

Eg:

Int id=1234, children;

Char name[ ]="Ravi", gender='M';

float height=5.8;

TC

File Edit Run Compile Project Options Debug Break/watch

Line 12 Col 23 Insert Indent Tab Fill Unindent \* E:9AM.C

```
#include<stdio.h>
#include<conio.h>
void main()
{
int id=1234,children;
char name[5]="Ravi", gender='M';
float height=5.8;
clrscr();
printf("Id=%d\n",id);
printf("children=%d\n",children);
printf("Name=%s\n",name);
printf("Gender=%c\n",gender);
printf("Height=%f",height);
getch();
}
```

TC

```
Id=1234
children=26872
Name=Ravi
Gender=M
Height=5.800000_
```

## Memory allocation for variables:

4 bits = 1 nibble

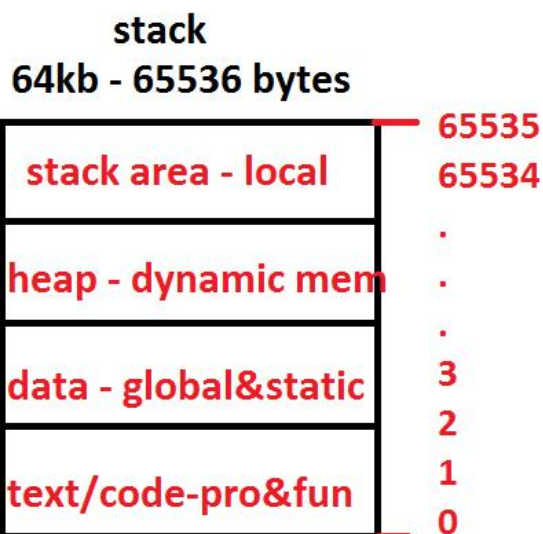
2 nibbles / 8 bits = 1 byte

1024 bytes = 1 kb

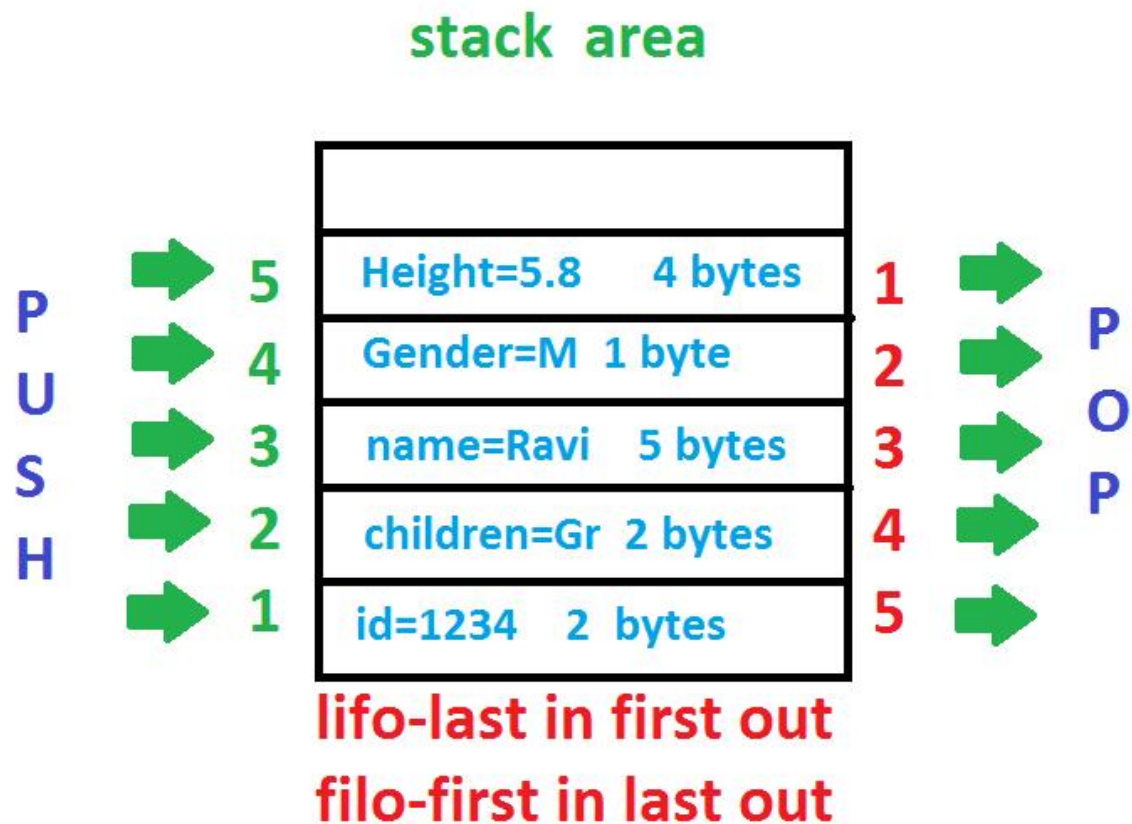
1024kb = 1mb

1024mb=1gb

1024gb=1tb



byte address - unsigned int - %u



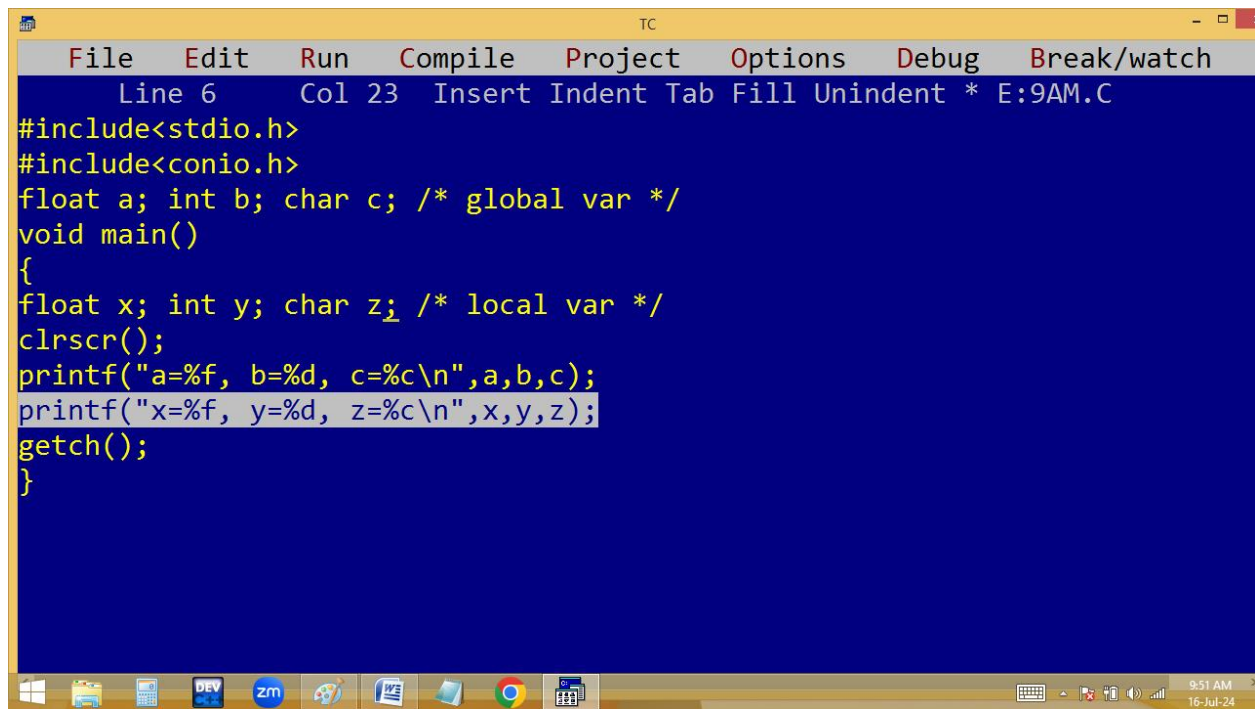
Basically the variables divided into 2 types.

1. Local variables
2. Global variables

	<b>Local variables</b>	<b>Global variables</b>
<b>Declaration</b>	Within fun / { }	Top of program
<b>Storage area</b>	Stack area	Data area
<b>Initial values</b> <b>[starting values]</b>	Garbage values	Int-0, char-blank float-0.00000,
<b>Scope-where we</b> <b>can access</b>	Within fun / { }	Anywhere

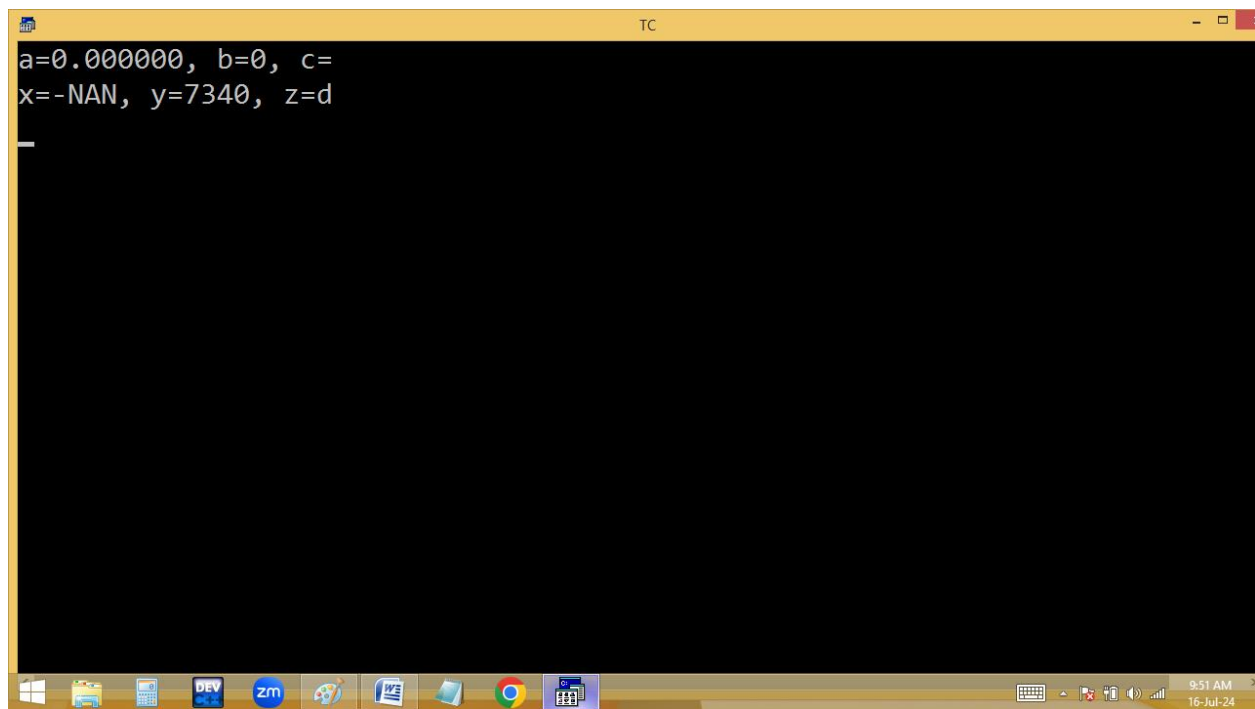
<b>Life time – when the variable is deleted</b>	After fun / { } execution	After main() closed
---	---------------------------	---------------------

**Finding initial value of local and global variables:**



The screenshot shows the Turbo C++ (TC) IDE with a menu bar (File, Edit, Run, Compile, Project, Options, Debug, Break/watch) and a toolbar. The main window displays the source code of a C program. The code includes headers for stdio.h and conio.h, declares global variables a (float), b (int), and c (char), and defines a main function. Inside main, it declares local variables x (float), y (int), and z (char), clears the screen, and prints the values of a, b, c, x, y, and z. The status bar at the bottom indicates the current line is 6 and column is 23.

