

Pointer to array:

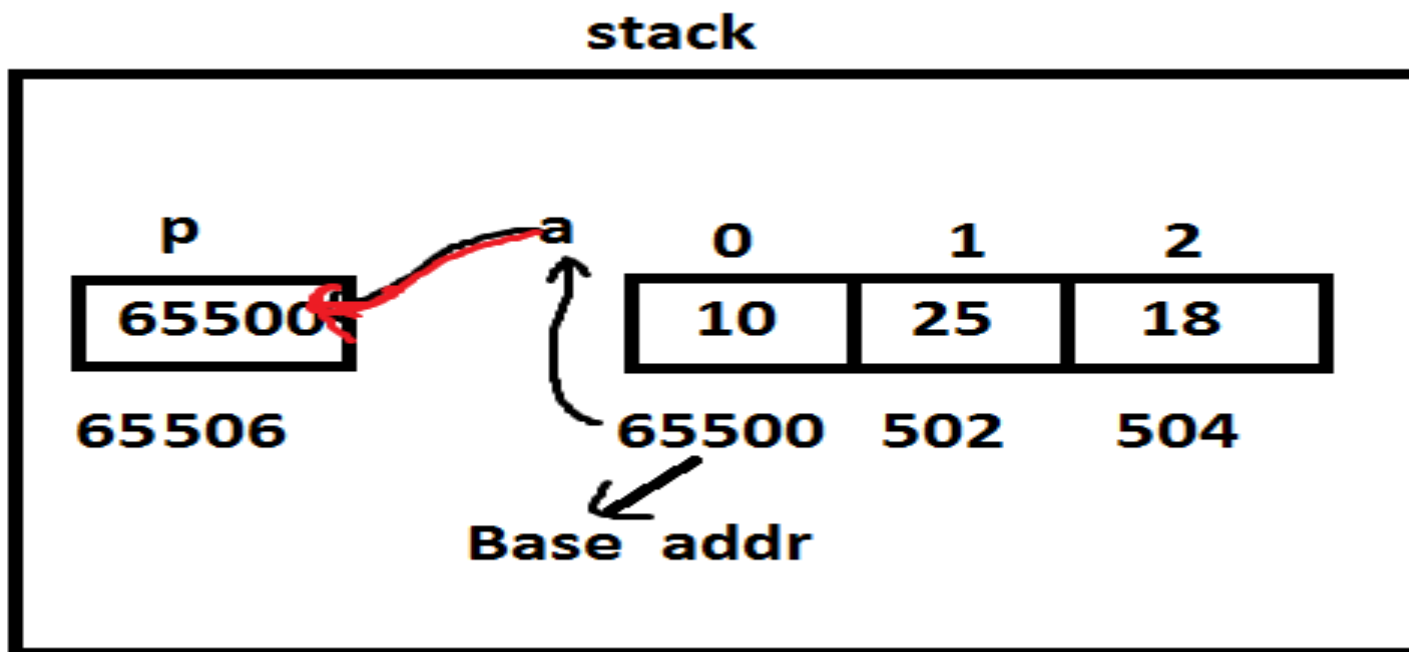
Array is implicit pointer. Due to this it holds the base cell addr [0 cell addr] implicitly. By assigning the array name or 0 cell addr to the pointer, we can handle array elements using the following syntax.

`*(ptrvariable + offset/index * sizeof(variable));`

Eg:

```
int a[3]={10, 25, 18}, *p, i;
```

```
p = a ; or p = &a[0]; or p = &a;
```



```
for(i=0;i<3;i++)
```

```
printf("%4d", *(p+i));
```

Here `*(p+i)` meaning is:

p is 65500

1. `*(p+0*2) → *65500 → value at 65500 → 10`

2. `*(p+1*2) → *65502 → value at 65502 → 25`

3. $*(p+2*2) \rightarrow *65504 \rightarrow \text{value at } 65504 \rightarrow 18$

Note: Here 2 is int size.

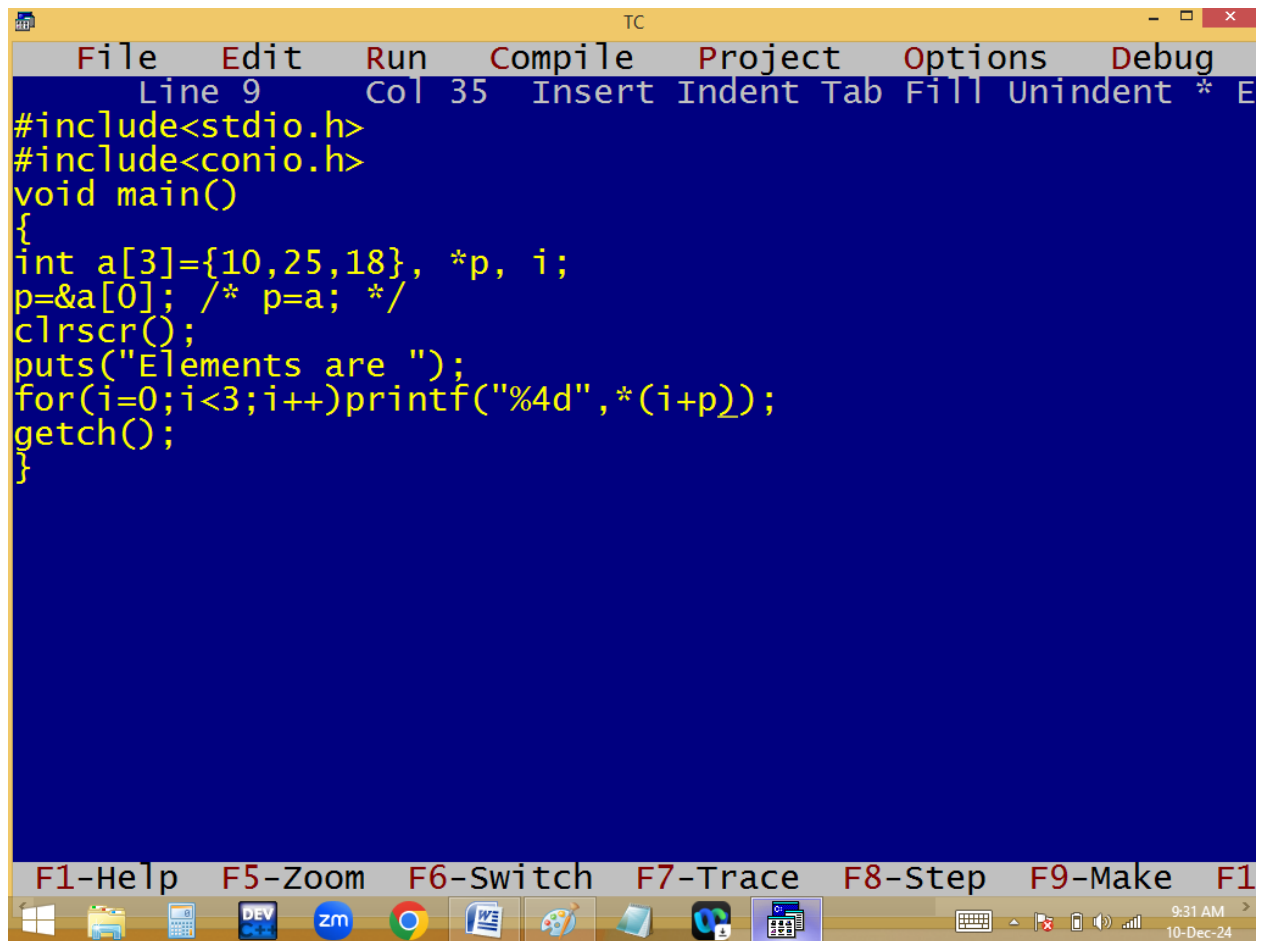
Eg:

```
#include<stdio.h>
#include<conio.h>
void main()
{
    int *p, a[3]={10,25,18}, i;
    clrscr();
    p = a; /* p=&a[0]; or p=&a; */
    printf("Elements are: ");
    for(i=0;i<3;i++)
        printf("%4d",*(p+i));
    getch();
}
```

Output: Elements are: 10 25 18

Note: We can access array elements using array / pointer in following ways.

a[i] / i[a] / p[i] / i[p] / *(p+i) / *(a+i) / *(i+p) / *(i+a)

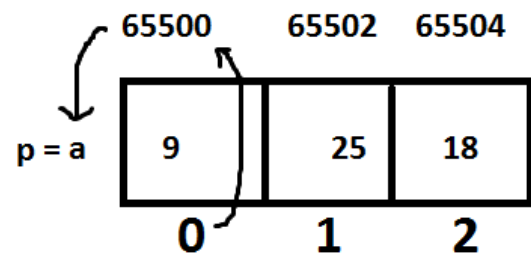


```
TC
File Edit Run Compile Project Options Debug
Line 9 Col 35 Insert Indent Tab Fill Unindent * E
#include<stdio.h>
#include<conio.h>
void main()
{
int a[3]={10,25,18}, *p, i;
p=&a[0]; /* p=a; */
clrscr();
puts("Elements are ");
for(i=0;i<3;i++)printf("%4d",*(i+p));
getch();
}
```

F1-Help F5-Zoom F6-Switch F7-Trace F8-Step F9-Make F10-Run

9:31 AM
10-Dec-24

```
TC
Elements are
10 25 18
```

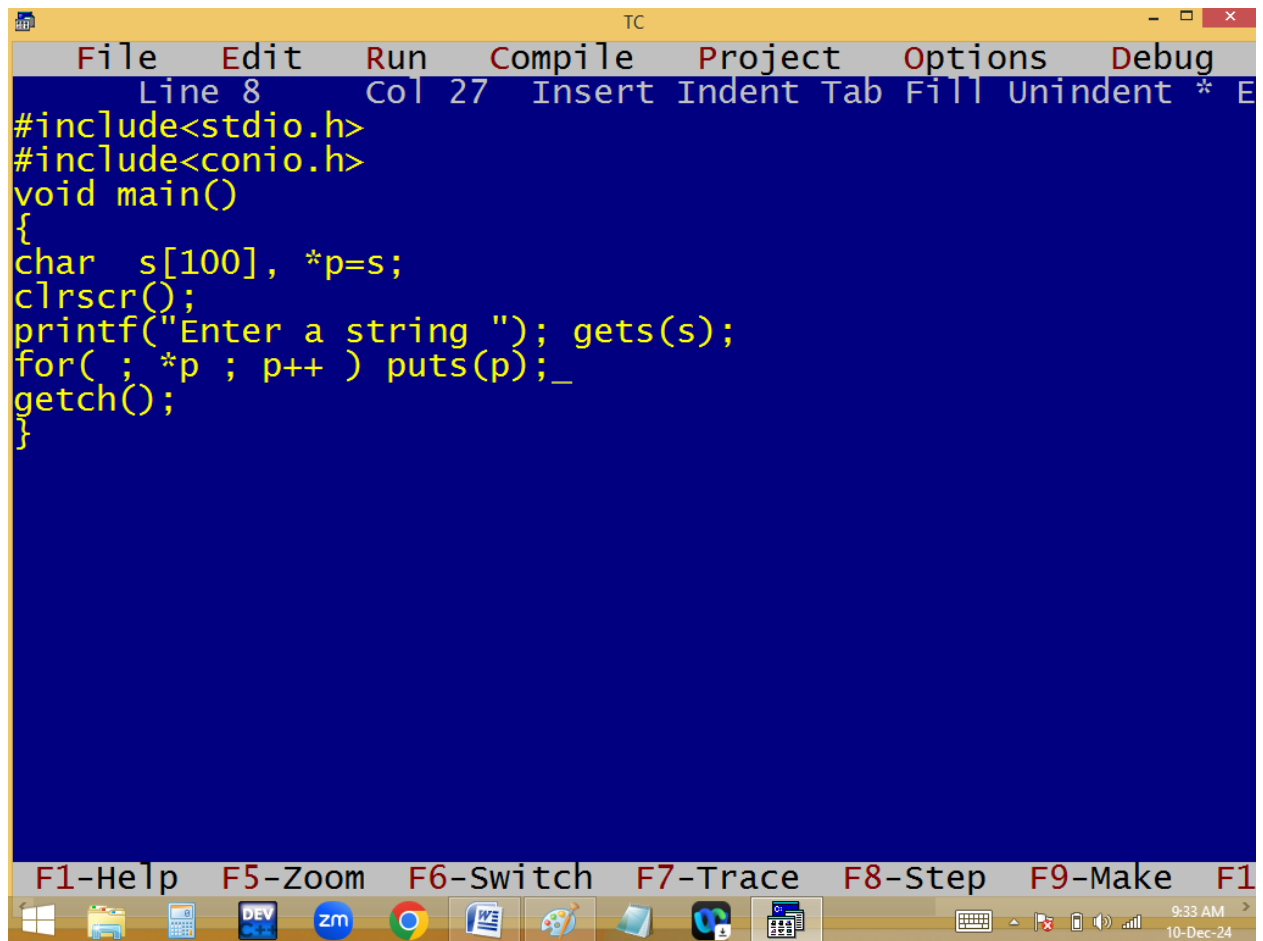


```
for( i=0; i<3;i++ ) p(* ( p + i ) );
```

