

The image shows a screenshot of the Turbo C++ (TC) IDE. The top window, titled 'Edit', displays a C program. The code is as follows:

```
Line 9      Col 16  Insert Indent Tab Fill Unindent * E:11AM.C
#include<stdio.h>
#include<conio.h>
void main()
{
    unsigned int a=32768;
    clrscr();
    printf("a=%d\n",a); /* -32768 */
    a=65540;
    printf("a=%u\n",a); /* 4 */
    a=32770;
    printf("a=%d\n",a); /* -32766 */
    a=-32770;
    printf("a=%u",a); /* 32766 */
    getch();
}
```

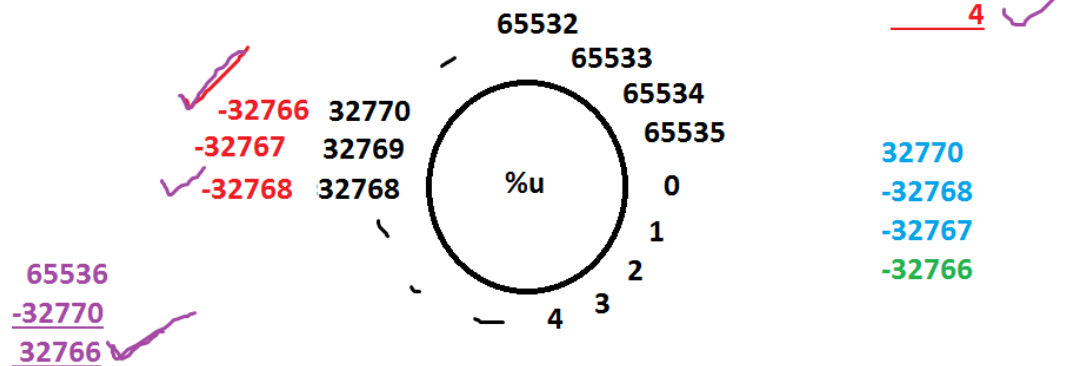
The bottom window shows the output of the program, which is:

```
a=-32768
a=4
a=-32766
a=32766
```

Both windows include a status bar at the bottom with the text 'Activate Windows Go to PC settings to activate Windows.' and a system tray on the right showing the time as 11:21 AM on 22-Jun-24. The taskbar at the very bottom contains icons for Windows, Chrome, File Explorer, VLC, Calculator, DEV, WE, Paint, Zoom, and the TC application.