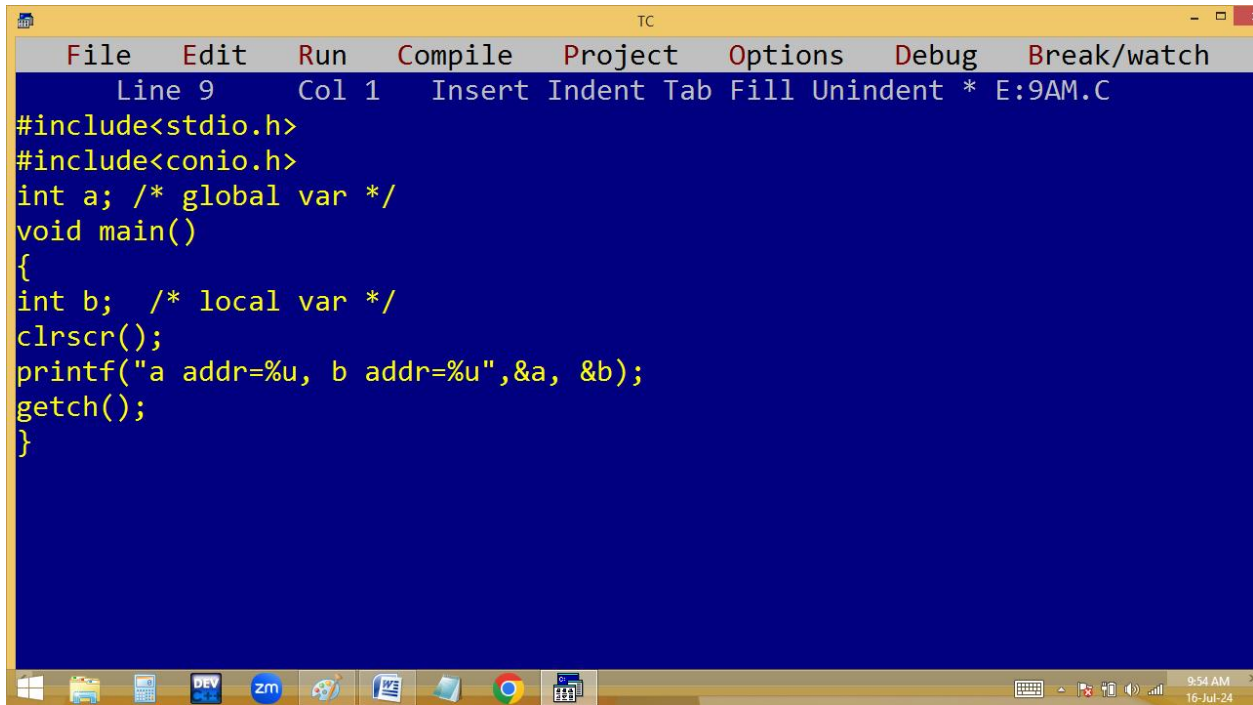
```
TC
File Edit Run Compile Project Options Debug Break/watch
Line 6 Col 23 Insert Indent Tab Fill Unindent * E:9AM.C
#include<stdio.h>
#include<conio.h>
float a; int b; char c; /* global var */
void main()
{
float x; int y; char z; /* local var */
clrscr();
printf("a=%f, b=%d, c=%c\n",a,b,c);
printf("x=%f, y=%d, z=%c\n",x,y,z);
getch();
}
```



The screenshot shows the Turbo C++ (TC) IDE with the same menu bar and toolbar. The main window displays the output of the program, which is the printed values of the variables a, b, c, x, y, and z. The status bar at the bottom indicates the current line is 6 and column is 23.

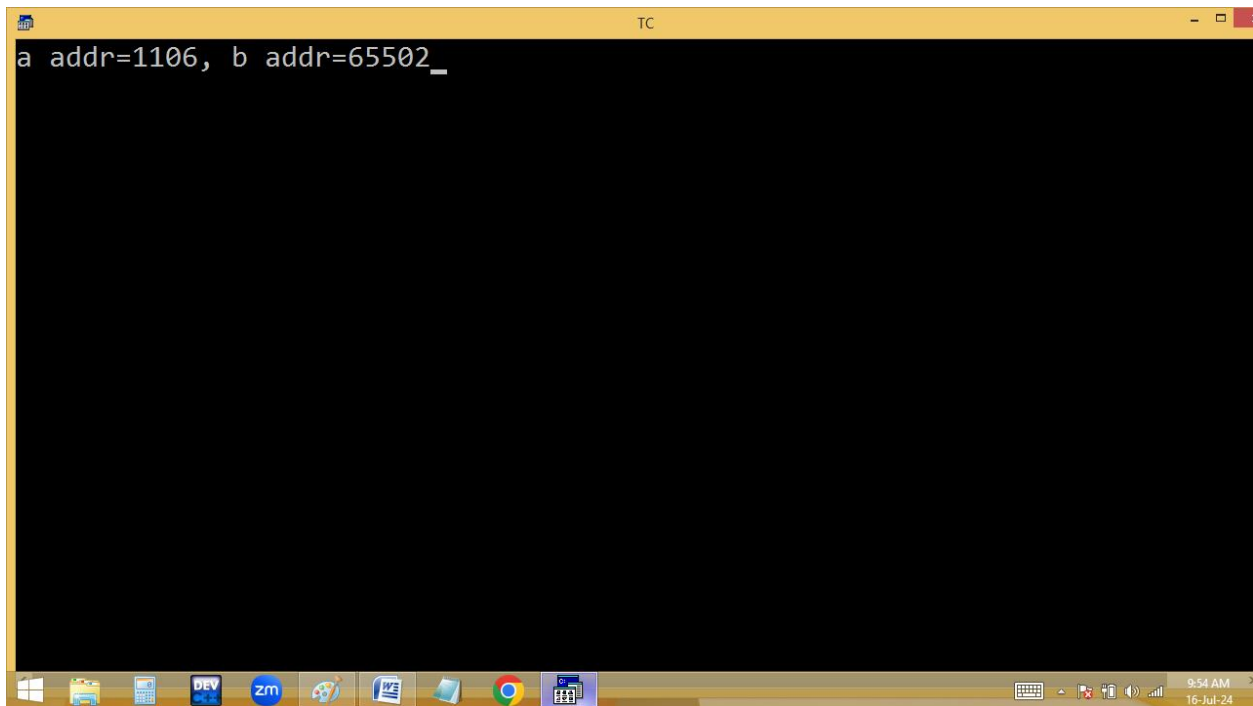
```
TC
a=0.000000, b=0, c=
x=-NAN, y=7340, z=d
```

## Finding storage are of local and global variables:



The screenshot shows the Turbo C++ (TC) IDE with a blue background. The menu bar includes File, Edit, Run, Compile, Project, Options, Debug, and Break/watch. The status bar at the bottom shows 'Line 9 Col 1 Insert Indent Tab Fill Unindent \* E:9AM.C'. The code in the editor is as follows:

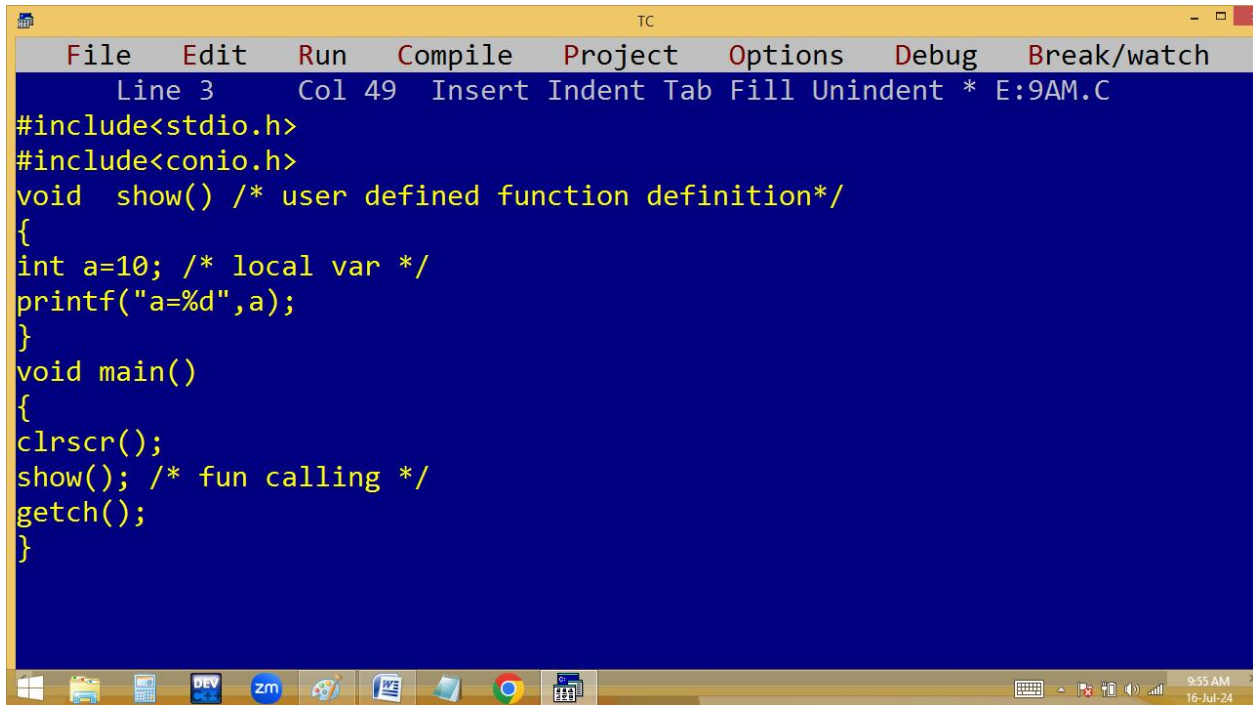
```
#include<stdio.h>
#include<conio.h>
int a; /* global var */
void main()
{
int b; /* local var */
clrscr();
printf("a addr=%u, b addr=%u",&a, &b);
getch();
}
```