↓

$*65500+0*2=*65500 \Rightarrow \text{value at } 65500 \Rightarrow 9$
 $*65500+1*2=*65502 \Rightarrow \text{value at } 65502 \Rightarrow 25$
 $*65500+2*2=*65504 \Rightarrow \text{value at } 65504 \Rightarrow 18$

Pointer to string:

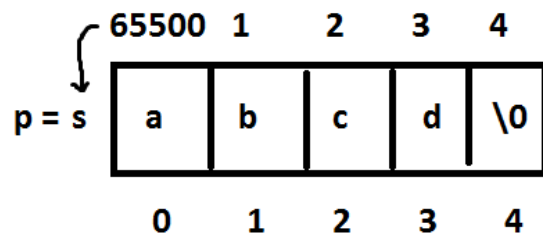


```
TC
File Edit Run Compile Project Options Debug
Line 8 Col 27 Insert Indent Tab Fill Unindent * E
#include<stdio.h>
#include<conio.h>
void main()
{
char s[100], *p=s;
clrscr();
printf("Enter a string "); gets(s);
for( ; *p ; p++ ) puts(p);_
getch();
}
```

F1-Help F5-Zoom F6-Switch F7-Trace F8-Step F9-Make F10-Exit

9:33 AM 10-Dec-24

```
TC
Enter a string Vanitha
Vanitha
anitha
nitha
itha
tha
ha
a
```

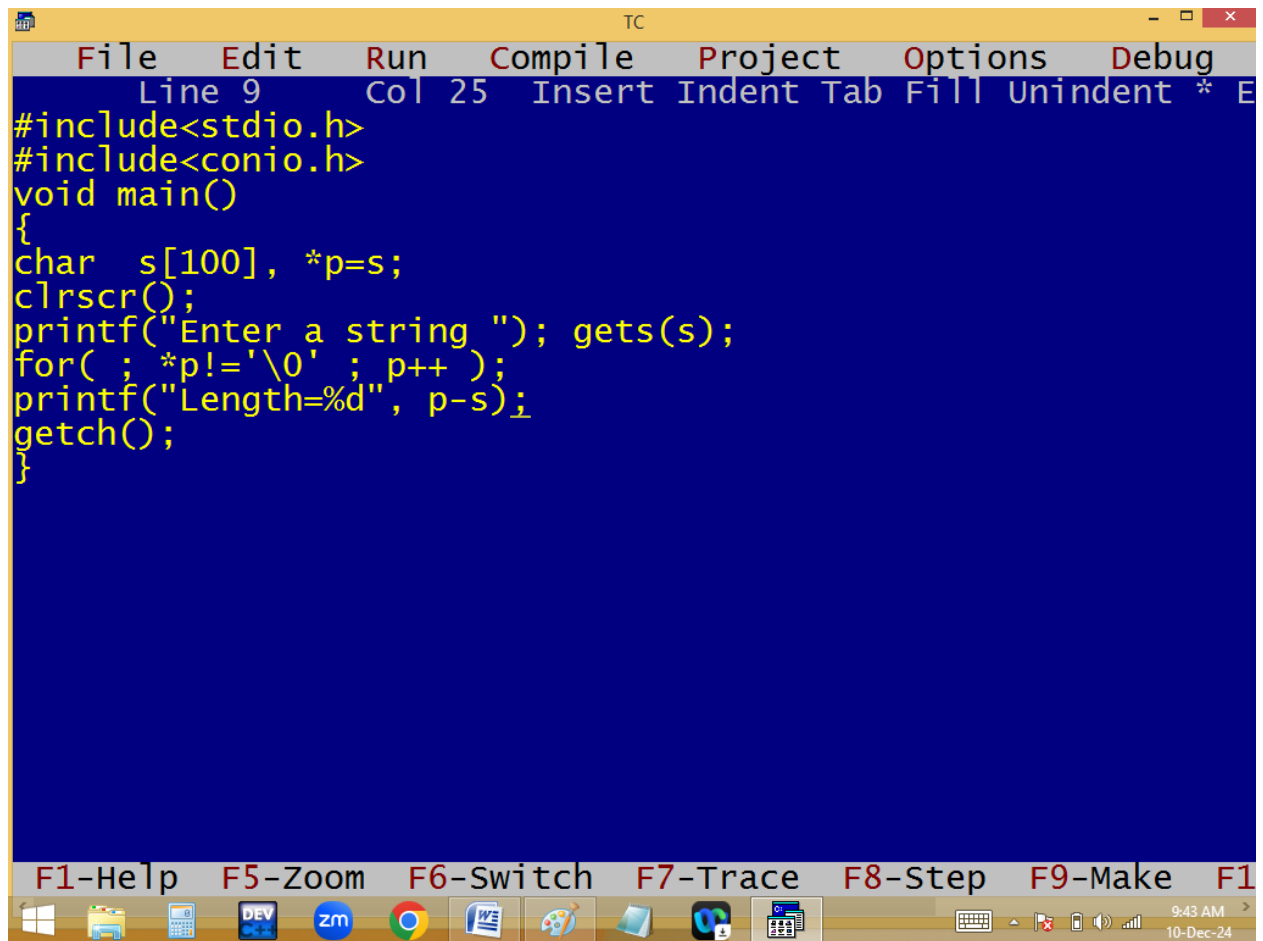


```
*p!='\0'
for( ; *p ; p++ ) puts ( p );
```

↓

- 65500 to \0 ==> abcd
- 65501 to \0 ==> bcd
- 65502 to \0 ==> cd
- 65503 to \0 ==> d
- 65504 ==> \0 != \0 ==> false

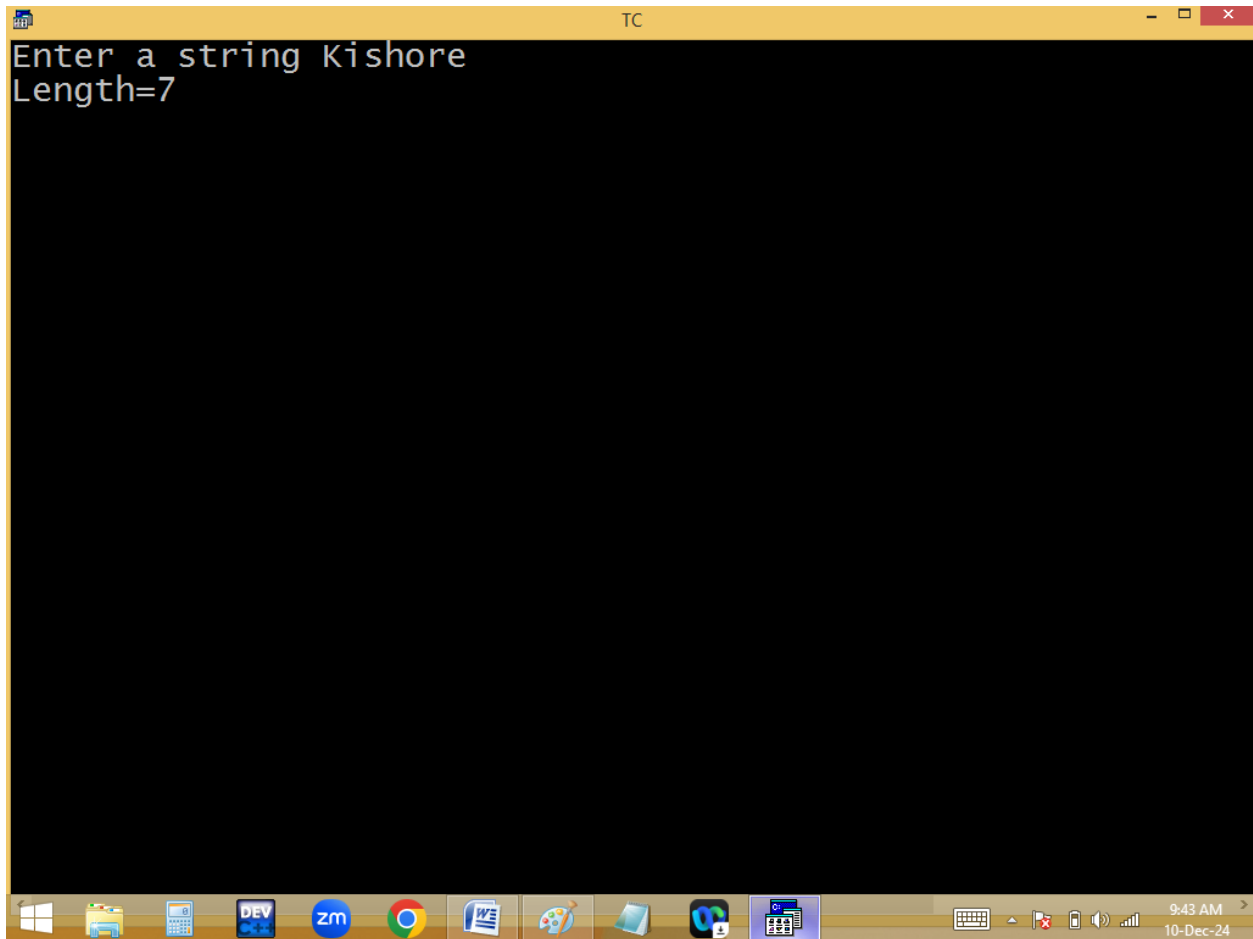
Finding string length using pointer only:



The image shows a screenshot of a Turbo C++ (TC) IDE window. The window has a yellow title bar with the text "TC" and standard window controls. The menu bar includes "File", "Edit", "Run", "Compile", "Project", "Options", and "Debug". Below the menu bar, a status bar shows "Line 9", "Col 25", and a list of editing actions: "Insert", "Indent", "Tab", "Fill", "Unindent", and a cursor icon. 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()
{
char  s[100], *p=s;
clrscr();
printf("Enter a string "); gets(s);
for( ; *p!='\0' ; p++ );
printf("Length=%d", p-s);
getch();
}
```

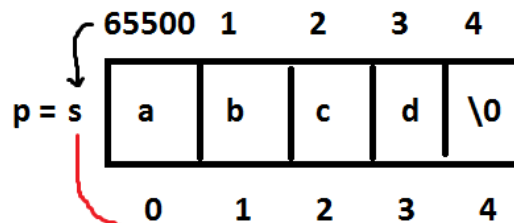
At the bottom of the window, there is a toolbar with function key shortcuts: "F1-Help", "F5-Zoom", "F6-Switch", "F7-Trace", "F8-Step", "F9-Make", and "F10-Run". Below the toolbar is the Windows taskbar, which includes icons for the Start button, File Explorer, Calculator, DEV C++, Zoom, Google Chrome, Word, Paint, and other applications. The system clock in the bottom right corner shows "9:43 AM" and "10-Dec-24".



