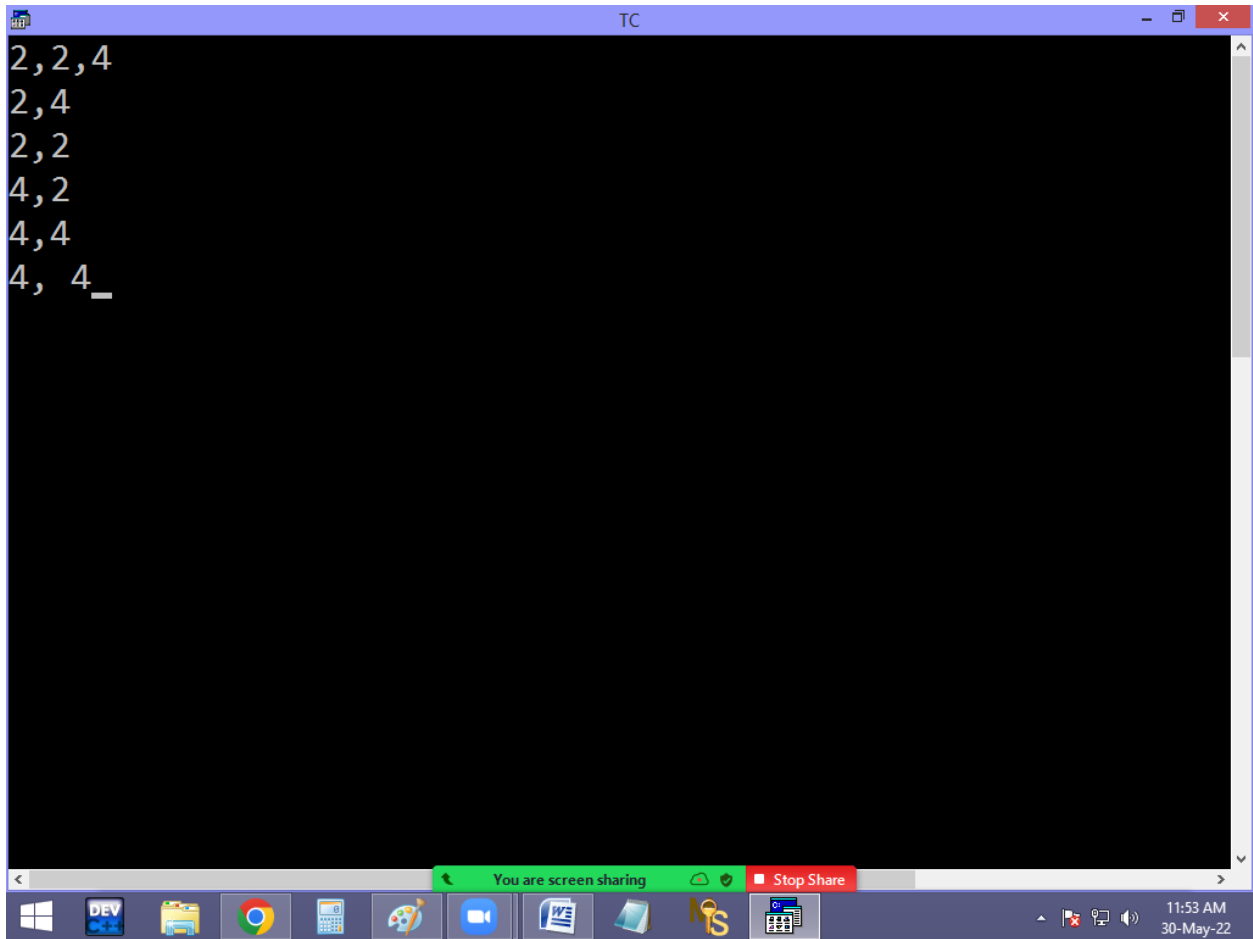
11:41 AM 30-May-22

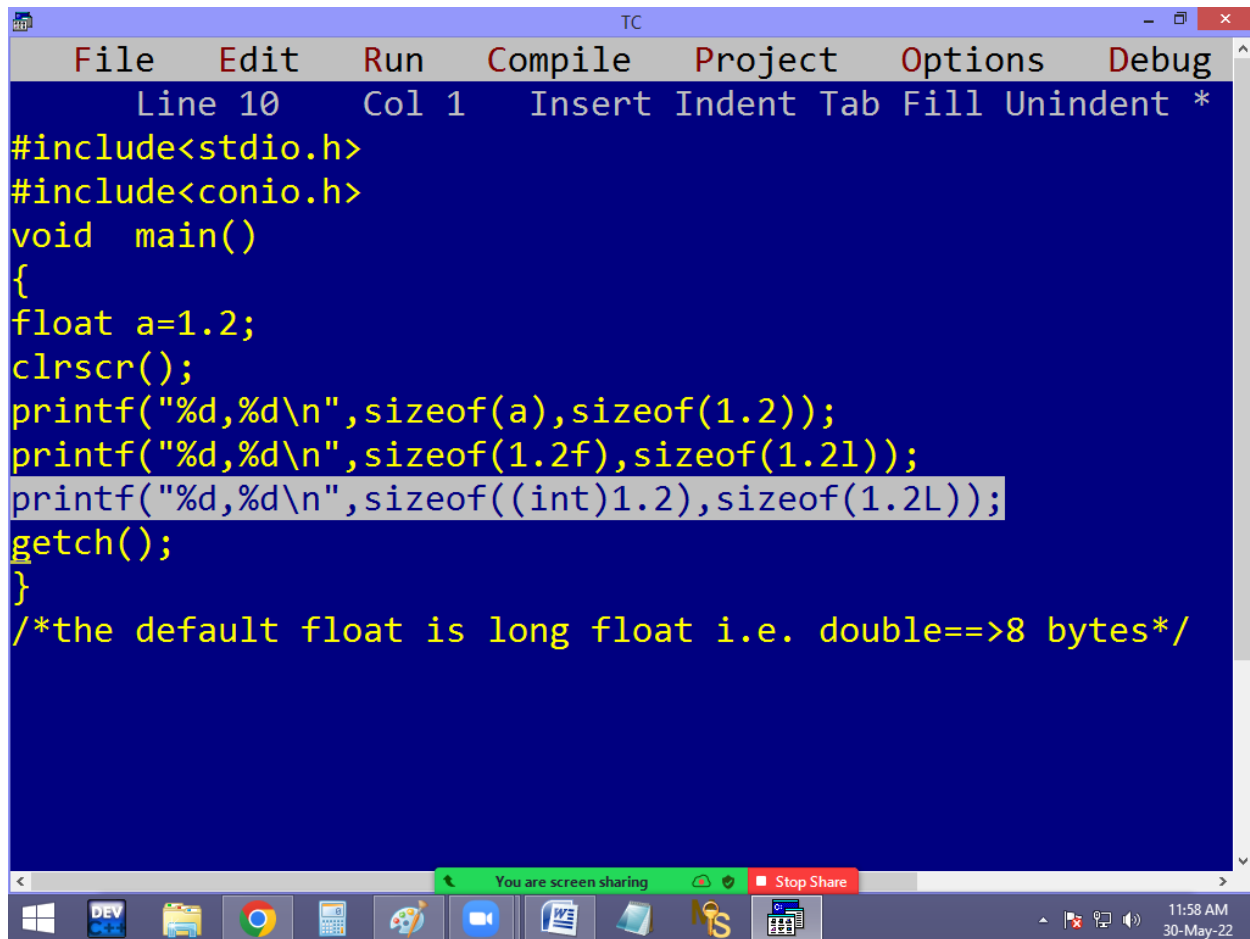




```
TC
File Edit Run Compile Project Options Debug
Line 12 Col 29 Insert Indent Tab Fill Unindent *
#include<stdio.h>
#include<conio.h>
void main()
{
int a=10,b=32768;
clrscr();
printf("%d,%d,%d\n",sizeof(a),sizeof(b),sizeof(32768));
printf("%d,%d\n",sizeof(-10),sizeof(50000));
printf("%d,%d\n",sizeof(32768u),sizeof(50000U));
printf("%d,%d\n",sizeof(100000u),sizeof((unsigned)100000));
printf("%d,%d\n",sizeof(10l),sizeof(10L));
printf("%d, %d",sizeof(10f),sizeof((float)10));
getch();
}
/* After 32767 every int is long int i.e. 4 bytes */

You are screen sharing Stop Share
11:53 AM
30-May-22
```





```
TC
File Edit Run Compile Project Options Debug
Line 10 Col 1 Insert Indent Tab Fill Unindent *
#include<stdio.h>
#include<conio.h>
void main()
{
float a=1.2;
clrscr();
printf("%d,%d\n",sizeof(a),sizeof(1.2));
printf("%d,%d\n",sizeof(1.2f),sizeof(1.2l));
printf("%d,%d\n",sizeof((int)1.2),sizeof(1.2L));
getch();
}
/*the default float is long float i.e. double==>8 bytes*/
```