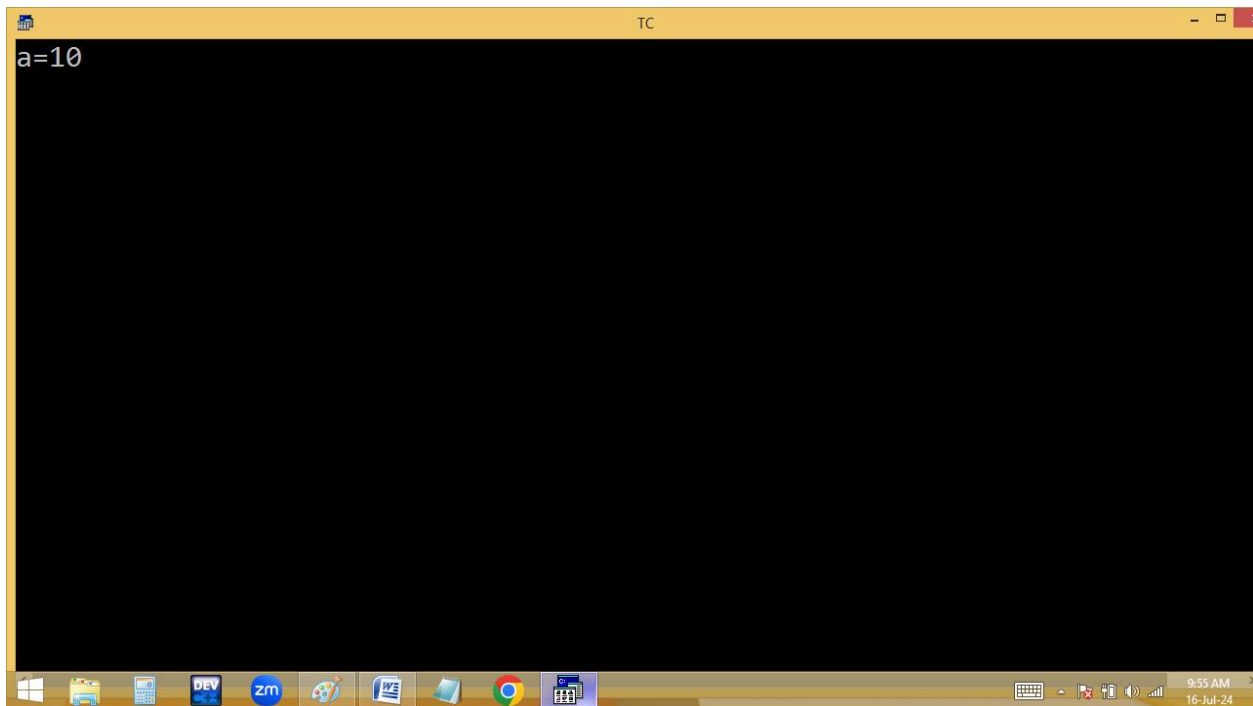
The screenshot shows the Turbo C++ (TC) IDE with a black background. The output of the program is displayed at the top of the window:

```
a addr=1106, b addr=65502_
```

## Finding scope of a local variable:

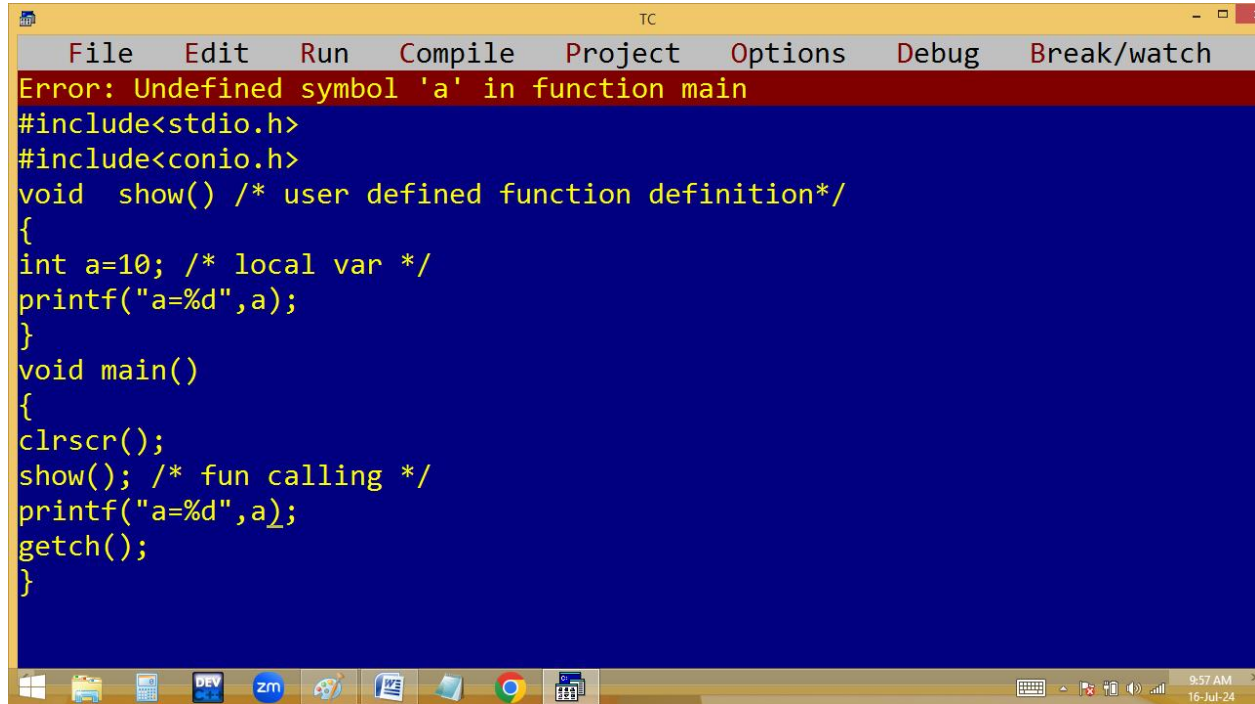


```
TC
File Edit Run Compile Project Options Debug Break/watch
Line 3 Col 49 Insert Indent Tab Fill Unindent * E:9AM.C
#include<stdio.h>
#include<conio.h>
void show() /* user defined function definition*/
{
int a=10; /* local var */
printf("a=%d",a);
}
void main()
{
clrscr();
show(); /* fun calling */
getch();
}
```



```
TC
a=10
```