```
*p!=='\0'  
for( ; *p ; p++ ) puts ( p );
```



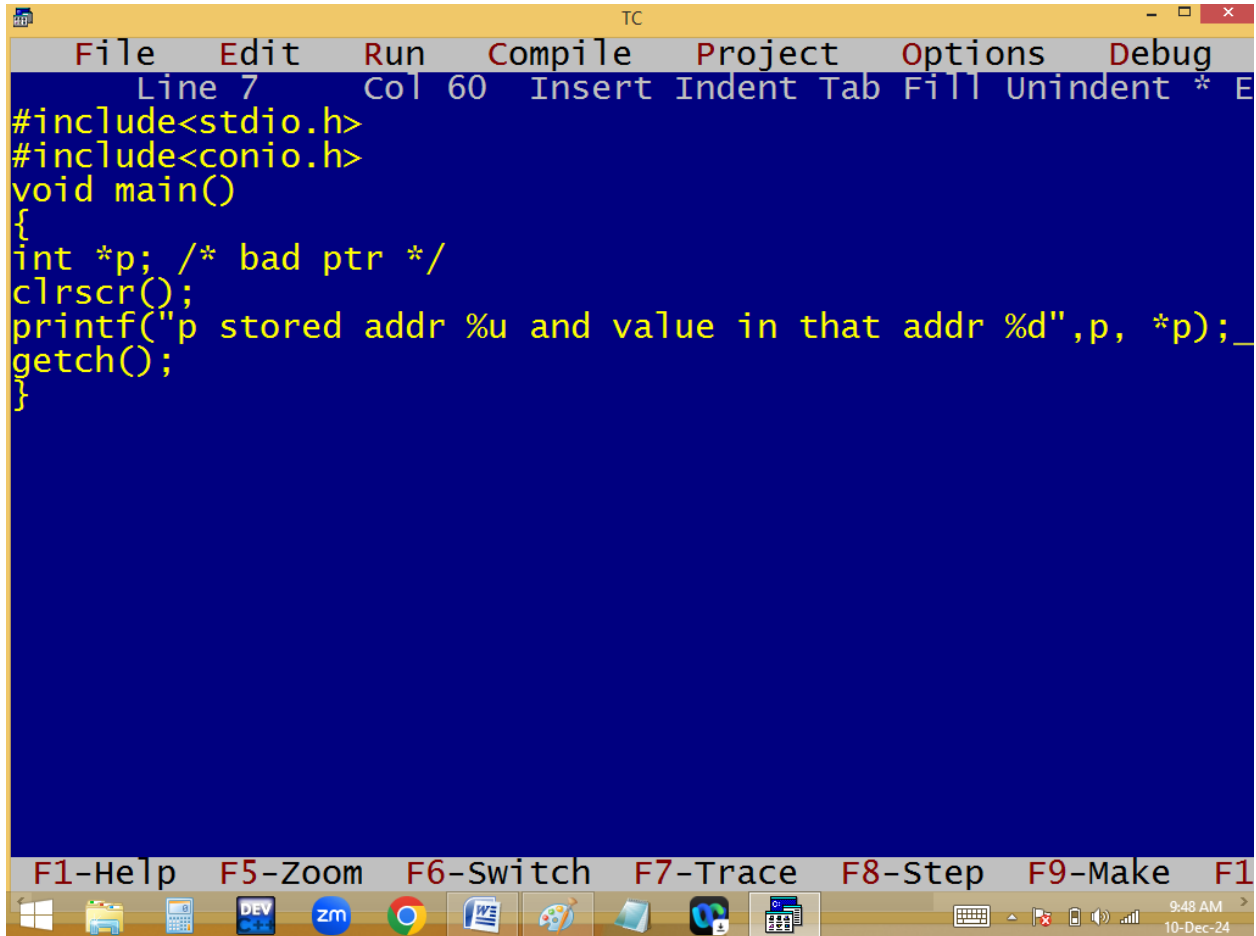
```
65500 to \0 ==> abcd  
65501 to \0 ==> bcd  
65502 to \0 ==> cd  
65503 to \0 ==> d  
65504 ==> \0 != \0 ==> false
```



```
p("Length=%d", p-s);
```

65504 - 65500 = 4

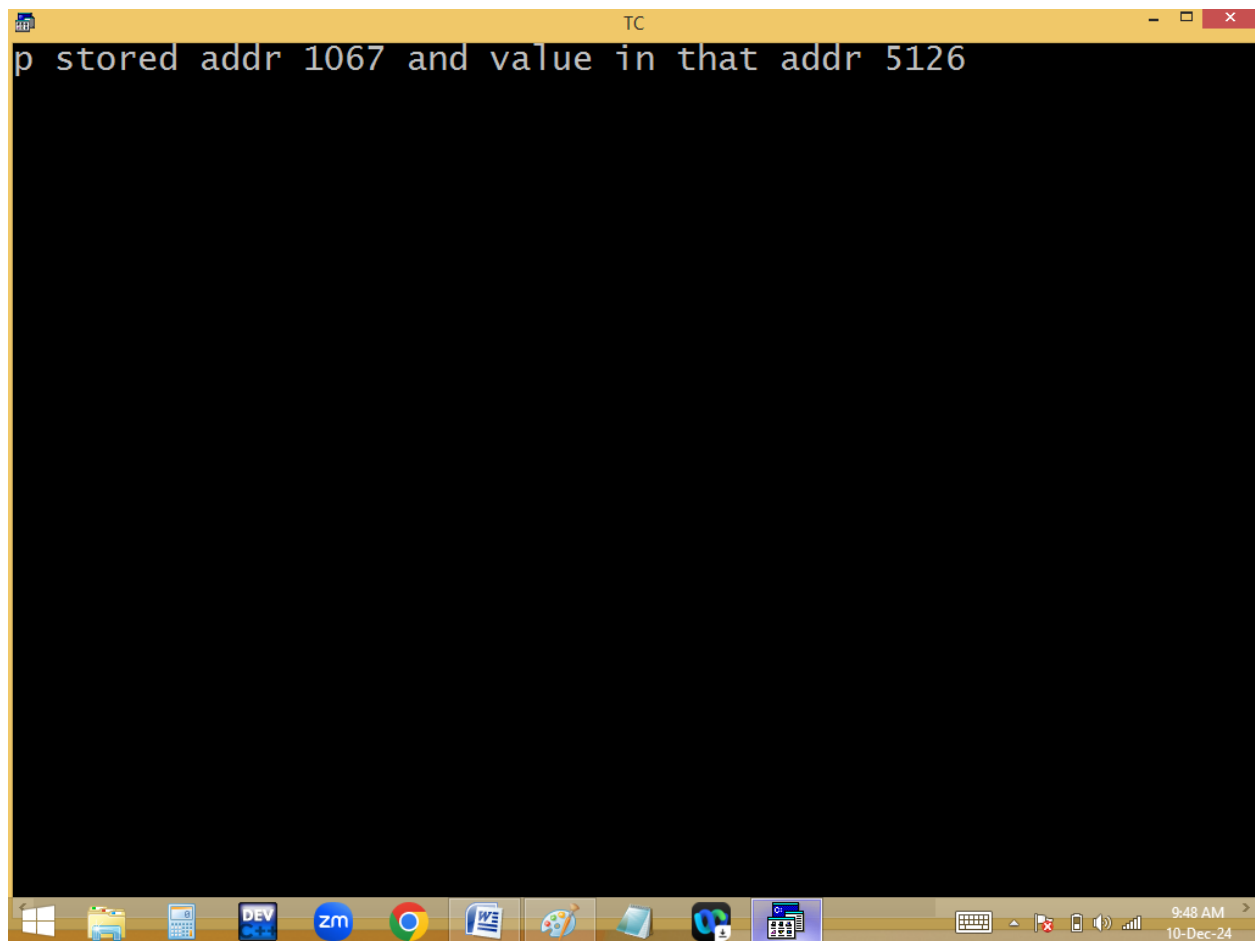
Bad / wild pointer: A pointer is declared but not initialized. In this situation the pointer is storing some unknown value and address. This kind of pointer is called bad / wild pointer.



```
TC
File Edit Run Compile Project Options Debug
Line 7 Col 60 Insert Indent Tab Fill Unindent * E
#include<stdio.h>
#include<conio.h>
void main()
{
int *p; /* bad ptr */
clrscr();
printf("p stored addr %u and value in that addr %d",p, *p);_
getch();
}
```

F1-Help F5-Zoom F6-Switch F7-Trace F8-Step F9-Make F1

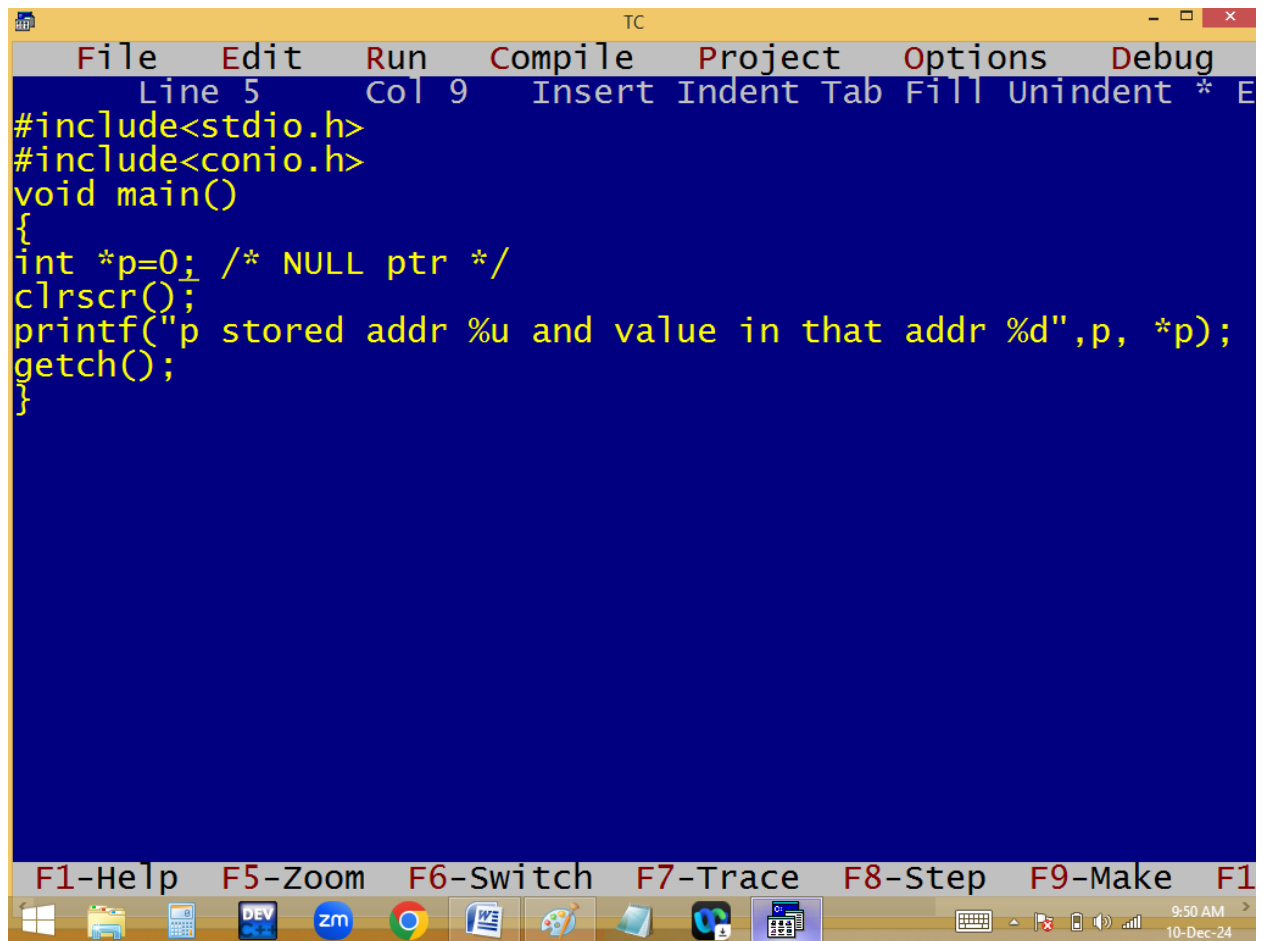
9:48 AM
10-Dec-24



The image shows a screenshot of a Turbo C++ (TC) compiler window. The window has a yellow title bar with the text "TC" in the center. The main area is black, and the text "p stored addr 1067 and value in that addr 5126" is displayed in a white, monospaced font. The Windows taskbar is visible at the bottom, showing various application icons and the system clock indicating 9:48 AM on 10-Dec-24.