You are screen sharing Stop Share

11:58 AM 30-May-22

TC

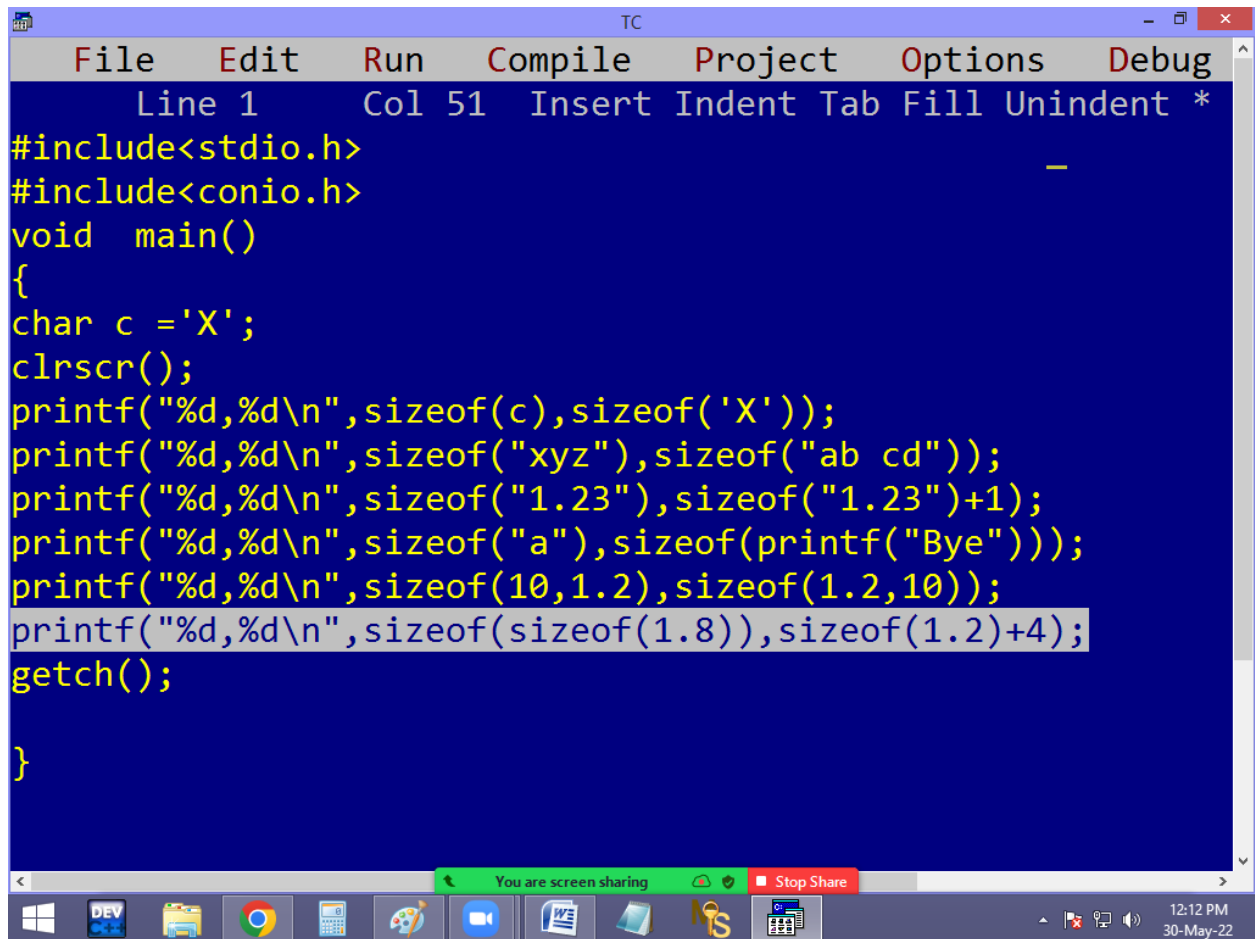
4,8
4,10
2,10

You are screen sharing Stop Share

Mute Start Video Participants 13 Chat New Share Pause Share Annotate Remote Control Apps More

DEV File Explorer Chrome Calendar Paint Desktop App Store Word Edge Locks Task View

11:58 AM 30-May-22



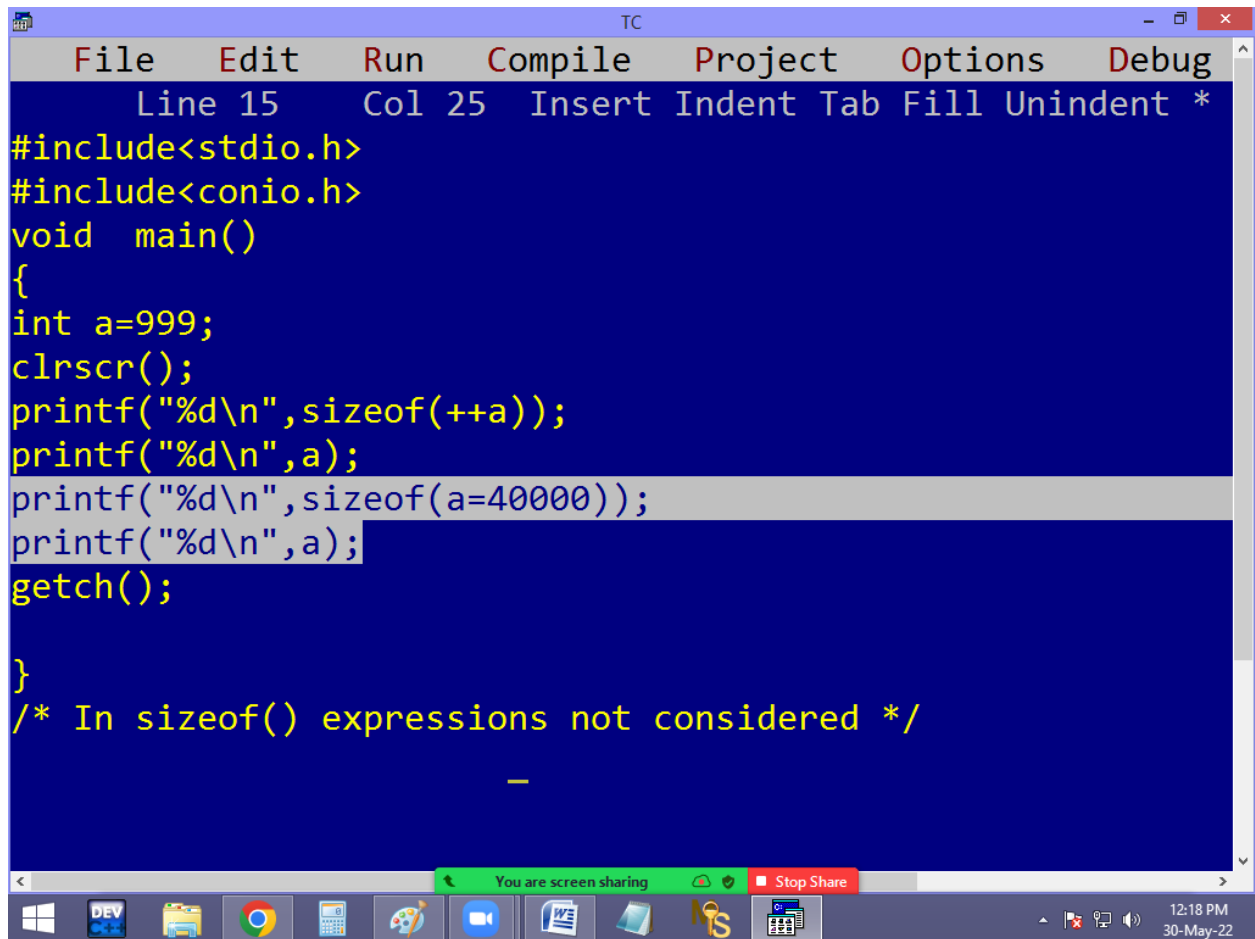
```
TC
File Edit Run Compile Project Options Debug
Line 1 Col 51 Insert Indent Tab Fill Unindent *
#include<stdio.h>
#include<conio.h>
void main()
{
char c ='X';
clrscr();
printf("%d,%d\n",sizeof(c),sizeof('X'));
printf("%d,%d\n",sizeof("xyz"),sizeof("ab cd"));
printf("%d,%d\n",sizeof("1.23"),sizeof("1.23")+1);
printf("%d,%d\n",sizeof("a"),sizeof(printf("Bye")));
printf("%d,%d\n",sizeof(10,1.2),sizeof(1.2,10));
printf("%d,%d\n",sizeof(sizeof(1.8)),sizeof(1.2)+4);
getch();
}
```