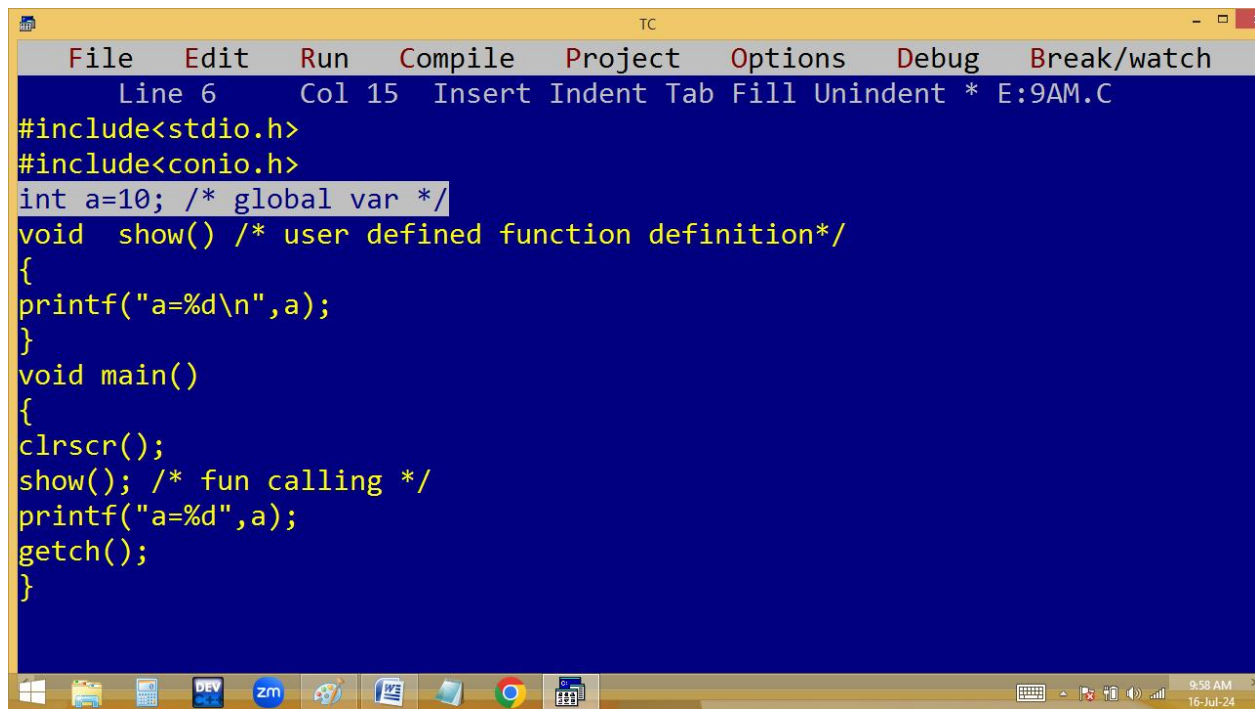


The image shows a screenshot of the Turbo C++ (TC) IDE. The title bar at the top reads "TC". Below it is a menu bar with the following options: File, Edit, Run, Compile, Project, Options, Debug, and Break/watch. A red error message banner at the top of the code editor area states: "Error: Undefined symbol 'a' 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 show() /* user defined function definition*/
{
int a=10; /* local var */
printf("a=%d",a);
}
void main()
{
clrscr();
show(); /* fun calling */
printf("a=%d",a);
getch();
}
```

The Windows taskbar is visible at the bottom of the screen, showing icons for the Start menu, File Explorer, Calculator, DEV C++, ZOOM, and several other applications. The system clock in the bottom right corner indicates the time is 9:57 AM on 16-Jul-24.

**Finding scope of global variable:**



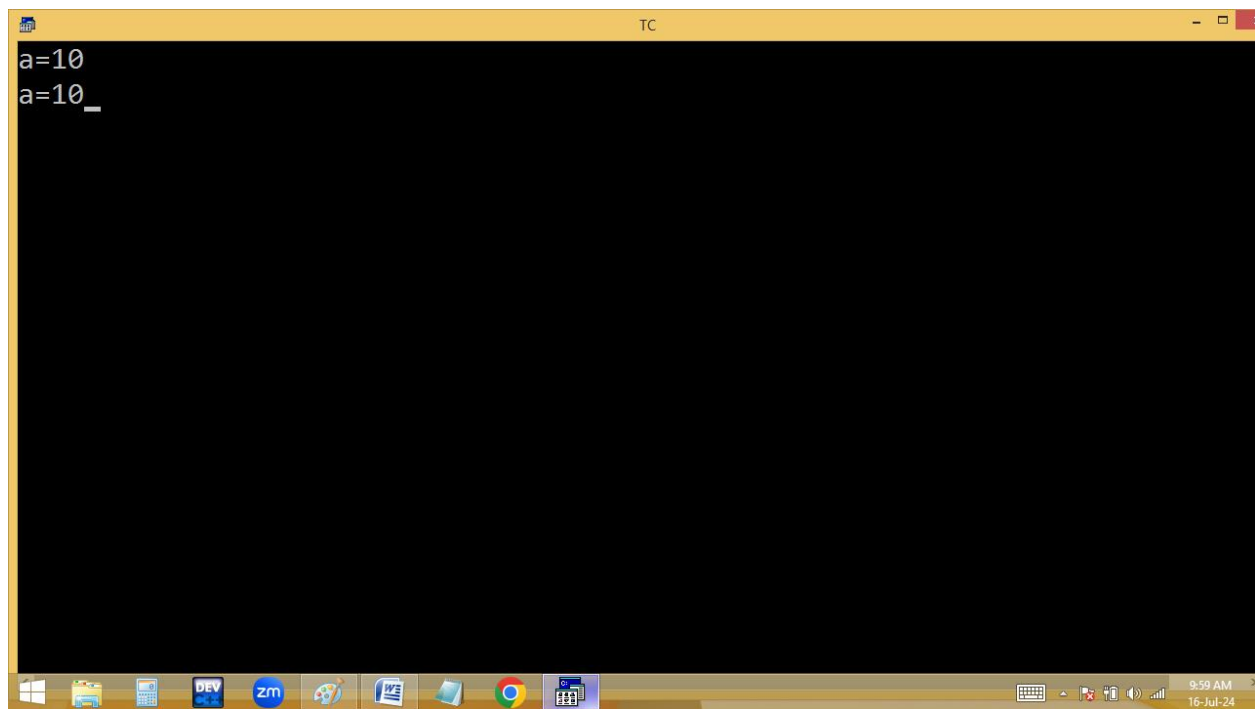
TC

File Edit Run Compile Project Options Debug Break/watch

Line 6 Col 15 Insert Indent Tab Fill Unindent \* E:9AM.C

```
#include<stdio.h>
#include<conio.h>
int a=10; /* global var */
void show() /* user defined function definition*/
{
printf("a=%d\n",a);
}
void main()
{
clrscr();
show(); /* fun calling */
printf("a=%d",a);
getch();
}
```

9:58 AM 16-Jul-24

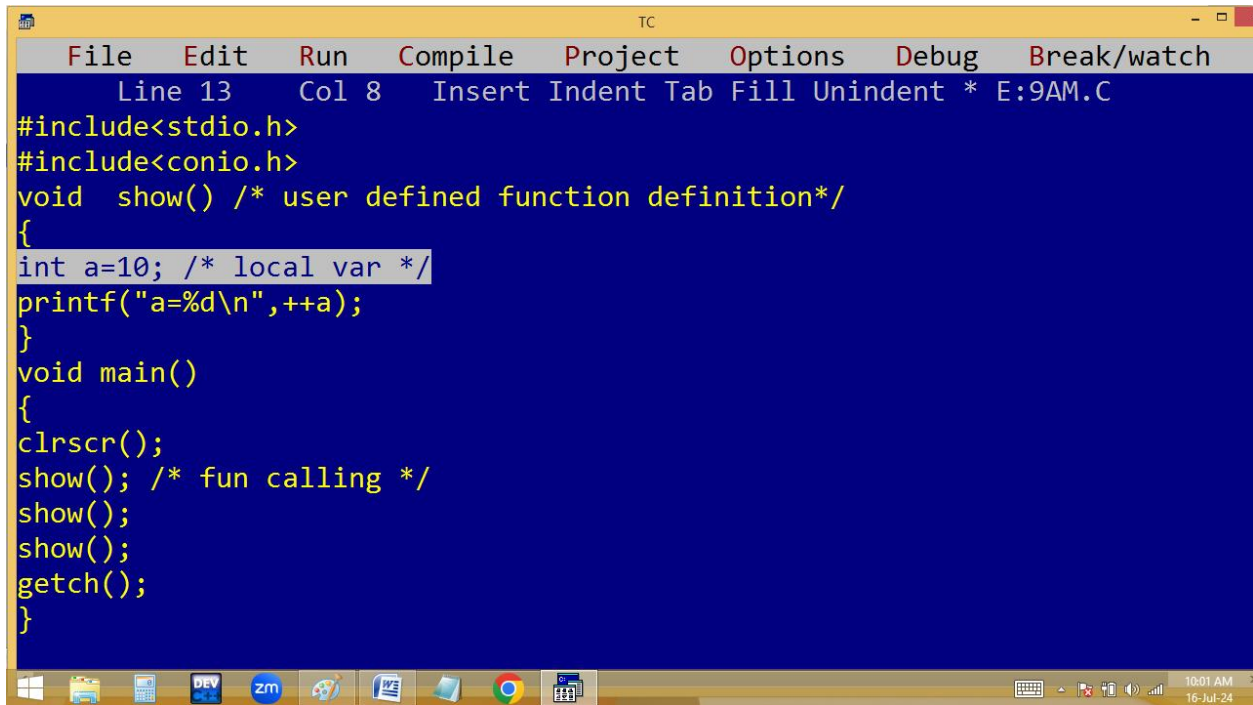


TC

```
a=10
a=10_
```

9:59 AM 16-Jul-24

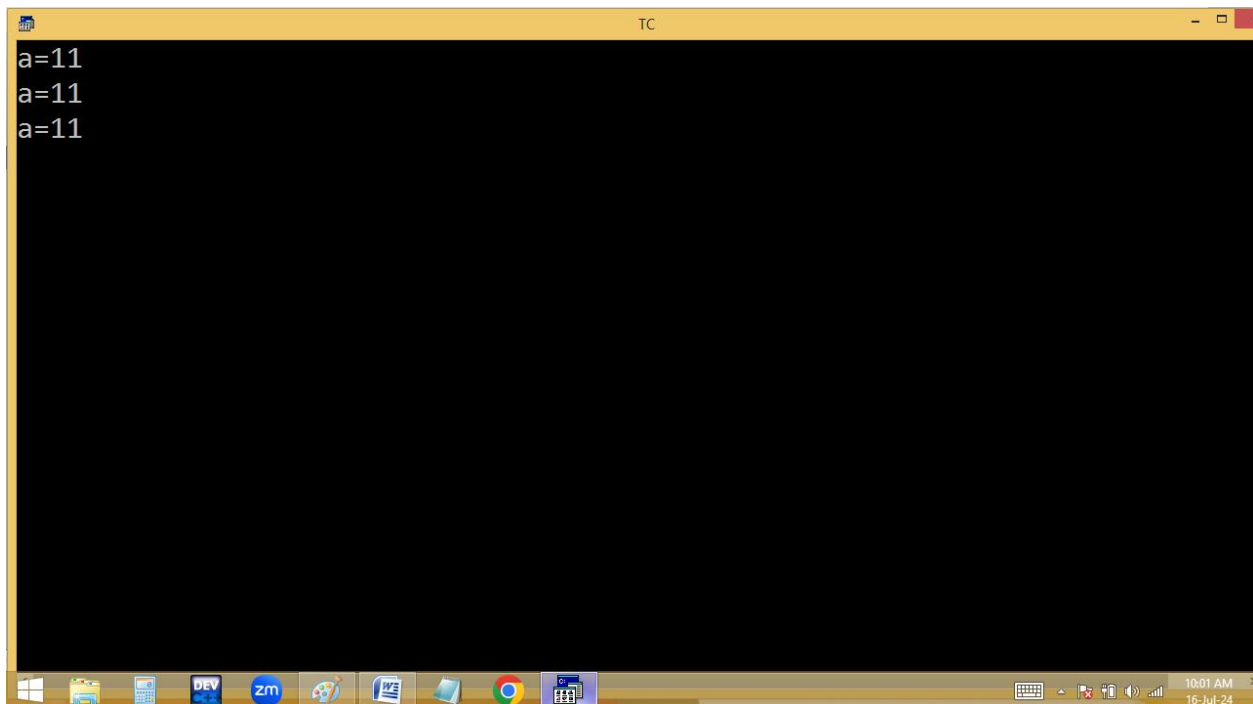
## Finding life time of a local variable:



The screenshot shows the Turbo C++ (TC) IDE with the following code:

```
File Edit Run Compile Project Options Debug Break/watch
Line 13 Col 8 Insert Indent Tab Fill Unindent * E:9AM.C
#include<stdio.h>
#include<conio.h>
void show() /* user defined function definition*/
{
int a=10; /* local var */
printf("a=%d\n",++a);
}
void main()
{
clrscr();
show(); /* fun calling */
show();
show();
getch();
}
```

The code defines a function `show()` that declares a local variable `a` and increments it. The `main()` function calls `show()` three times. The status bar at the bottom indicates the time is 10:01 AM on 16-Jul-24.



The screenshot shows the output of the program in the Turbo C++ (TC) IDE. The output consists of three lines, each displaying the value of the local variable `a` after it has been incremented:

```
a=11
a=11
a=11
```

The status bar at the bottom indicates the time is 10:01 AM on 16-Jul-24.