unsigned int cycle

a=32768

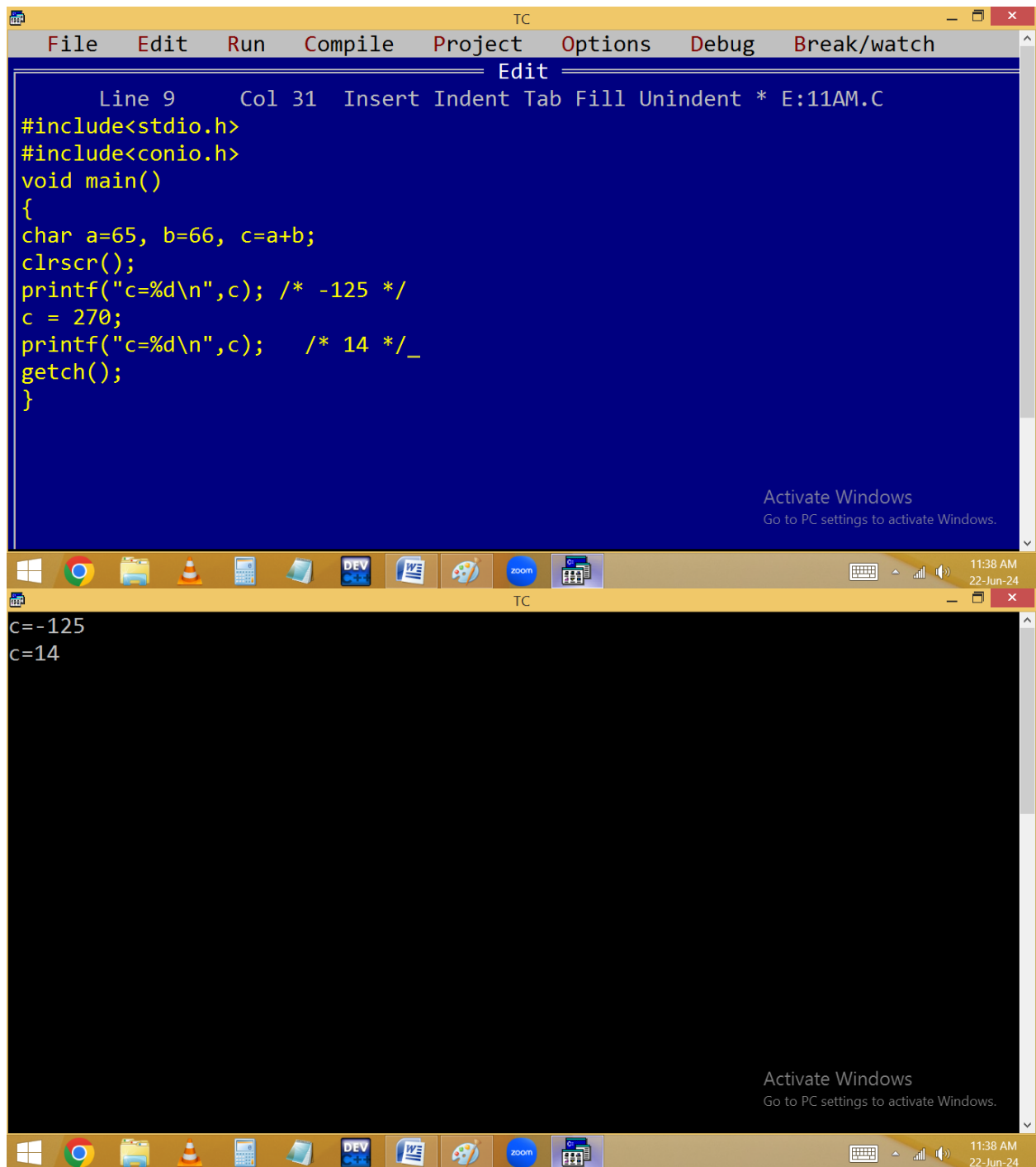


C uses ascii character set → 256 characters

$$256/2 = 128$$

Signed char → -128 to +127

Unsigned char → 0 to 255

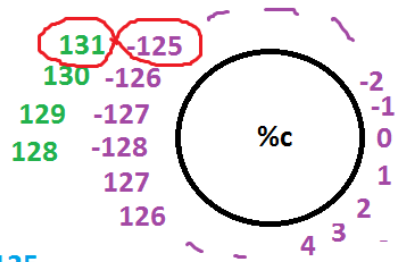


char cycle 256 ascii char

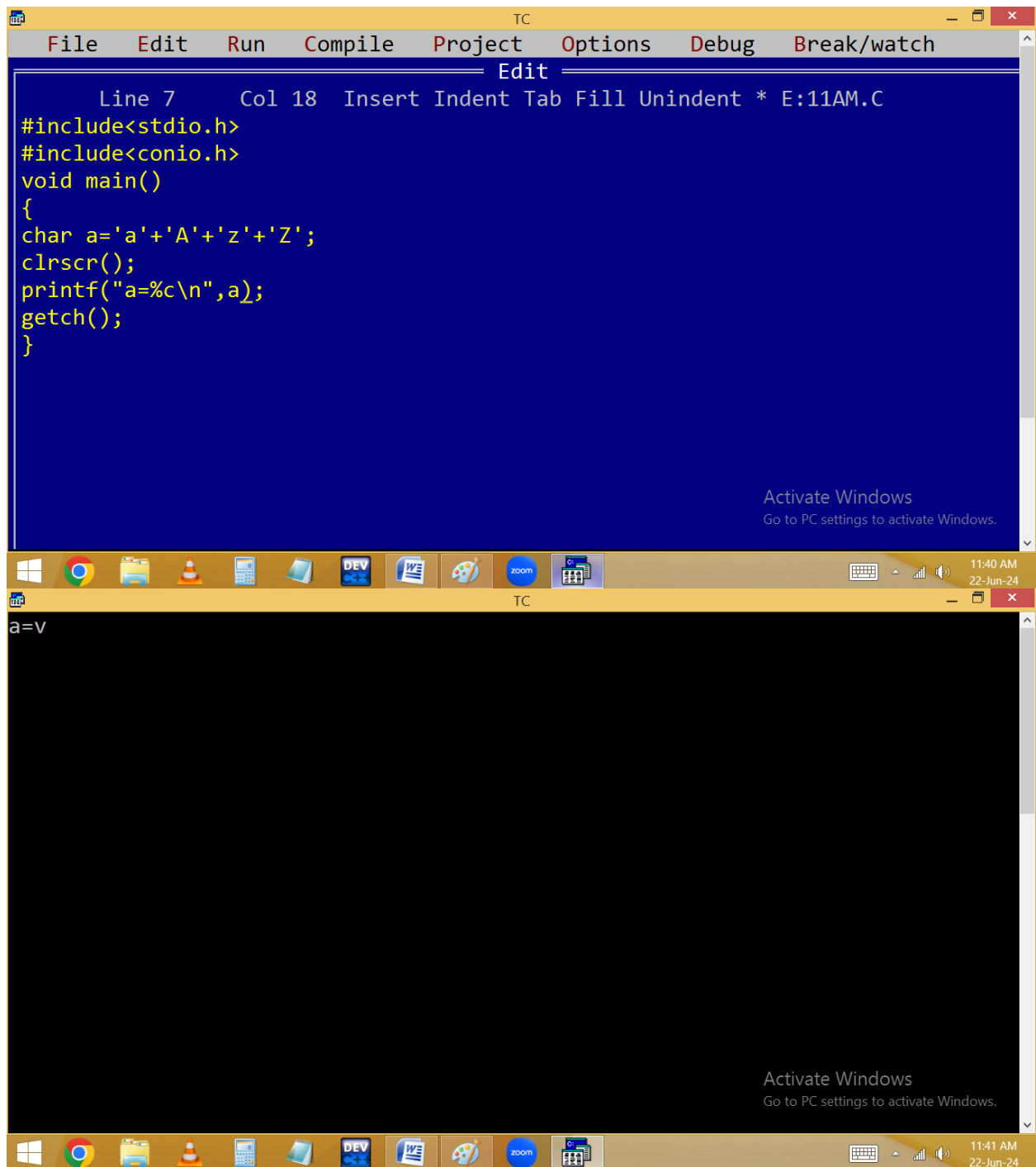
a=65
b=66
c=131

256
-131
-125

131
-128 + 3 = -125
3



270
-256
14 ✓



$$97+65+122+90=374$$

374

-256

118 = v

VARIABLES

Variable is a container is used to store the values in our programs.

Variable is a named memory location where we can store and manipulate [modify] the values in our programs.

Every variable is going to store in the **primary memory** i.e. **RAM**, which is temporary. Due to this the variable deleted automatically after the function / program execution.

In c compiler always the variables declared in first line only. In C++ we can declare anywhere.

Variables are case sensitive. i.e. lower and upper are different.

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

```
Line 8   Col 26   Insert Indent Tab Fill Unindent * E:11AM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int a=10;
int A=20;
clrscr();
printf("a=%d, A=%d\n",a,A);
getch();
}
```

The bottom window, titled 'TC', shows the output of the program: `a=10, A=20`. The Windows taskbar at the bottom includes icons for various applications and the system clock showing 11:53 AM on 22-Jun-24. An 'Activate Windows' watermark is visible in the bottom right corner of both windows.

Every variable is having 2 stages.

1. Variable declaration / declared

Eg: `int a;`

2. Variable initialization / defined

a=100;

When a variable is initialized then only memory allocated.