1,2
4,6
5,6
2,2
8,2
2,12

You are screen sharing [Stop Share](#)

Mute Start Video Participants 13 Chat New Share Pause Share Annotate Remote Control Apps More

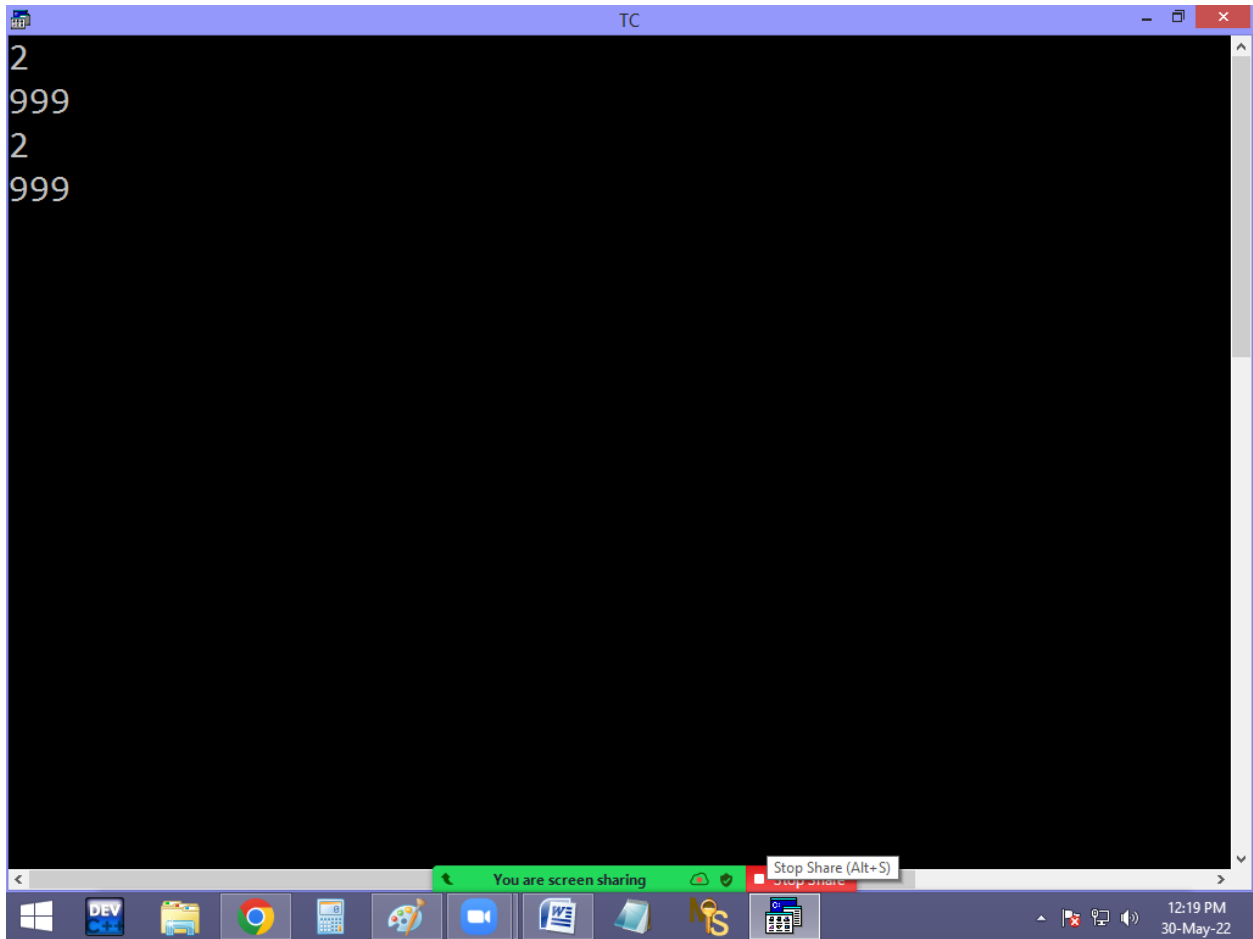
12:13 PM
30-May-22

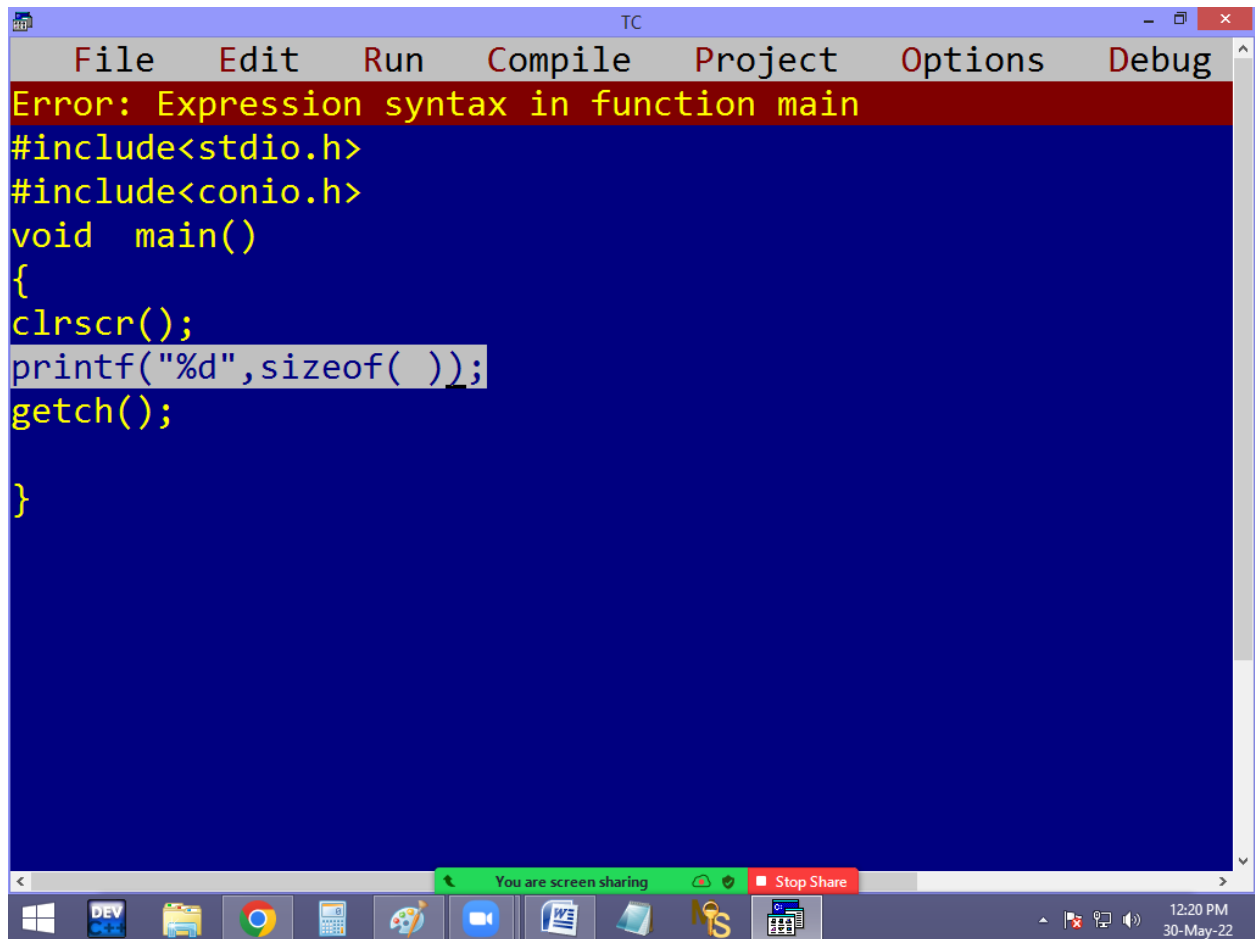


The image shows a screenshot of a Turbo C++ (TC) IDE window. The title bar reads "TC". The menu bar includes "File", "Edit", "Run", "Compile", "Project", "Options", and "Debug". Below the menu bar, the status bar shows "Line 15", "Col 25", and a list of editing actions: "Insert", "Indent", "Tab", "Fill", "Unindent", and "*". The main editing area has a dark blue background with yellow text. The code is as follows:

```
#include<stdio.h>
#include<conio.h>
void main()
{
int a=999;
clrscr();
printf("%d\n",sizeof(++a));
printf("%d\n",a);
printf("%d\n",sizeof(a=40000));
printf("%d\n",a);
getch();
}
/* In sizeof() expressions not considered */
```

The line containing `printf("%d\n",sizeof(a=40000));` is highlighted with a light gray background. At the bottom of the IDE window, there is a green status bar that says "You are screen sharing" and a red button labeled "Stop Share". Below the IDE window is the Windows taskbar, which includes icons for the Start menu, DEV, File Explorer, Google Chrome, Calculator, Paint, Zoom, Word, and a folder icon. The system clock in the bottom right corner shows "12:18 PM" and "30-May-22".