```

void show() /* user defin
{
int a=10; /* local var */
printf("a=%d\n",++a);
} /* a deleted */
void main()
{
clrscr();
show(); /* fun calling */
show();
show();
getch();
}

```

## stack

```

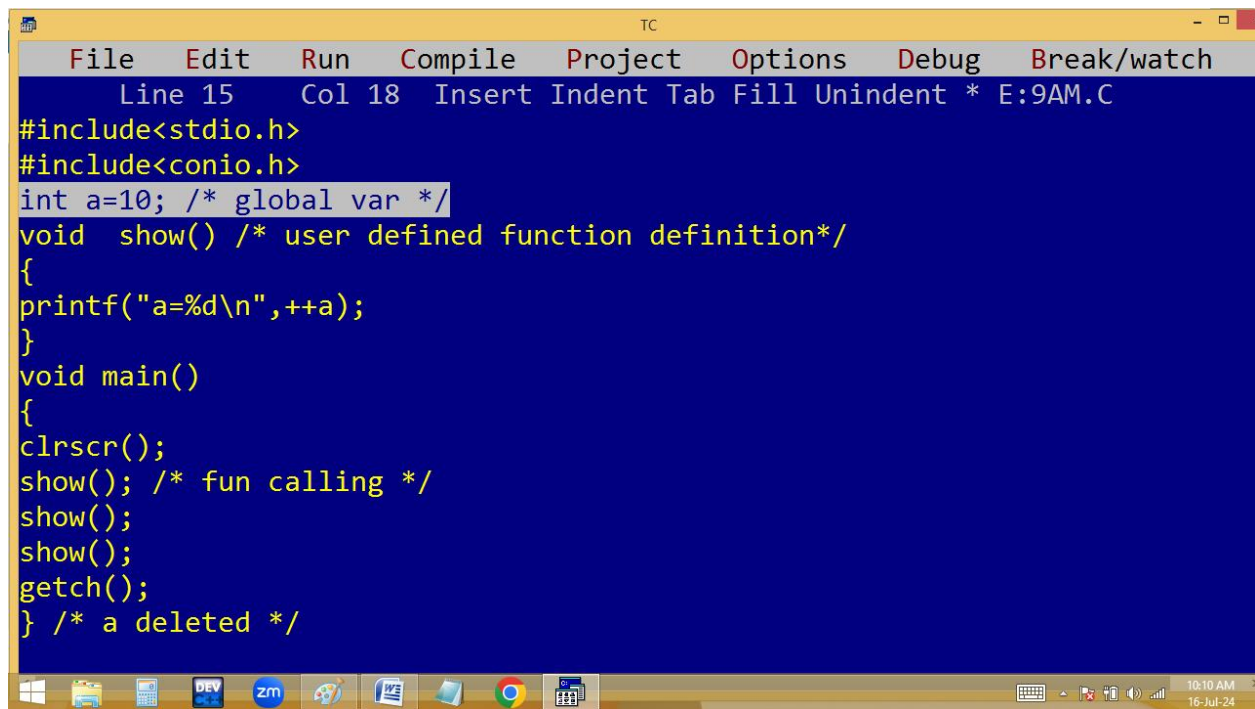
int a=10
++a=11 printed ✓
a deleted

int a=10
++a=11 printed ✓
a deleted

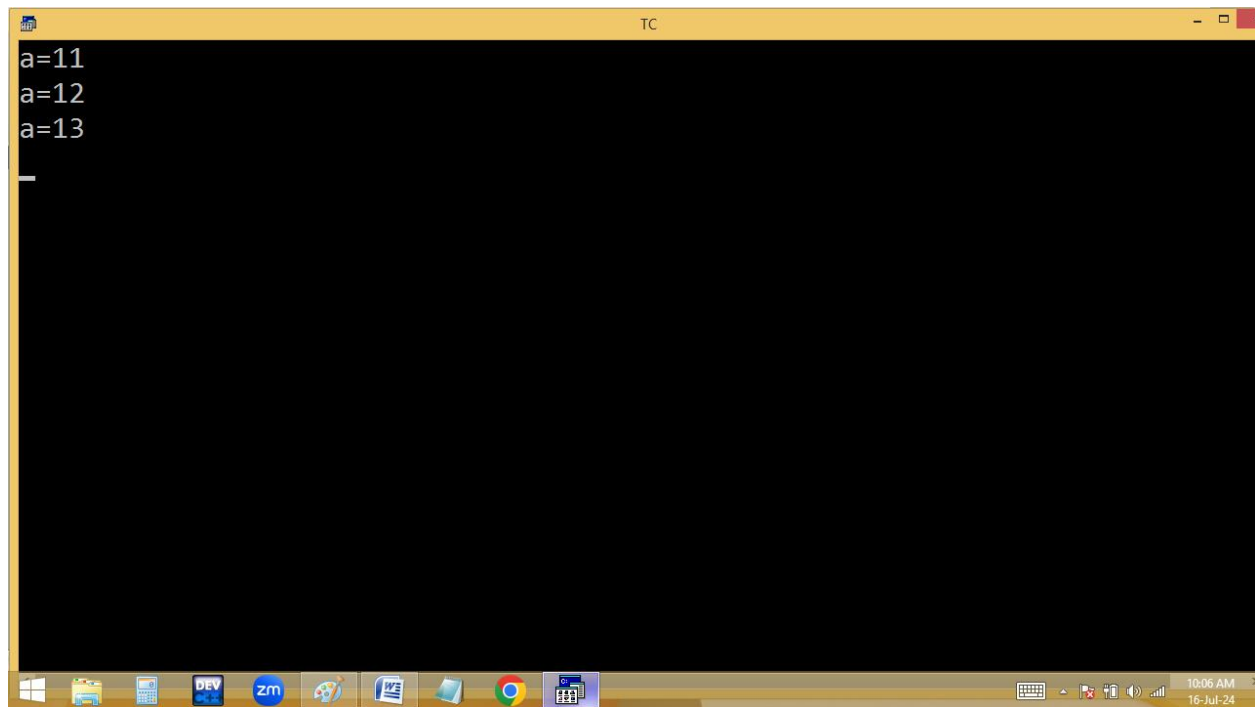
int a=10
++a=11 printed ✓
a deleted

```

**Finding global variable life time:**



```
TC
File Edit Run Compile Project Options Debug Break/watch
Line 15 Col 18 Insert Indent Tab Fill Unindent * E:9AM.C
#include<stdio.h>
#include<conio.h>
int a=10; /* global var */
void show() /* user defined function definition*/
{
printf("a=%d\n",++a);
}
void main()
{
clrscr();
show(); /* fun calling */
show();
show();
getch();
} /* a deleted */
10:10 AM
16-Jul-24
```

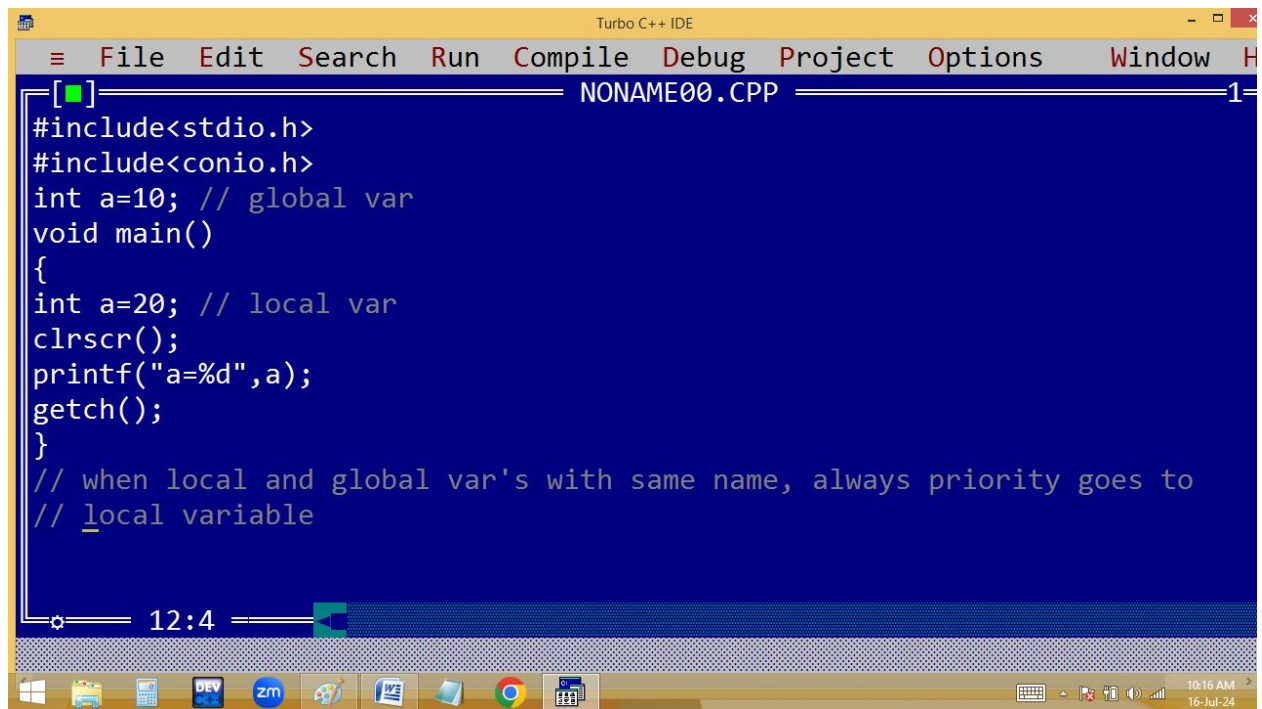