```
p stored addr 1067 and value in that addr 5126
```

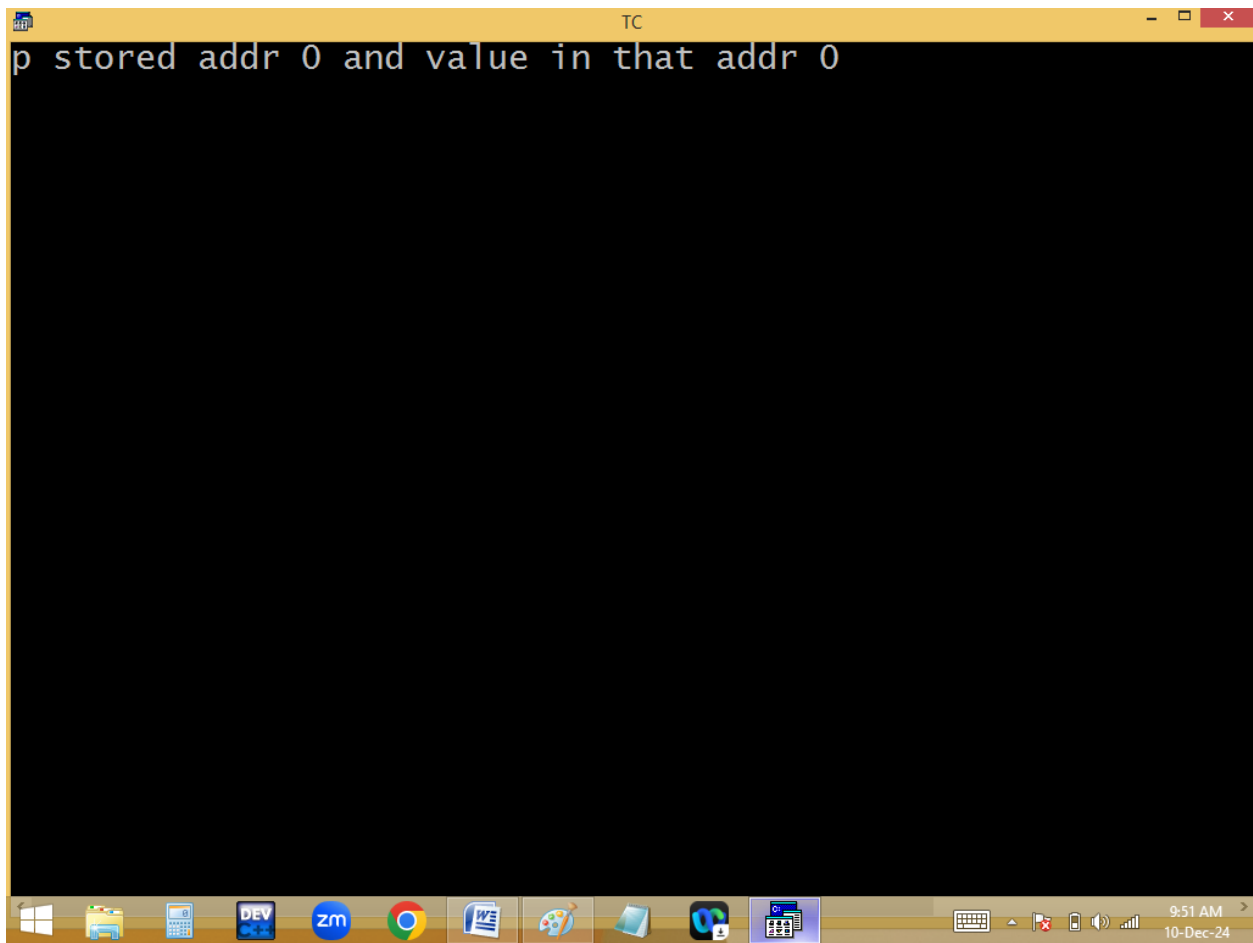
NULL pointer: When a pointer is initialized with 0 / NULL then it is a NULL pointer. To avoid bad and dangling pointers we are using NULL pointer.

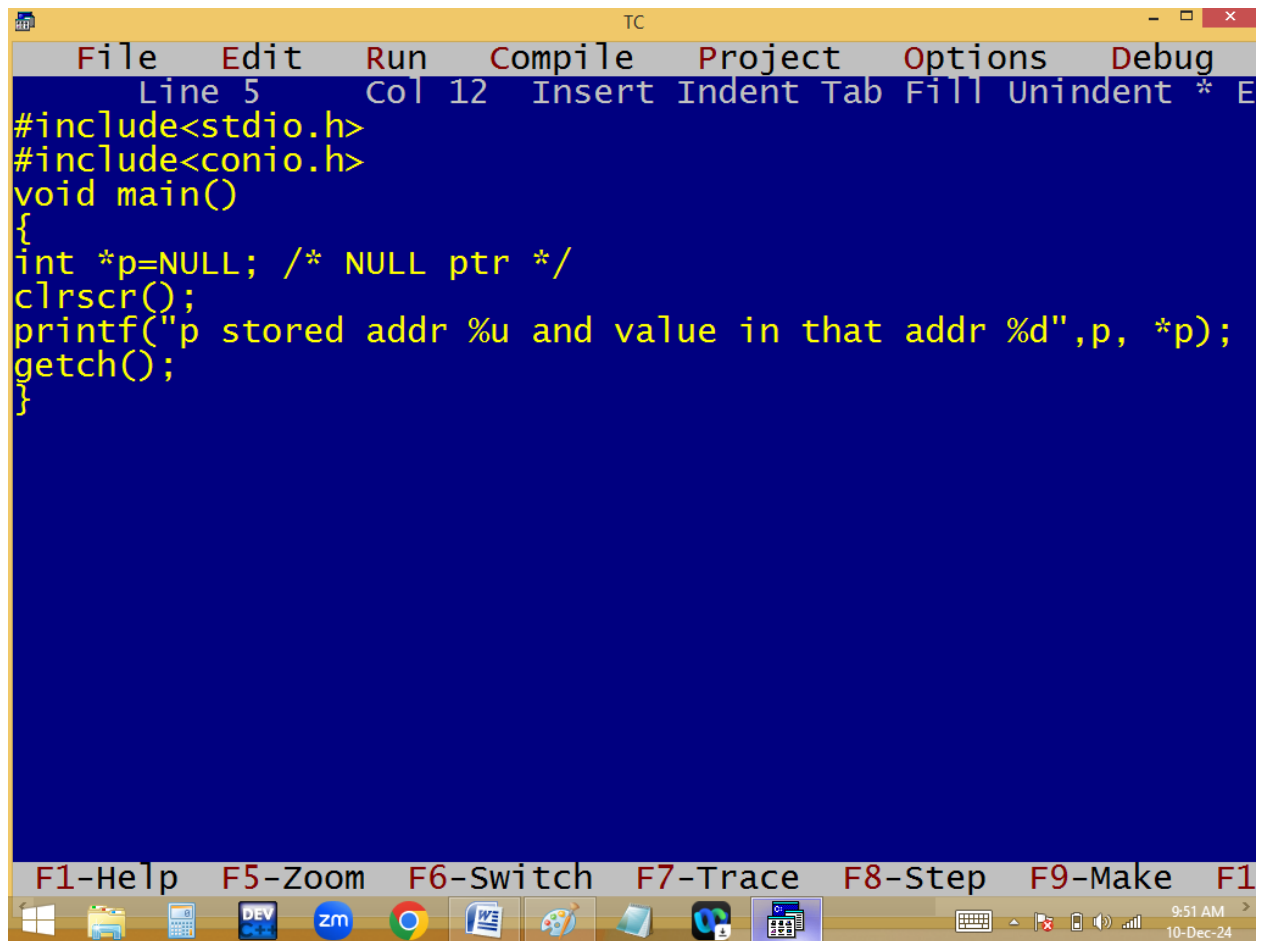