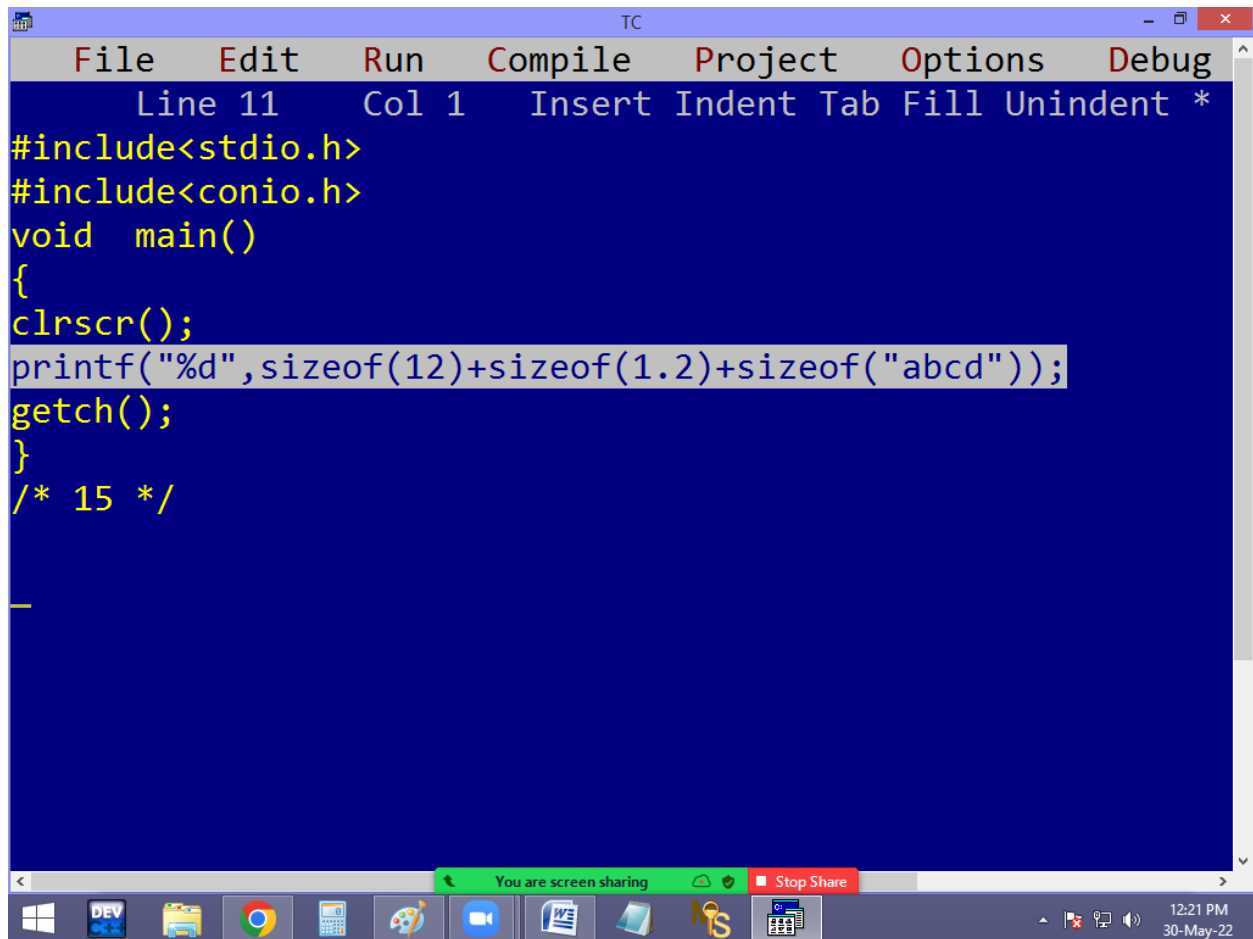




The image shows a screenshot of a Turbo C++ (TC) IDE window. The title bar reads "TC". The menu bar includes "File", "Edit", "Run", "Compile", "Project", "Options", and "Debug". A red error message banner at the top states "Error: Expression syntax in function main". The code editor has a dark blue background with yellow text. The code is as follows:

```
#include<stdio.h>
#include<conio.h>
void main()
{
clrscr();
printf("%d",sizeof( ));
getch();
}
```

The line `printf("%d",sizeof());` is highlighted with a light blue background. A green status bar at the bottom of the window says "You are screen sharing" with a "Stop Share" button. The Windows taskbar at the very bottom shows various application icons and the system clock indicating 12:20 PM on 30-May-22.



```
TC
File Edit Run Compile Project Options Debug
Line 11 Col 1 Insert Indent Tab Fill Unindent *
#include<stdio.h>
#include<conio.h>
void main()
{
clrscr();
printf("%d",sizeof(12)+sizeof(1.2)+sizeof("abcd"));
getch();
}
/* 15 */
```

BITWISE OPERATORS

Bitwise operator's works on bits.

Turbo-c is a 16 bit compiler. Due to this bitwise operations are limited to 16 bits only [2^0 to 2^{15}].

Bitwise operators operate **integer** type values only.

We have to calculate only the **on** bits [**1**].

When the first bit[**Sign bit**] is **1** then the number is **Negative** and it is **0** then the number is **positive**.

They are very much used in system software development.

Note: Bitwise operator is low level feature.

C-Language supports following bitwise operators.

& -Bitwise and

| - Bitwise or

^ - XOR ==> Exclusive OR

~ - Compliment operator

<< - Left shift operator

>> - Right shift operator

& - Bitwise and: In this both bits are 1's then result bit is 1. Otherwise result bit is 0.