```
TC
a=11
a=12
a=13
_
10:06 AM
16-Jul-24
```

```
int a=10; /* global var */
void show() /* user defined
{
printf("a=%d\n",++a);
}
void main()
{
clrscr();
show(); /* fun calling */
show();
show();
getch();
} /* a deleted */
```

stack

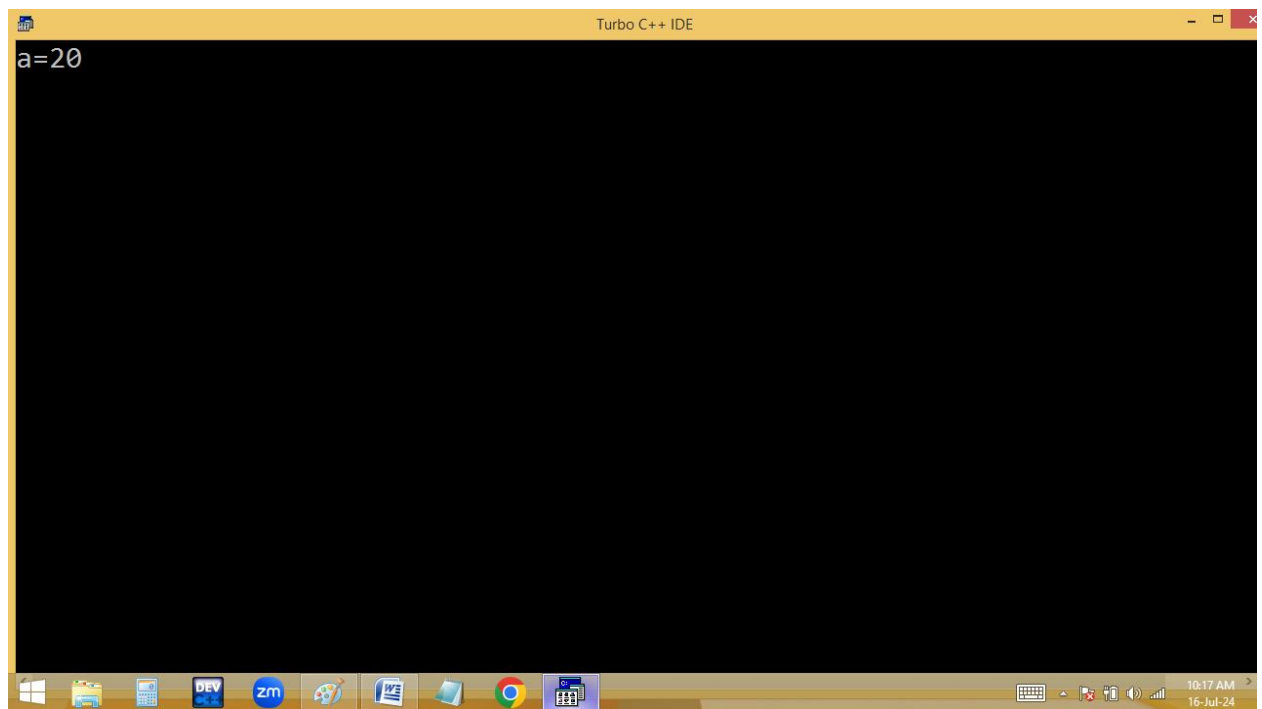
int a=10  
++a=11 printed  
++a=12 printed  
++a=13 printed  
a deleted



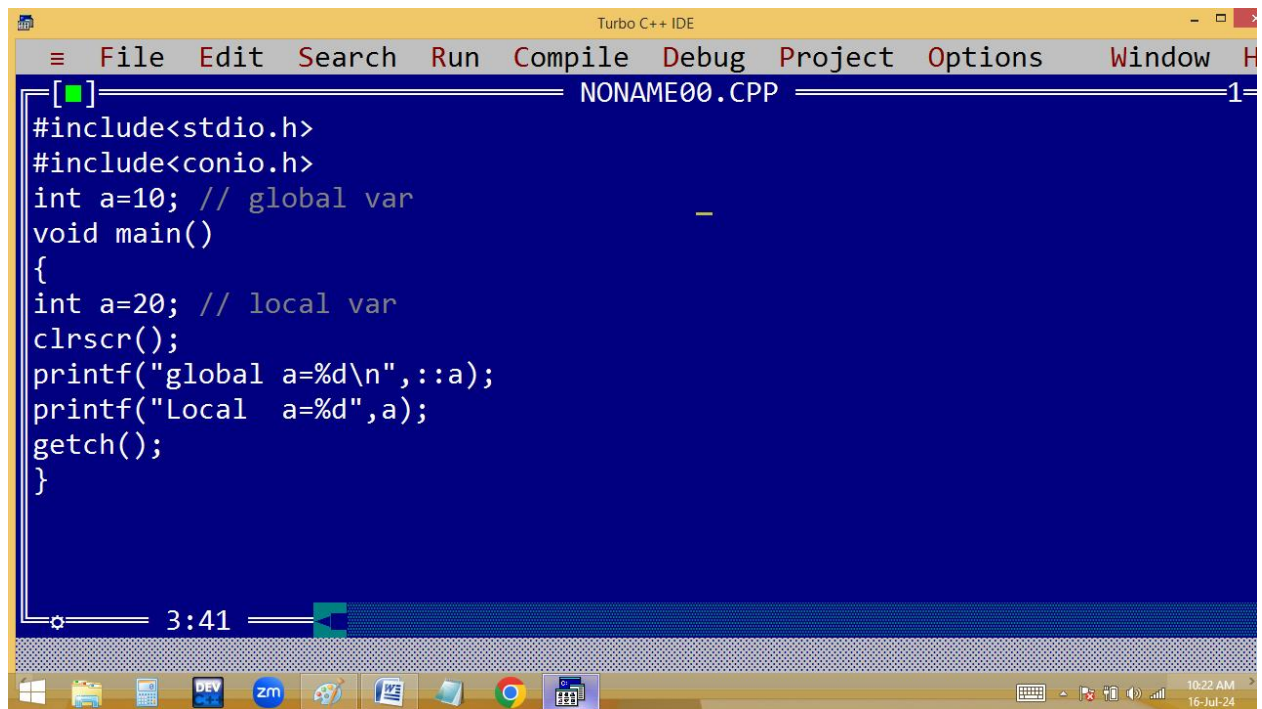
The screenshot shows the Turbo C++ IDE with a menu bar (File, Edit, Search, Run, Compile, Debug, Project, Options, Window, Help) and a toolbar. The main window displays a C++ program in a file named NONAME00.CPP. The code defines a global variable 'a' with the value 10 and a function 'main()' that declares a local variable 'a' with the value 20. The program uses 'clrscr()' to clear the screen, 'printf()' to print the value of 'a', and 'getch()' to wait for a key press. A comment at the bottom explains that the local variable takes precedence over the global one. The status bar at the bottom shows the time as 12:4.

```
[■] NONAME00.CPP 1
#include<stdio.h>
#include<conio.h>
int a=10; // global var
void main()
{
int a=20; // local var
clrscr();
printf("a=%d",a);
getch();
}
// when local and global var's with same name, always priority goes to
// local variable