```
TC
File Edit Run Compile Project Options Debug
Line 5 Col 9 Insert Indent Tab Fill Unindent * E
#include<stdio.h>
#include<conio.h>
void main()
{
int *p=0; /* NULL ptr */
clrscr();
printf("p stored addr %u and value in that addr %d",p, *p);
getch();
}
```

F1-Help F5-Zoom F6-Switch F7-Trace F8-Step F9-Make F10-Run

9:50 AM
10-Dec-24

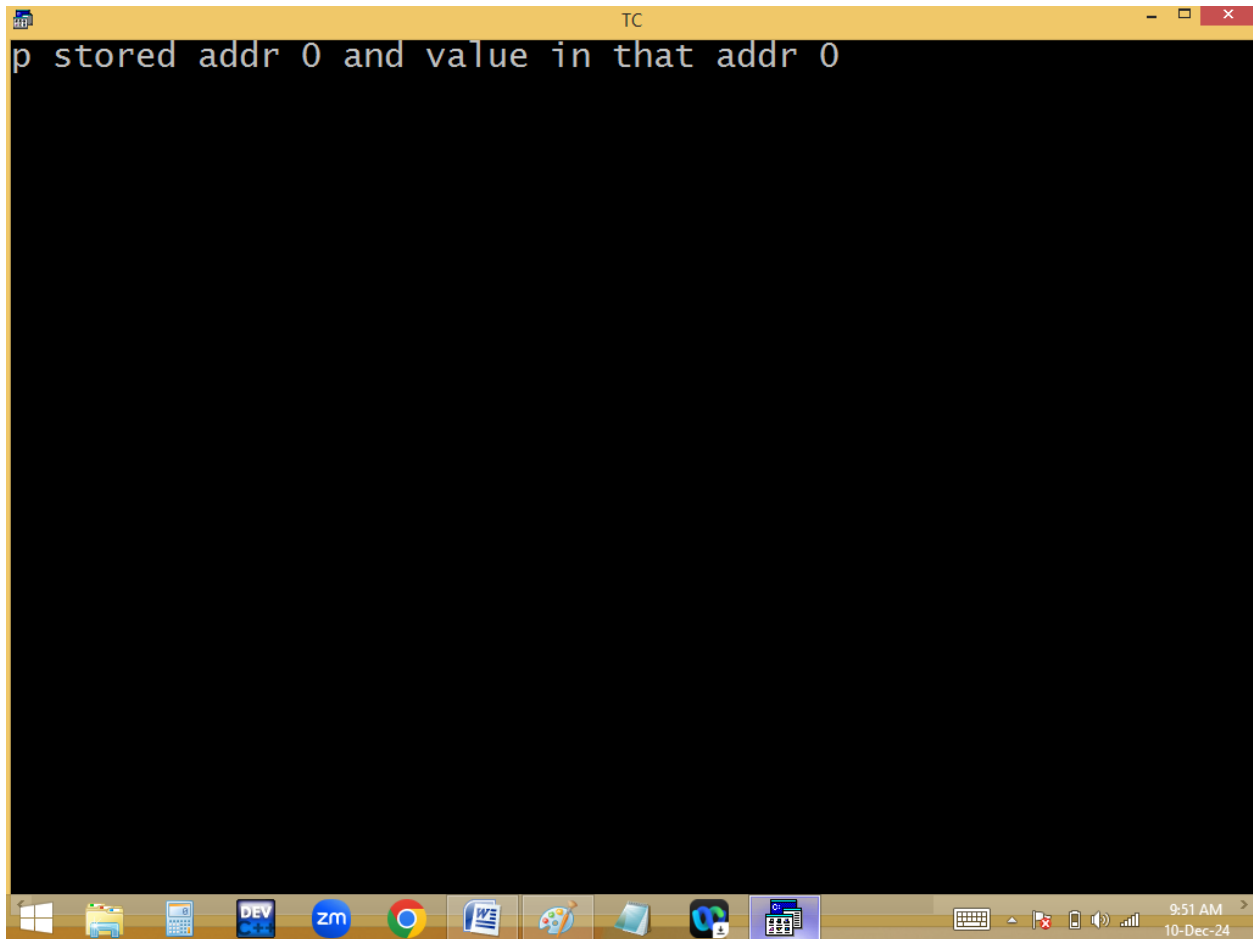




The image shows a screenshot of the Turbo C++ (TC) IDE. The window title is "TC". The menu bar includes "File", "Edit", "Run", "Compile", "Project", "Options", and "Debug". The status bar at the top indicates "Line 5", "Col 12", and "Insert" mode. The code editor has a blue background and contains the following C code:

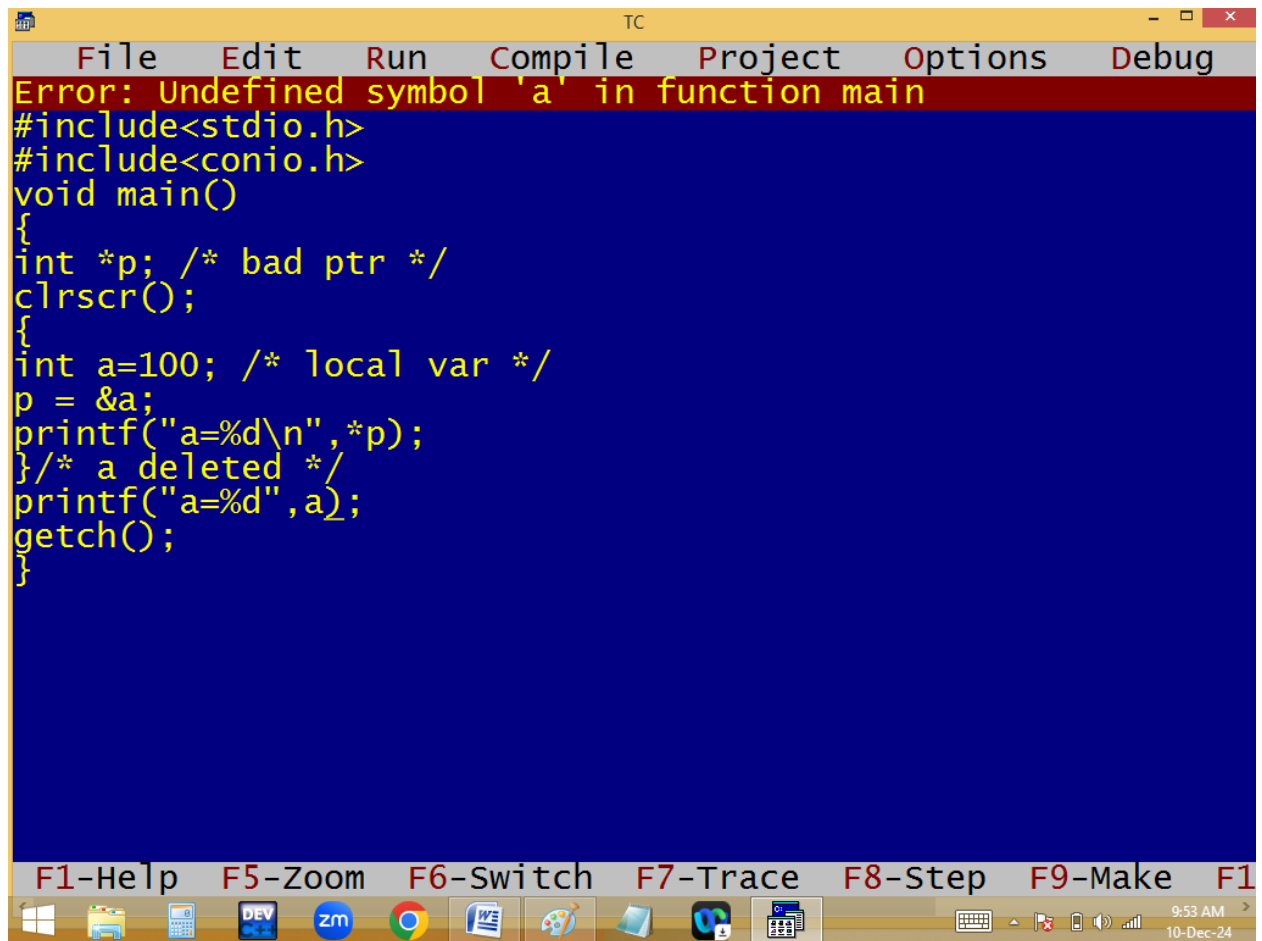
```
#include<stdio.h>
#include<conio.h>
void main()
{
int *p=NULL; /* NULL ptr */
clrscr();
printf("p stored addr %u and value in that addr %d",p, *p);
getch();
}
```

Below the code editor, there is a toolbar with function key shortcuts: "F1-Help", "F5-Zoom", "F6-Switch", "F7-Trace", "F8-Step", "F9-Make", and "F10-Run". The Windows taskbar is visible at the bottom, showing icons for the Start menu, File Explorer, Calculator, DEV C++, Zoom, Google Chrome, Word, Paint, and the Turbo C++ application. The system clock in the bottom right corner shows "9:51 AM" and "10-Dec-24".



The image shows a Windows desktop environment. At the top, there is a terminal window titled 'TC' with a yellow title bar. The terminal's content area is black, and the text 'p stored addr 0 and value in that addr 0' is displayed in a light-colored monospace font. Below the terminal window is the Windows taskbar, which contains several application icons including File Explorer, Calculator, DEV, zm, Google Chrome, Word, a game controller icon, and a folder icon. On the right side of the taskbar, the system tray shows the time as 9:51 AM and the date as 10-Dec-24.

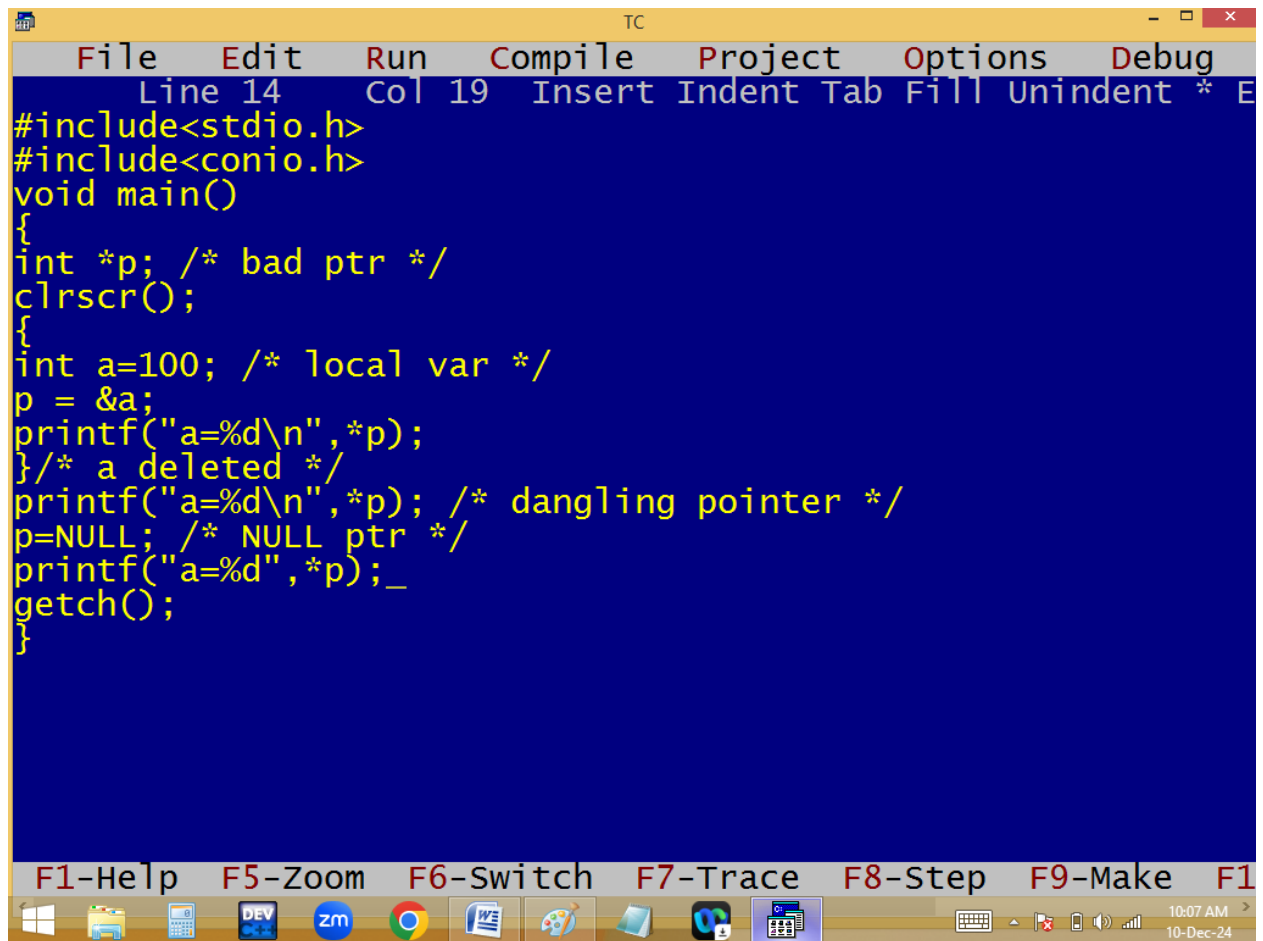
Dangling pointer: A pointer is declared and some variable address also assigned. After some time that variable deleted from memory. But still the pointer is storing that deleted variable value and address. This kind of pointers are called dangling pointer and to avoid this initialize with NULL pointer.



The image shows a screenshot of the Turbo C++ (TC) IDE. The window title is "TC". The menu bar includes "File", "Edit", "Run", "Compile", "Project", "Options", and "Debug". A red error message banner at the top reads: "Error: Undefined symbol 'a' in function main". The code editor has a blue background and contains the following C code:

```
#include<stdio.h>
#include<conio.h>
void main()
{
int *p; /* bad ptr */
clrscr();
}
int a=100; /* local var */
p = &a;
printf("a=%d\n",*p);
}/* a deleted */
printf("a=%d",a);
getch();
}
```

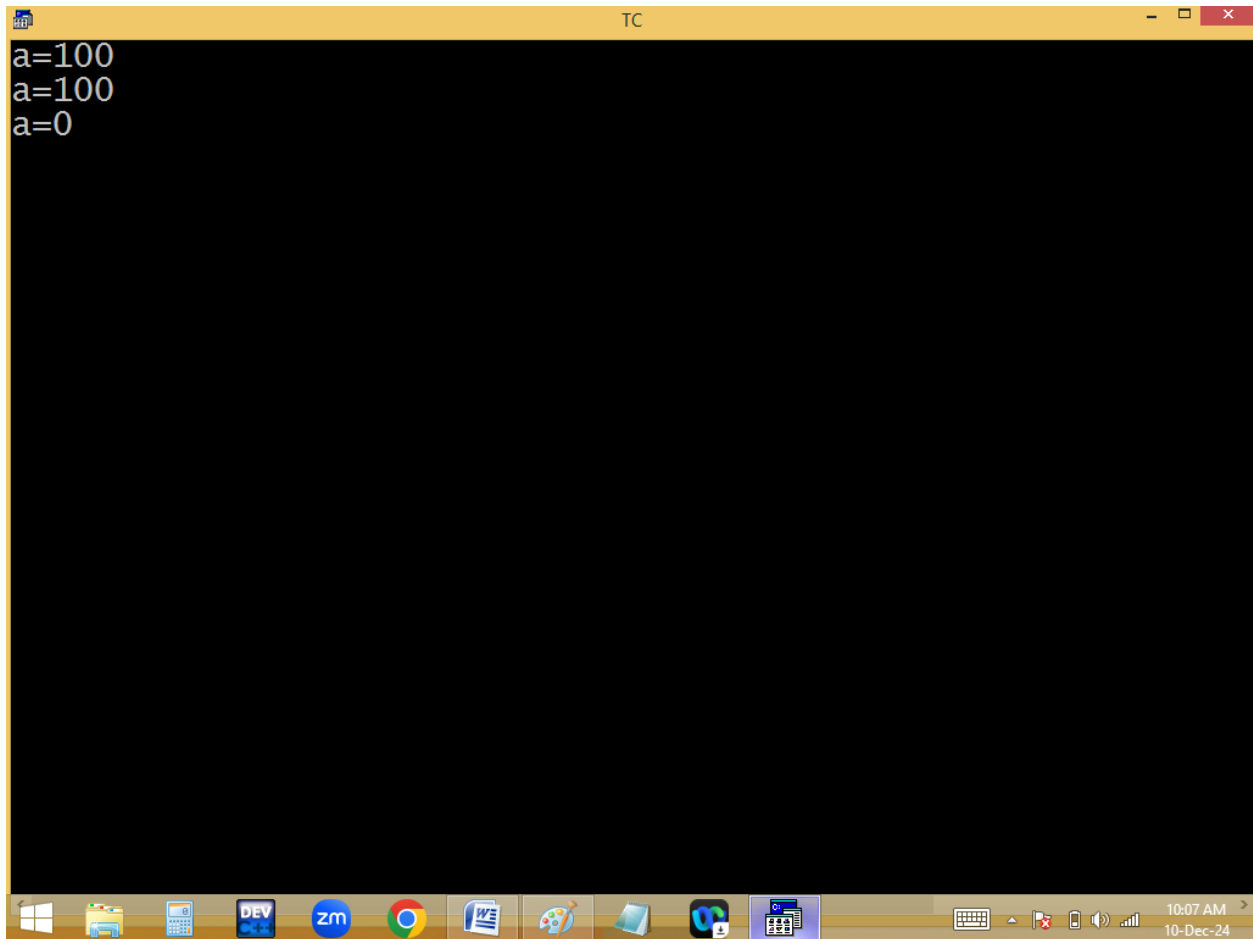
Below the code editor, there is a toolbar with function key shortcuts: "F1-Help", "F5-Zoom", "F6-Switch", "F7-Trace", "F8-Step", "F9-Make", and "F10-Run". The Windows taskbar at the bottom shows various application icons and the system clock indicating 9:53 AM on 10-Dec-24.



```
TC
File Edit Run Compile Project Options Debug
Line 14 Col 19 Insert Indent Tab Fill Unindent * E
#include<stdio.h>
#include<conio.h>
void main()
{
int *p; /* bad ptr */
clrscr();
{
int a=100; /* local var */
p = &a;
printf("a=%d\n",*p);
}/* a deleted */
printf("a=%d\n",*p); /* dangling pointer */
p=NULL; /* NULL ptr */
printf("a=%d",*p);_
getch();
}
```

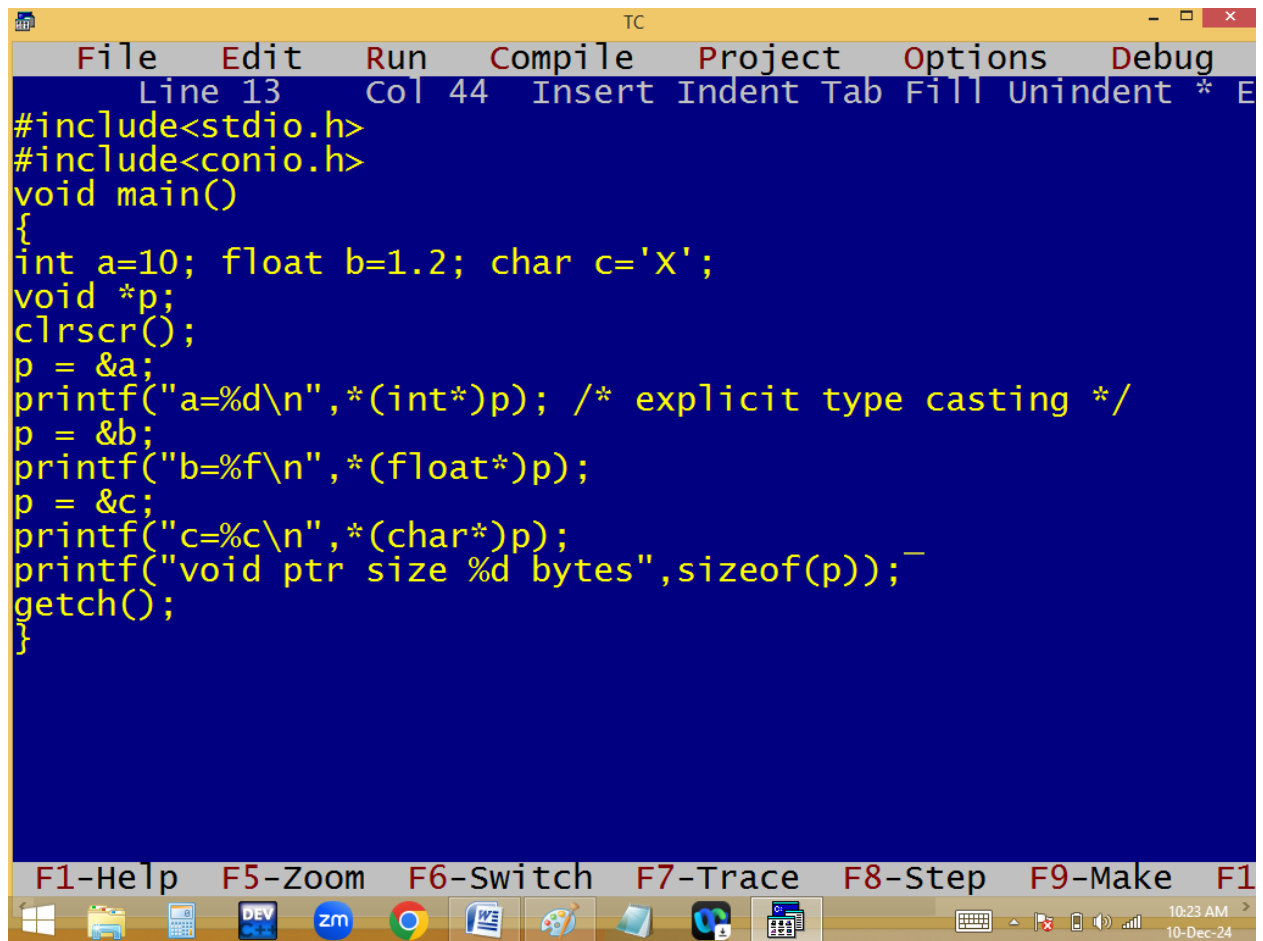
F1-Help F5-Zoom F6-Switch F7-Trace F8-Step F9-Make F10-Run

10:07 AM
10-Dec-24



The image shows a screenshot of a Turbo C++ (TC) window. The window has a yellow title bar with the text "TC" and standard window controls (minimize, maximize, close). The main area is black and contains three lines of white text: `a=100`, `a=100`, and `a=0`. At the bottom, there is a Windows taskbar with various icons including the Start button, File Explorer, Calculator, DEV, zm, Chrome, Word, Paint, and a folder. The system tray on the right shows the time as 10:07 AM and the date as 10-Dec-24.

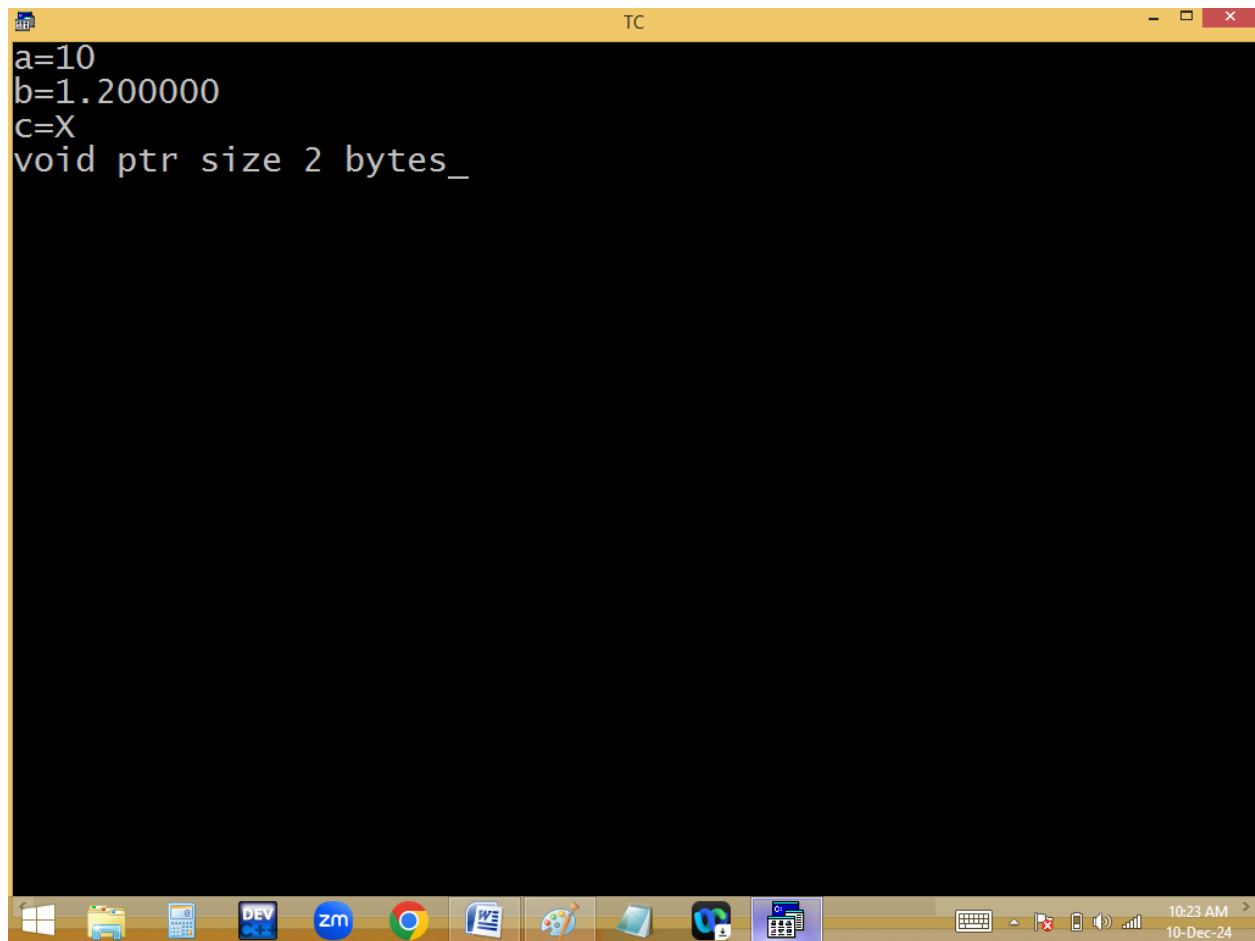
void / generic pointer: Pointer can store only the same type of address. Void pointer can store any type of variable address. But before going to use void pointer, explicit type casting should be provided. Void pointer takes 2 bytes and used in dynamic memory allocation.



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 13", "Col 44", and "Insert Indent Tab Fill Unindent * E". 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=10; float b=1.2; char c='X';
void *p;
clrscr();
p = &a;
printf("a=%d\n",*(int*)p); /* explicit type casting */
p = &b;
printf("b=%f\n",*(float*)p);
p = &c;
printf("c=%c\n",*(char*)p);
printf("void ptr size %d bytes",sizeof(p));
getch();
}
```