Syntax:

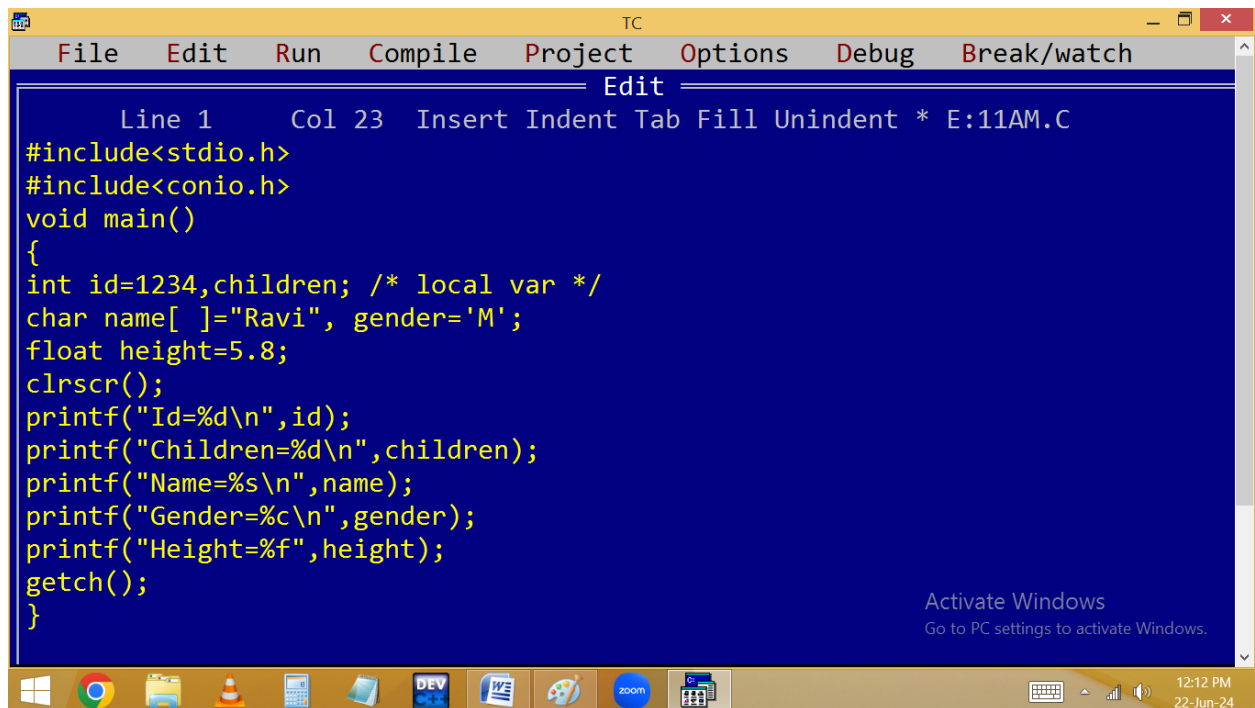
datatype variable[=value], variable[=value],.....;

Eg:

int id=1234, children=2;

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

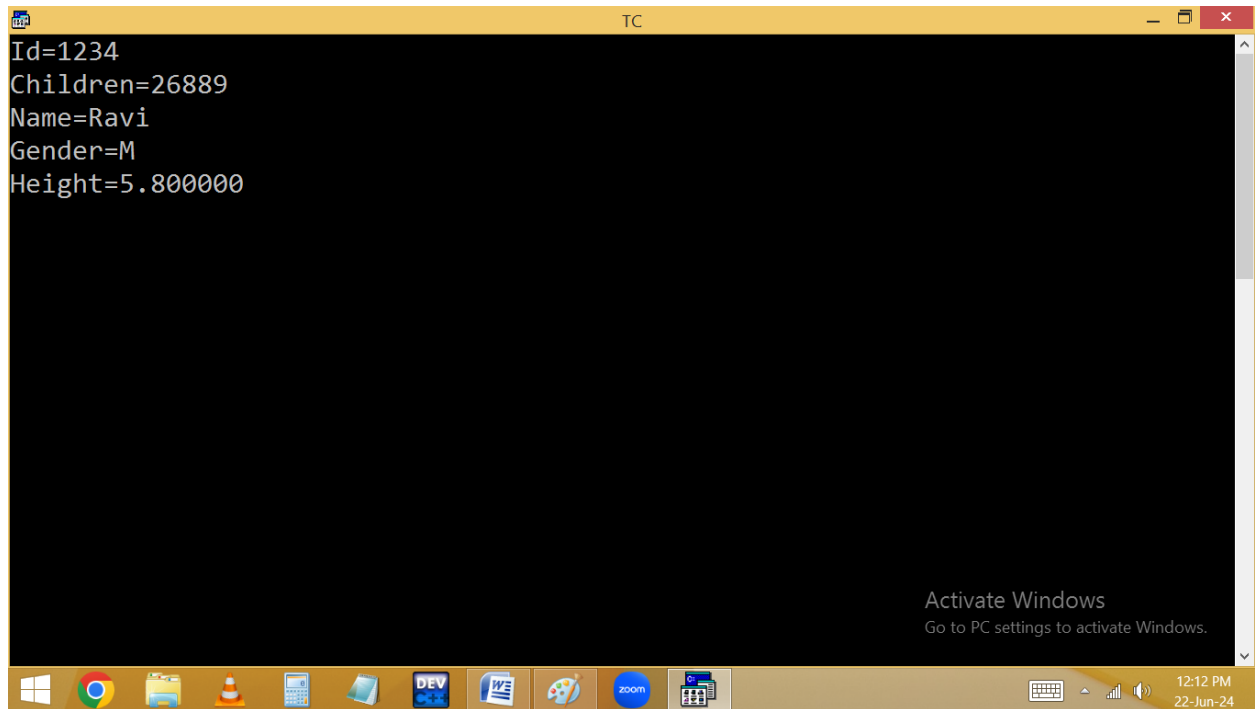
float height = 5.8;