12:4
```

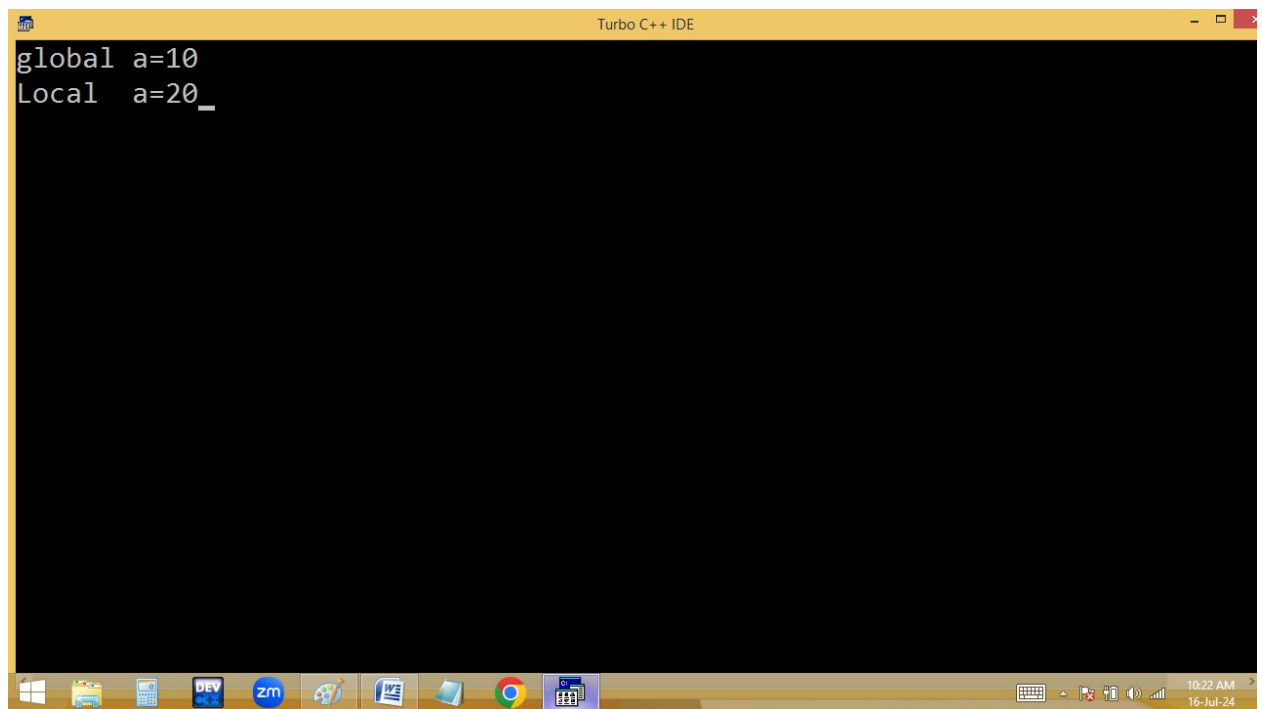






```
[■] NONAME00.CPP 1
#include<stdio.h>
#include<conio.h>
int a=10; // global var
void main()
{
int a=20; // local var
clrscr();
printf("global a=%d\n",::a);
printf("Local  a=%d",a);
getch();
}
```

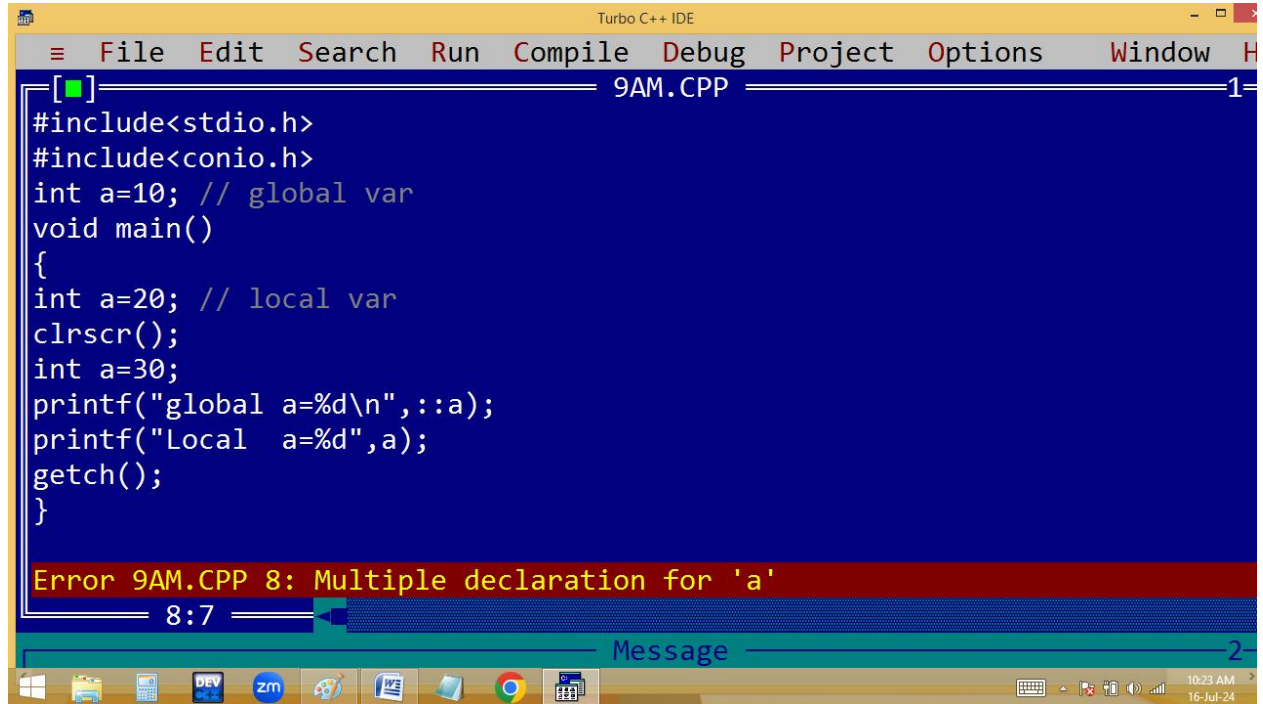
3:41



```
global a=10
Local  a=20_
```

10:22 AM  
16-Jul-24





The image shows a screenshot of the Turbo C++ IDE. The main window displays a C++ program named 9AM.CPP. The code defines a global variable 'a' as 10, then enters a 'main' function where it declares a local variable 'a' as 20, clears the screen, redeclares 'a' as 30, and prints both values. A red error bar at the bottom of the code editor indicates a 'Multiple declaration for 'a'' at line 8, column 7. The IDE's menu bar includes File, Edit, Search, Run, Compile, Debug, Project, Options, Window, and Help. The Windows taskbar at the bottom shows various icons and the system clock.

```
[■] 9AM.CPP 1
#include<stdio.h>
#include<conio.h>
int a=10; // global var
void main()
{
int a=20; // local var
clrscr();
int a=30;
printf("global a=%d\n",::a);
printf("Local a=%d",a);
getch();
}

Error 9AM.CPP 8: Multiple declaration for 'a'
8:7 Message 2
```

10:23 AM  
16-Jul-24

Turbo C++ IDE

File Edit Search Run Compile Debug Project Options Window

9AM.CPP 1

```
#include<stdio.h>
#include<conio.h>
int a=10, b=20, c=30; // global var
void main()
{
    int a=20; // local var
    clrscr();
    printf("a=%d\t",a);
    {
        int a=30; // local var
        printf("a=%d\t",a);
    }
    printf("a=%d",a);
    getch();
}
// a=20 a=30 a=20
```

int a=10, b=20, c=30; // global var

void main()

{

int a=20; // local var

clrscr();

printf("a=%d\t",a); 20

{

int a=30; // local var

printf("a=%d\t",a); 30

/\* a deleted \*/

printf("a=%d",a); 20

getch();

}

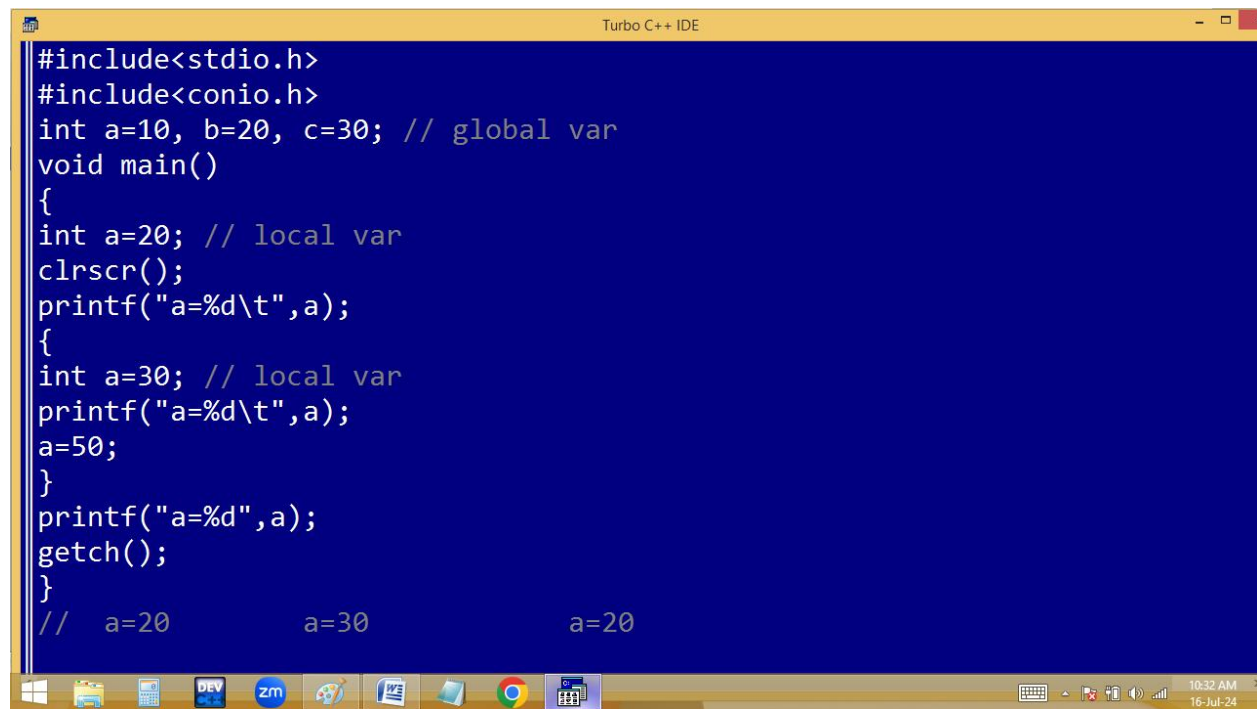
// a=20 a=30 a=20

```
Turbo C++ IDE
#include<stdio.h>
#include<conio.h>
int a=10, b=20, c=30; // global var
void main()
{
int a=20; // local var
clrscr();
printf("a=%d\t",a);
{
a=30; // var initialization
printf("a=%d\t",a);
}
printf("a=%d",a);
getch();
}
//  a=20          a=30          a=30
```

```
int a=10, b=20, c=30; // global var
void main()
{
int a=20; // local var
clrscr();
printf("a=%d\t",a); 20
{
a=30; // var initialization
printf("a=%d\t",a); 30
}
printf("a=%d",a); 30
getch();
}
//  a=20          a=30          a=30
```

```
Turbo C++ IDE

#include<stdio.h>
#include<conio.h>
int a=10, b=20, c=30; // global var
void main()
{
    int a=20; // local var
    clrscr();
    printf("a=%d\t",a);
    {
        int a=30; // local var
        printf("a=%d\t",a);
        a=50;
    }
    printf("a=%d",a);
    getch();
}
//    a=20          a=30          a=20
```



The screenshot shows the Turbo C++ IDE window. The code defines a global variable 'a' with the value 10. In the 'main' function, a local variable 'a' is declared and assigned the value 20. This local variable is printed. Then, an inner block is executed where 'a' is again declared as a local variable with the value 30, printed, and then changed to 50. After the inner block ends, the global 'a' is printed. The output shows the sequence of values for 'a': 20 (from the first local declaration), 30 (from the inner block), and 20 (from the global variable). The Windows taskbar at the bottom shows the time as 10:32 AM on 16-Jul-24.