Eg: **25 & 15 = 9**

25 = 0000 0000 0001 1001
 15 = 0000 0000 0000 1111

$$\begin{array}{r}
 2 \overline{) 25} \\
 \underline{2 \overline{) 12} - 1} \\
 2 \overline{) 6} - 0 \\
 \underline{2 \overline{) 3} - 0} \\
 1 - 1
 \end{array}$$

$$\begin{array}{r}
 2 \overline{) 15} \\
 \underline{2 \overline{) 7} - 1} \\
 2 \overline{) 3} - 1 \\
 \underline{1 - 1}
 \end{array}$$

25 & 15 = 9

25 = 0000 0000 0001 1001
 15 = 0000 0000 0000 1111

$$\begin{array}{r}
 \& \\
 \hline
 0000 \ 0000 \ 0000 \ 1001 \\
 \downarrow \downarrow \\
 2^3 + 2^0 \\
 \downarrow \downarrow \\
 8 + 1 = 9
 \end{array}$$

| - Bitwise or: In this both bits are 0's then result bit is 0. Otherwise result bit is 1.

Eg: 25 | 15 = 31

$$25 \cdot 15 = 31$$

$$25 = 0000 \ 0000 \ 0001 \ 1001$$

$$15 = 0000 \ 0000 \ 0000 \ 1111$$

$$0000 \ 0000 \ 0001 \ 1111$$

$2^4 + 2^3 + 2^2 + 2^1 + 2^0$
 $16 + 8 + 4 + 2 + 1 = 31$

^ - XOR [Exclusive OR]: In this both bits are same then result bit is 0. Otherwise result bit is 1.

Eg: $25 \wedge 15 = 22$

$$25 \wedge 15 = 22$$

$$25 = 0000 \ 0000 \ 0001 \ 1001$$

$$15 = 0000 \ 0000 \ 0000 \ 1111$$

\wedge

$$0000 \ 0000 \ 0001 \ 0110$$

$$2^4 + 2^2 + 2^1$$

$$16 + 4 + 2 = 22$$

~ - Compliment operator: In compliment operation the bits are complimented. i.e.

1's become 0's and 0's become 1's. Due to this +Ve no becomes -Ve and -Ve no becomes +Ve.

eg: ~25 → -26

25 = 0000 0000 0001 1001
1111 1111 1110 0110
-128+64+32+4+2=-26
-128 + 102 = -26

**Note: When starting bit is 1 given no is –
Ve.**

Eg: $\sim -25 \rightarrow +24$

$$\sim -25 = +24$$

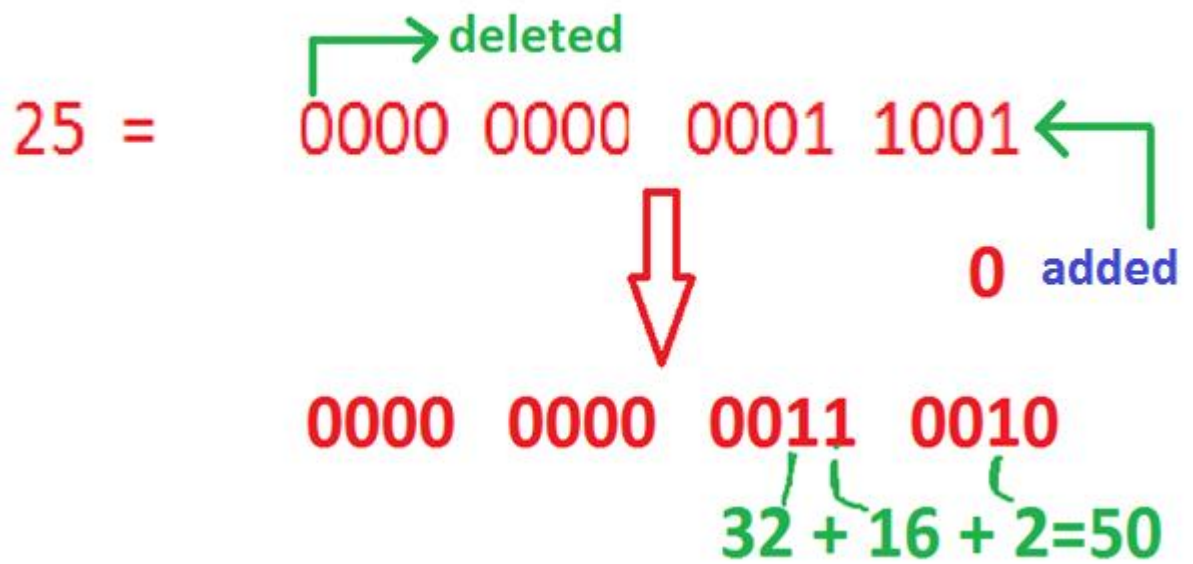
$$\begin{array}{r}
 25 = \begin{array}{|cc|cc} 0000 & 0000 & 0001 & 1001 \\ \hline 1111 & 1111 & 1110 & 0110 \end{array} \quad \begin{array}{l} \text{<== 1's compliment} \\ +1 \quad \text{<== 2's Compliment} \end{array} \\
 \hline
 \begin{array}{cccc} 1111 & 1111 & 1110 & 0111 \\ \sim \rightarrow 0000 & 0000 & 0001 & 1000 \end{array} \\
 \begin{array}{cc} \downarrow & \downarrow \\ & 16+8=24 \end{array}
 \end{array}$$

<< - left shift operator:

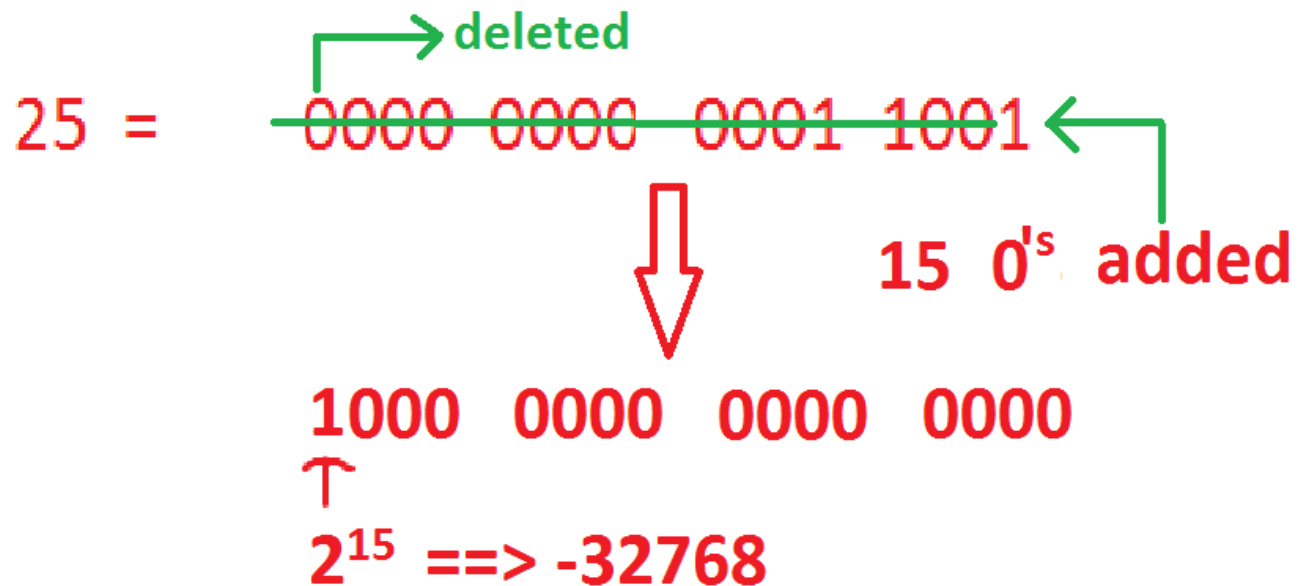
In left shift operation, the specified no of bits are deleted from left side and the same no of **zeros** added on right side. In left shift operation, most probably the value is multiplied with 2 that no of times.

Eg: $25 \ll 1 = 50$, $25 \ll 2 = 100$, $25 \ll 15 = -32768$,
 $25 \ll 16 = 0$

eg: $25 \ll 1 = 50$



eg: $25 \ll 15 = -32768$



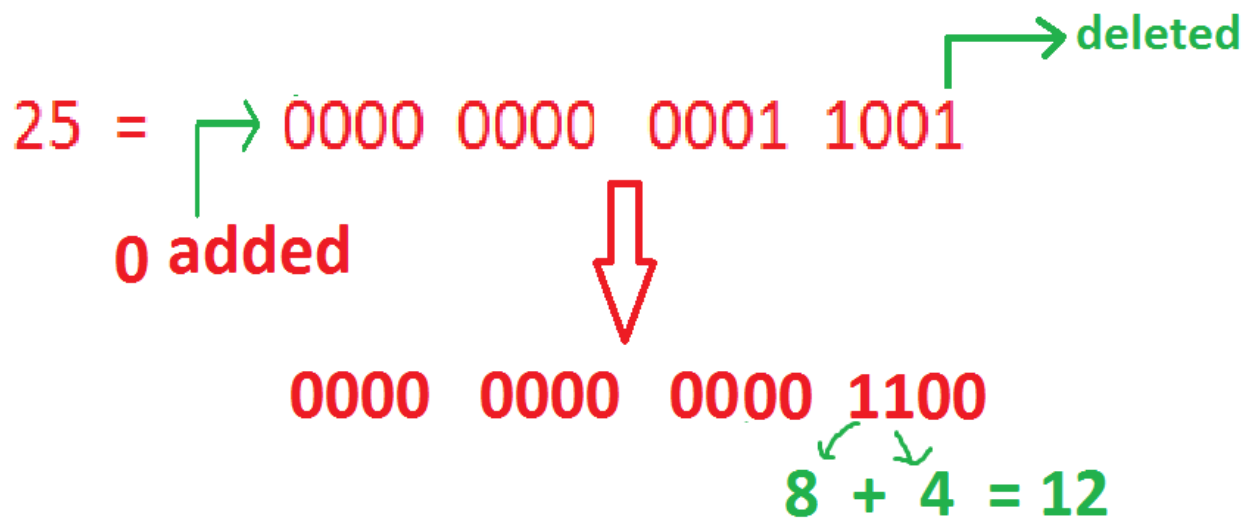
Note: When starting bit 1 no is negative.

>> - Right shift operator:

In right shift operation, the bits are moved to right side i.e. the specified no.of bits are deleted from right side and same no.of **zero's** are added left side. Due to this always the number is divided with 2 that no of times.

Eg: $25 \gg 1 = 12$, $25 \gg 2 = 6$, $25 \gg 3 = 3$, $25 \gg 4 = 1$, $25 \gg 5 = 0$

eg: $25 \gg 1 = 12$



eg: $25 \gg 5 = 0$