The screenshot shows a Turbo C++ (TC) IDE window. The menu bar includes File, Edit, Run, Compile, Project, Options, Debug, and Break/watch. The status bar at the top indicates 'Line 1 Col 23 Insert Indent Tab Fill Unindent * E:11AM.C'. 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 id=1234,children; /* local var */
    char name[ ]="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();
}
```

At the bottom right of the IDE, there is a message: 'Activate Windows Go to PC settings to activate Windows.' The Windows taskbar is visible at the very bottom, showing various application icons and the system clock indicating 12:12 PM on 22-Jun-24.



A screenshot of a Windows 10 desktop environment. A terminal window titled 'TC' is open, displaying the following text: Id=1234, Children=26889, Name=Ravi, Gender=M, Height=5.800000. The desktop background is dark. The taskbar at the bottom shows various application icons including Windows, Chrome, File Explorer, VLC, Calculator, File Explorer, DEV, WE, Paint, Zoom, and a calendar. The system tray on the right shows the time as 12:12 PM and the date as 22-Jun-24. An 'Activate Windows' watermark is visible in the bottom right corner of the terminal window.

```
Id=1234
Children=26889
Name=Ravi
Gender=M
Height=5.800000
```

Memory allocation for variables:

4 bits = 1 nibble

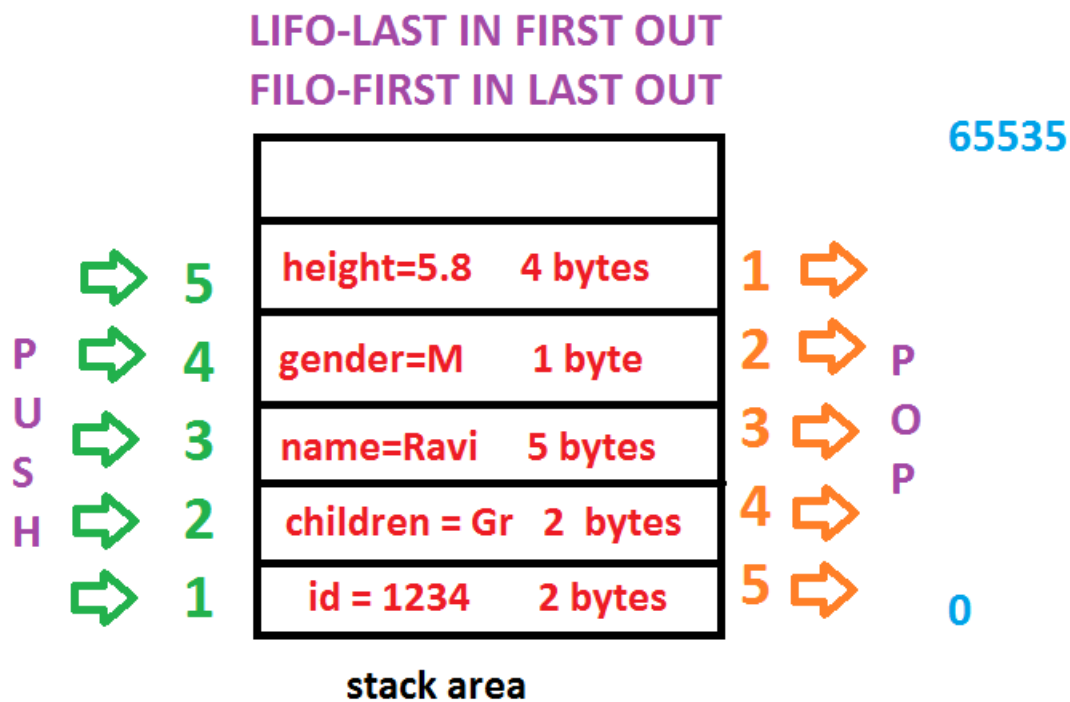
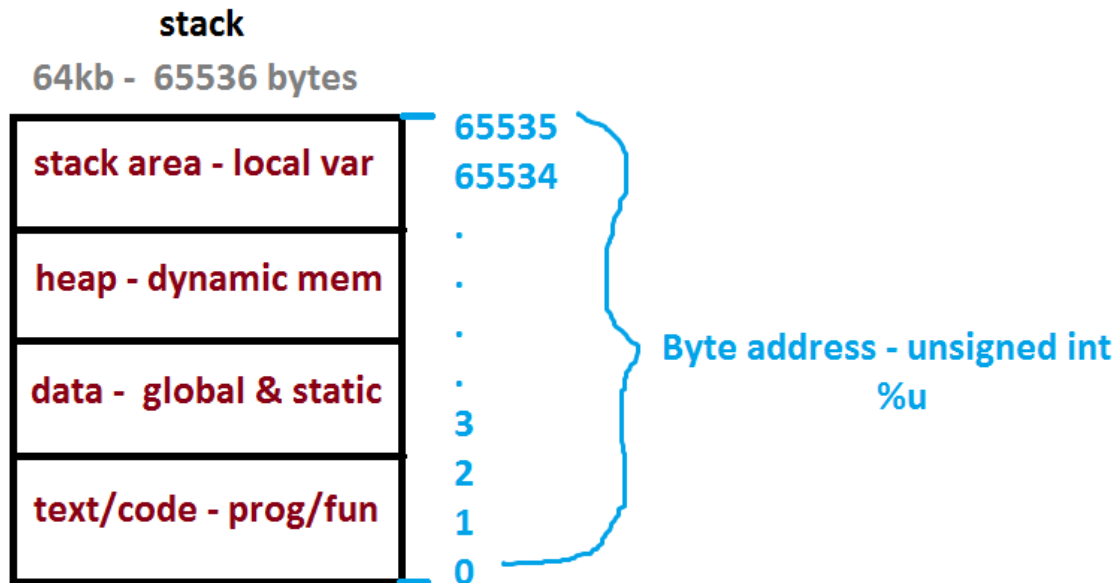
2 nibbles / 8 bits = 1 byte

1024 bytes = 1kb

1024kb = 1 mb

1024mb = 1 gb

1024gb = 1 tb

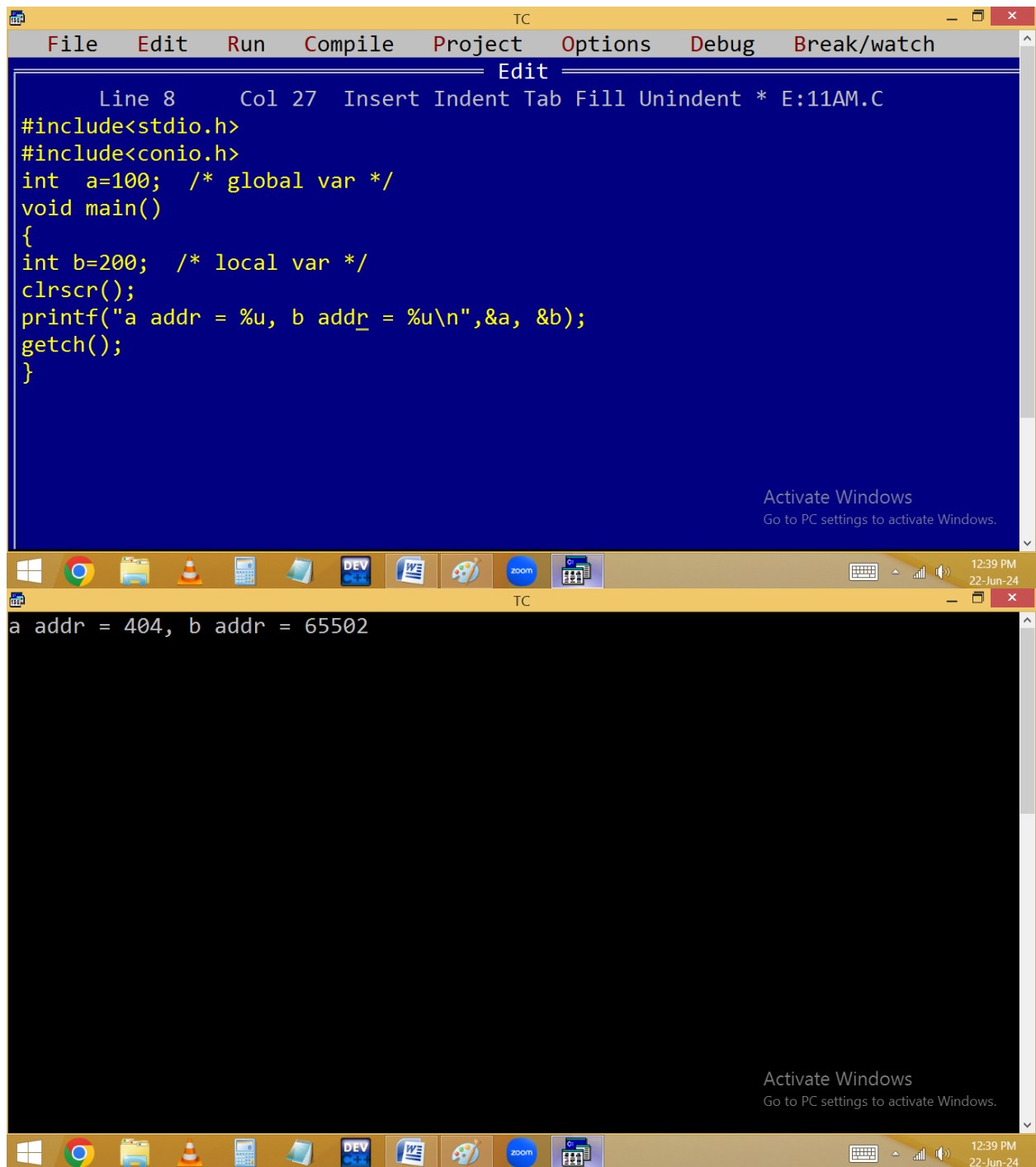


Basically the variables divided into 2 types.

1. Local variables
2. Global variables

	Local variables	Global variables
Declaration	Within function /{ }	Top of the program
Storage area	Stack area	Data area
Initial values [auto values]	Garbage values	Int-0, float-0.000000, char-blank
Scope [availability]	Within fun/{ } only	Anywhere
Life time [active in memory]	Until fun / { } execution	Until main() closed Tot program closed

Finding address of local and global variables[storage area]:



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

```
Line 8    Col 27  Insert Indent Tab Fill Unindent * E:11AM.C
#include<stdio.h>
#include<conio.h>
int  a=100; /* global var */
void main()
{
int b=200; /* local var */
clrscr();
printf("a addr = %u, b addr_ = %u\n",&a, &b);
getch();
}
```

The bottom window shows the output of the program: "a addr = 404, b addr = 65502". The Windows taskbar at the bottom indicates the time is 12:39 PM on 22-Jun-24. An "Activate Windows" watermark is visible in the bottom right corner of both windows.

Finding initial values of local and global variables:

TC

File Edit Run Compile Project Options Debug Break/watch

Edit

Line 9 Col 36 Insert Indent Tab Fill Unindent * E:11AM.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();
}
```

Activate Windows
Go to PC settings to activate Windows.

12:42 PM
22-Jun-24

TC

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

Activate Windows
Go to PC settings to activate Windows.

12:42 PM
22-Jun-24