```
int a=10, b=20, c=30; // global var
void main()
{
    int a=20; // local var
    clrscr();
    printf("a=%d\t",a); 20
    {
        int a=30; // local var
        printf("a=%d\t",a); 30
        a=50;
    } a deleted
    printf("a=%d",a); 20
    getch();
}
```

//     a=20                             a=30                             a=20



Turbo C++ IDE

File Edit Search Run Compile Debug Project Options Window

9AM.CPP 1

```
#include<stdio.h>
#include<conio.h>
int a=10, b=20, c=30; // global var
void main()
{
    clrscr();
    printf("a=%d\t",a);
    {
        int a=30; // local var
        printf("a=%d\t",a);
        a=50;
    }
    printf("a=%d",a);
    getch();
}
// a=10 a=30 a=10
```

int a=10, b=20, c=30; // global var

void main()

{

clrscr();

printf("a=%d\t",a); 10

{

int a=30; // local var

printf("a=%d\t",a); 30

a=50;

}

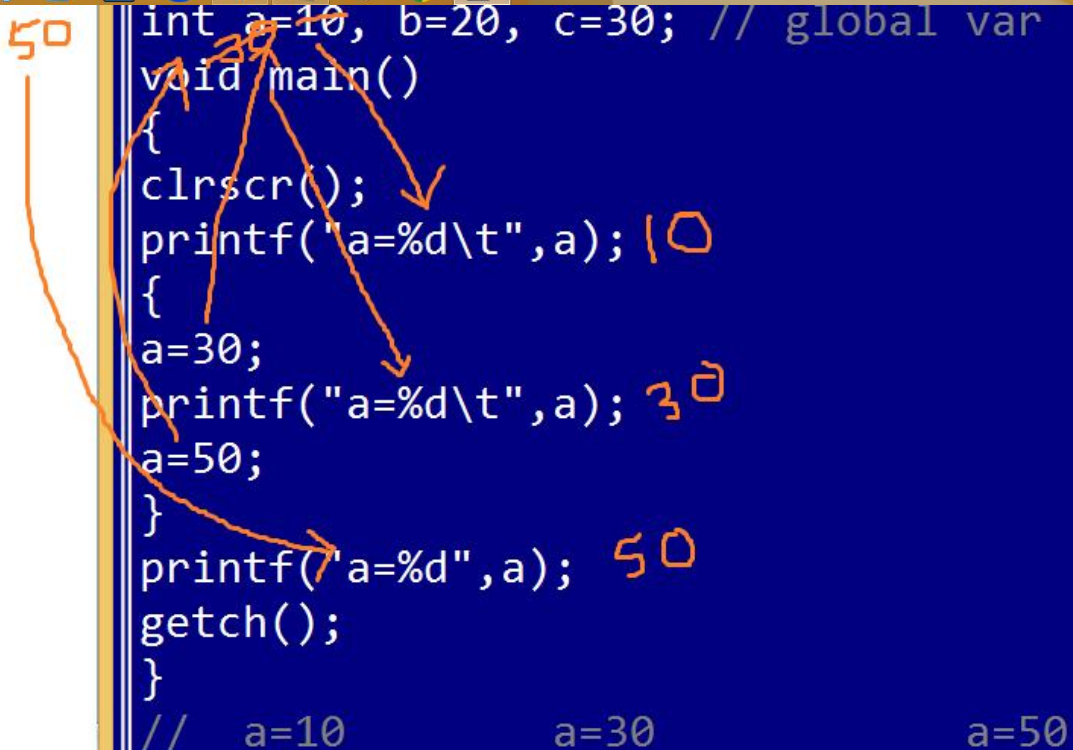
printf("a=%d",a); 10

getch();

}

// a=10 a=30 a=10

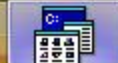
```
Turbo C++ IDE
File Edit Search Run Compile Debug Project Options Window
[ ] 9AM.CPP 1
#include<stdio.h>
#include<conio.h>
int a=10, b=20, c=30; // global var
void main()
{
clrscr();
printf("a=%d\t",a);
{
a=30;
printf("a=%d\t",a);
a=50;
}
printf("a=%d",a);
getch();
}
// a=10 a=30 a=50
```



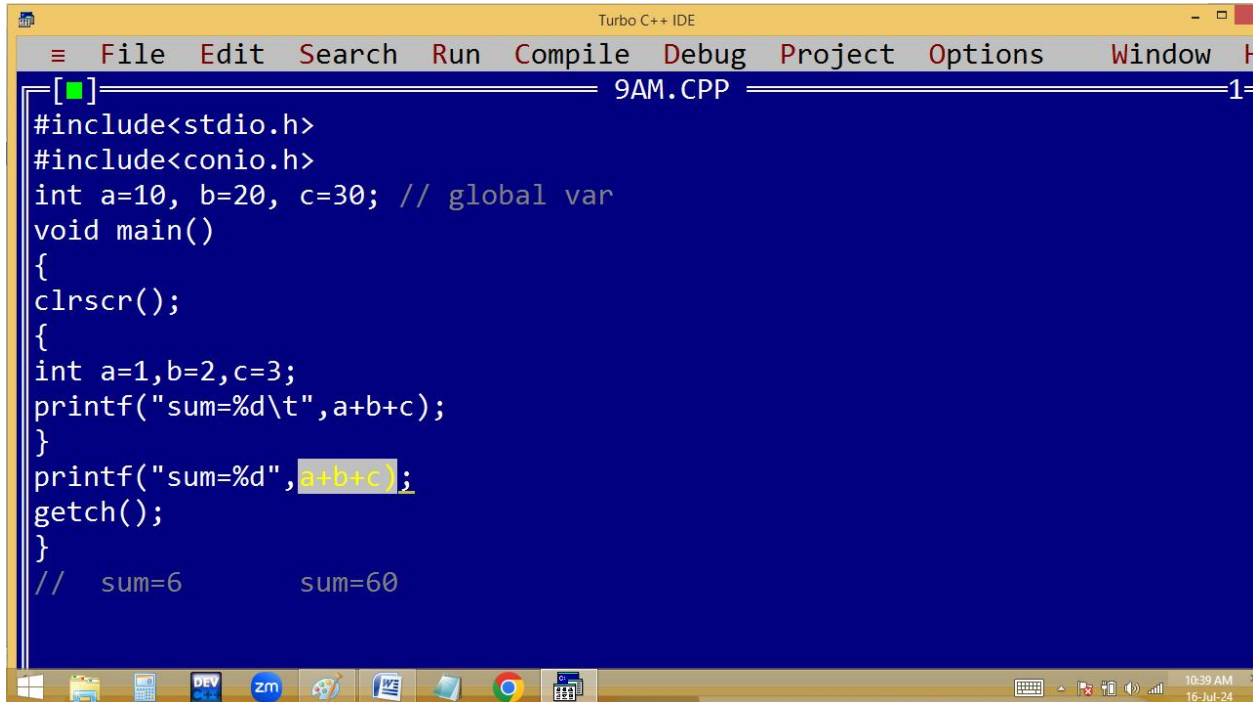


sum=6

sum=60\_

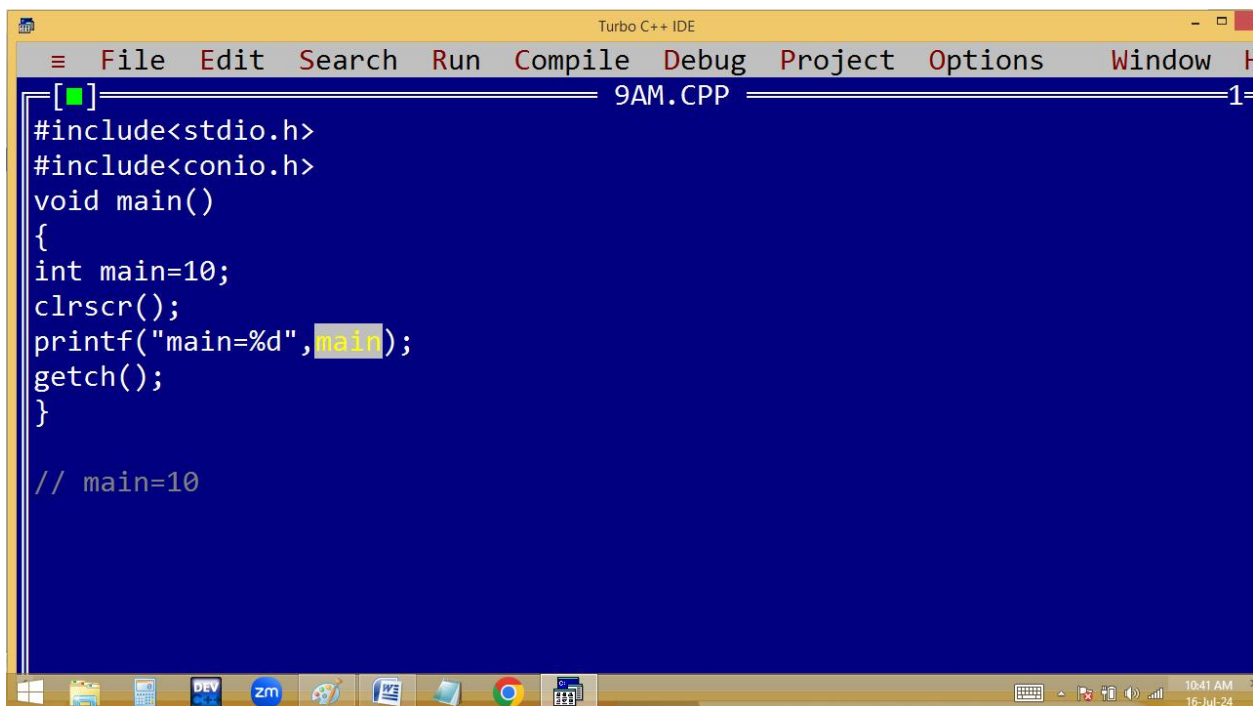






The screenshot shows the Turbo C++ IDE with a menu bar (File, Edit, Search, Run, Compile, Debug, Project, Options, Window) and a toolbar. The main window displays a C++ program named 9AM.CPP. The code includes `<stdio.h>` and `<conio.h>`, defines global variables `a=10, b=20, c=30`, and a `main()` function. Inside `main()`, it calls `clrscr()`, declares local variables `a=1, b=2, c=3`, prints the sum of these local variables, and then prints the sum of the global variables. The program ends with `getch()`. Comments at the bottom show the expected output: `// sum=6` and `sum=60`. The Windows taskbar at the bottom shows the time as 10:39 AM on 16-Jul-24.

```
[■] 9AM.CPP 1
#include<stdio.h>
#include<conio.h>
int a=10, b=20, c=30; // global var
void main()
{
clrscr();
{
int a=1,b=2,c=3;
printf("sum=%d\t",a+b+c);
}
printf("sum=%d",a+b+c);
getch();
}
// sum=6      sum=60
```



The screenshot shows the Turbo C++ IDE with the same menu bar and toolbar. The main window displays a C++ program named 9AM.CPP. The code includes `<stdio.h>` and `<conio.h>`, and a `main()` function. Inside `main()`, it declares a variable `main=10`, calls `clrscr()`, prints the value of `main`, and then calls `getch()`. A comment at the bottom shows the expected output: `// main=10`. The Windows taskbar at the bottom shows the time as 10:41 AM on 16-Jul-24.

```
[■] 9AM.CPP 1
#include<stdio.h>
#include<conio.h>
void main()
{
int main=10;
clrscr();
printf("main=%d",main);
getch();
}

// main=10
```