At the bottom of the window, there is a toolbar with icons for various functions. Below the toolbar, a row of function key shortcuts is displayed: "F1-Help", "F5-Zoom", "F6-Switch", "F7-Trace", "F8-Step", "F9-Make", and "F10-Run". The Windows taskbar is visible at the very bottom, showing the Start button, several application icons (including File Explorer, Calculator, DEV C++, Zoom, Chrome, Word, and Paint), and the system tray with the date and time "10:23 AM 10-Dec-24".



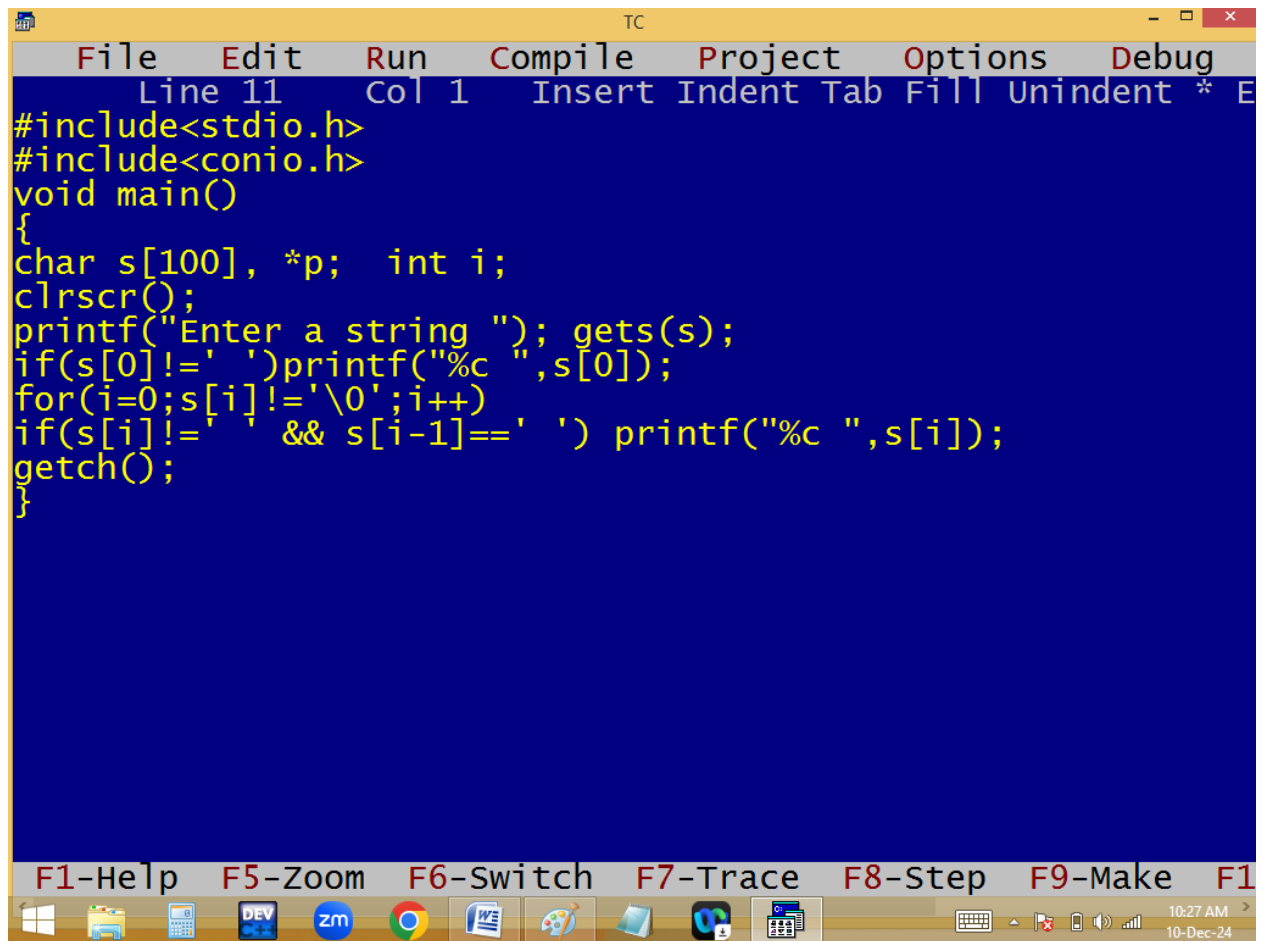
The image shows a screenshot of a Turbo C++ (TC) compiler window. The window has a yellow title bar with the text "TC" and standard window controls. The main area is black with white text showing the following code declarations:

```
a=10  
b=1.200000  
c=X  
void ptr size 2 bytes_
```

The Windows taskbar is visible at the bottom, showing various application icons and the system clock indicating 10:23 AM on 10-Dec-24.

Abbreviation:

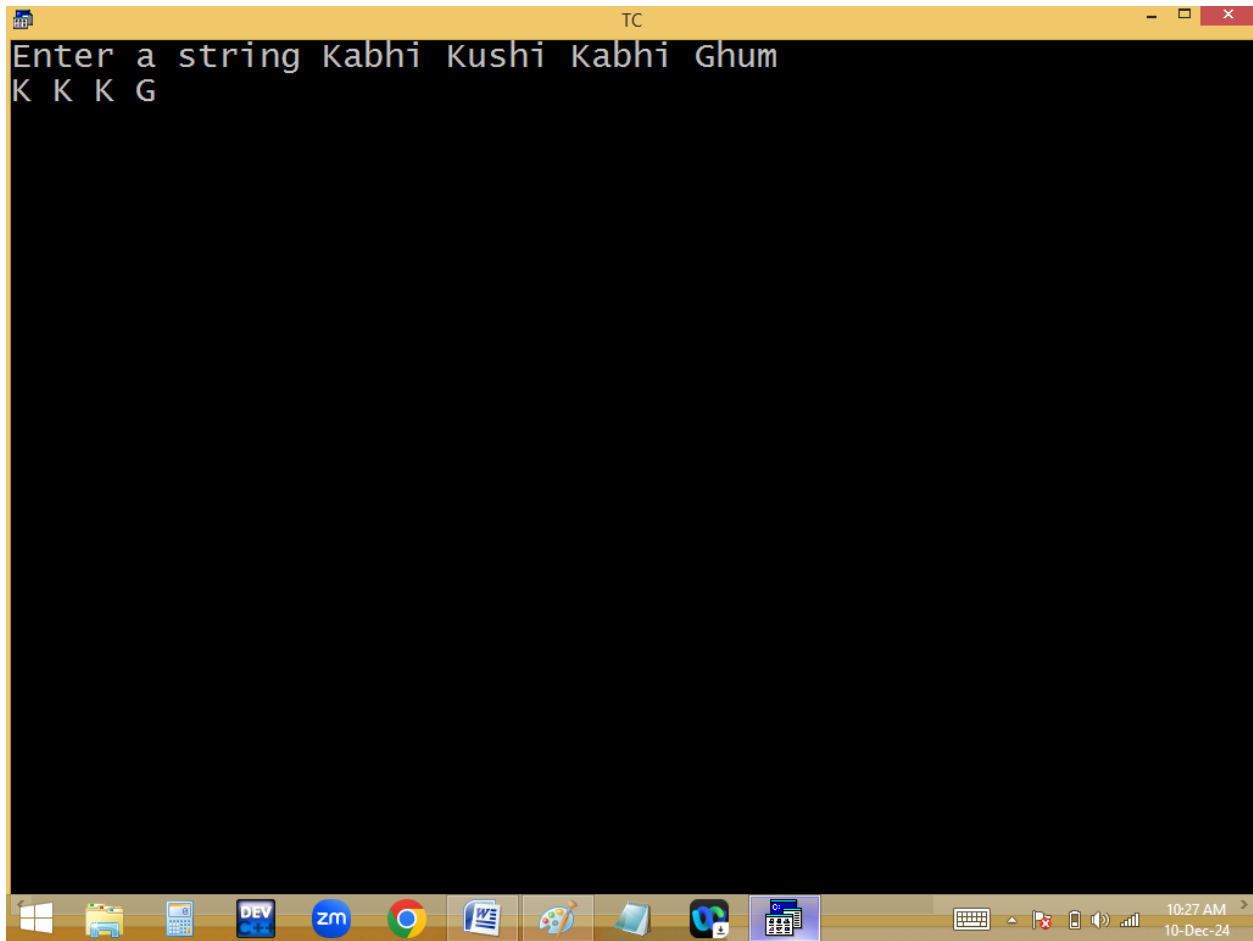
Ranam Rudhiram Raudram – R R R

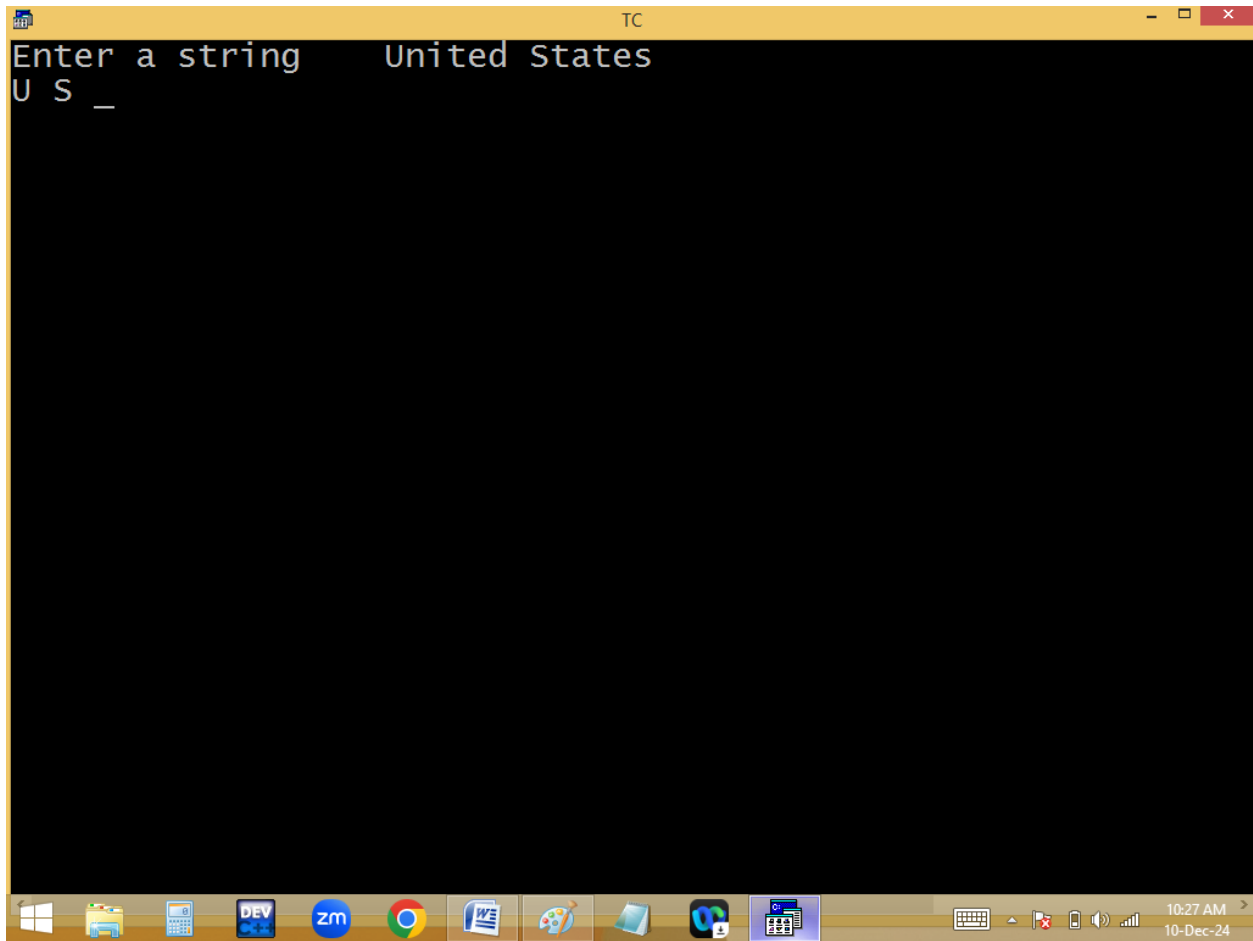


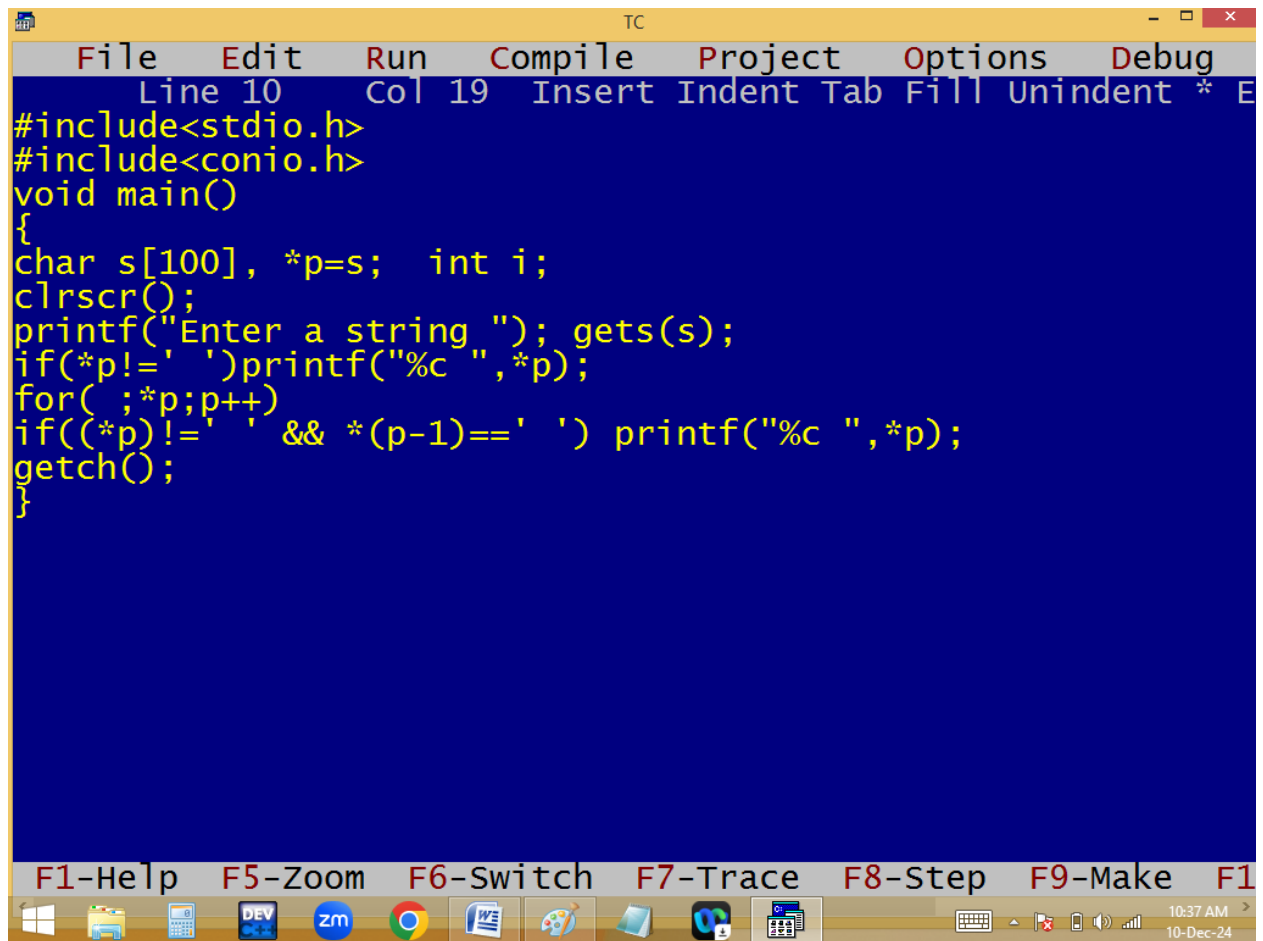
The image shows a screenshot of a Turbo C++ (TC) IDE window. The window has a yellow title bar with the text "TC" and standard window controls. The menu bar includes "File", "Edit", "Run", "Compile", "Project", "Options", and "Debug". Below the menu bar, a status bar shows "Line 11", "Col 1", and a list of editing actions: "Insert", "Indent", "Tab", "Fill", "Unindent", and a cursor icon. The main editing area has a blue background and contains the following C code:

```
#include<stdio.h>
#include<conio.h>
void main()
{
char s[100], *p;  int i;
clrscr();
printf("Enter a string "); gets(s);
if(s[0]!=' ')printf("%c ",s[0]);
for(i=0;s[i]!='\0';i++)
if(s[i]!=' ' && s[i-1]!=' ') printf("%c ",s[i]);
getch();
}
```

At the bottom of the window, there is a toolbar with icons for various functions and a row of function key shortcuts: "F1-Help", "F5-Zoom", "F6-Switch", "F7-Trace", "F8-Step", "F9-Make", and "F10-Run". The Windows taskbar is visible at the very bottom, showing several application icons and the system clock indicating "10:27 AM" on "10-Dec-24".



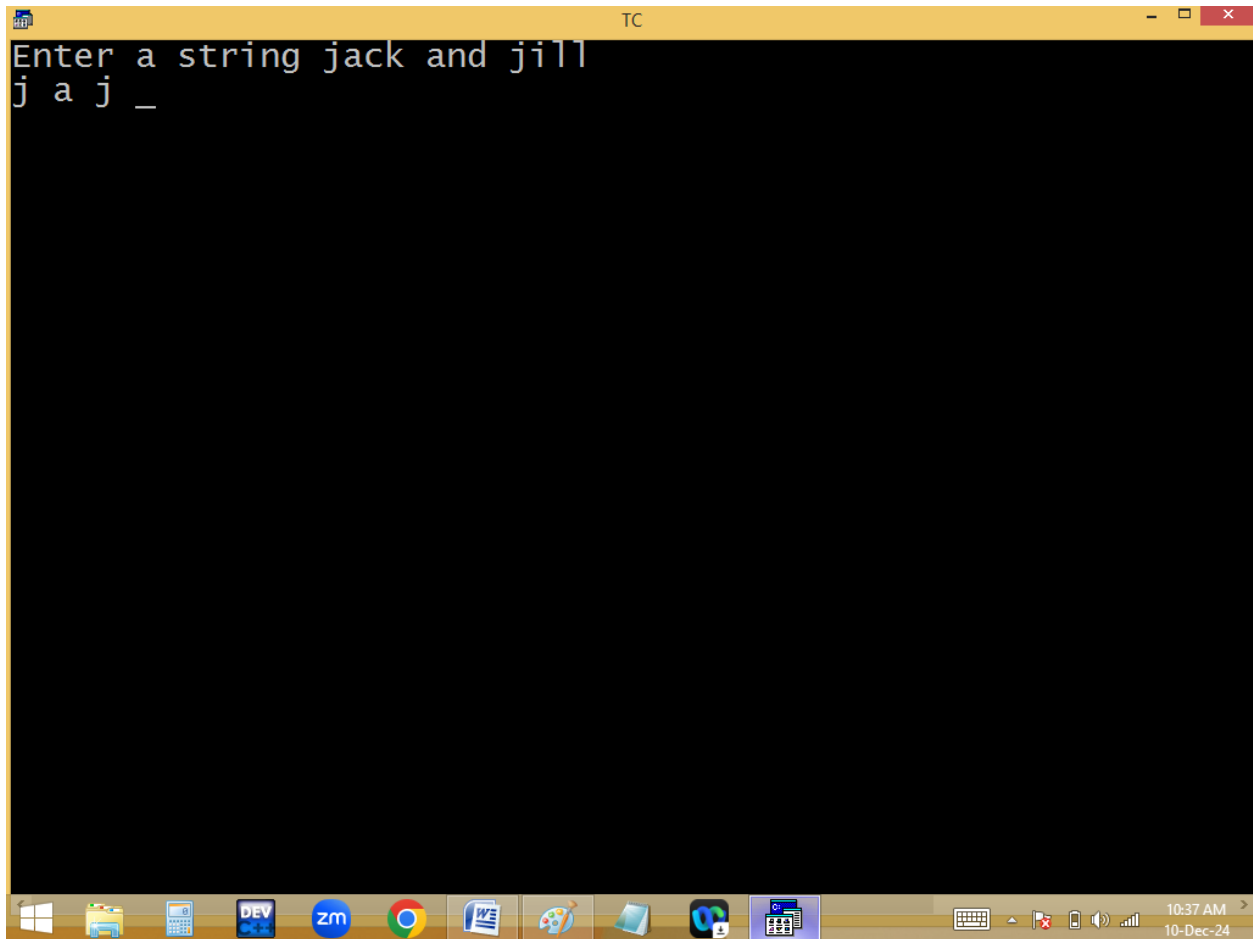




The image shows a screenshot of a Turbo C++ (TC) IDE window. The window has a yellow title bar with the text "TC" and standard window controls. The menu bar includes "File", "Edit", "Run", "Compile", "Project", "Options", and "Debug". Below the menu bar, a status bar shows "Line 10", "Col 19", and a list of editing actions: "Insert", "Indent", "Tab", "Fill", "Unindent", and a cursor icon. The main editing area has a blue background and contains the following C code:

```
#include<stdio.h>
#include<conio.h>
void main()
{
char s[100], *p=s;  int i;
clrscr();
printf("Enter a string "); gets(s);
if(*p!=' ')printf("%c ",*p);
for( ;*p;p++)
if((*p)!=' ' && *(p-1)==' ') printf("%c ",*p);
getch();
}
```

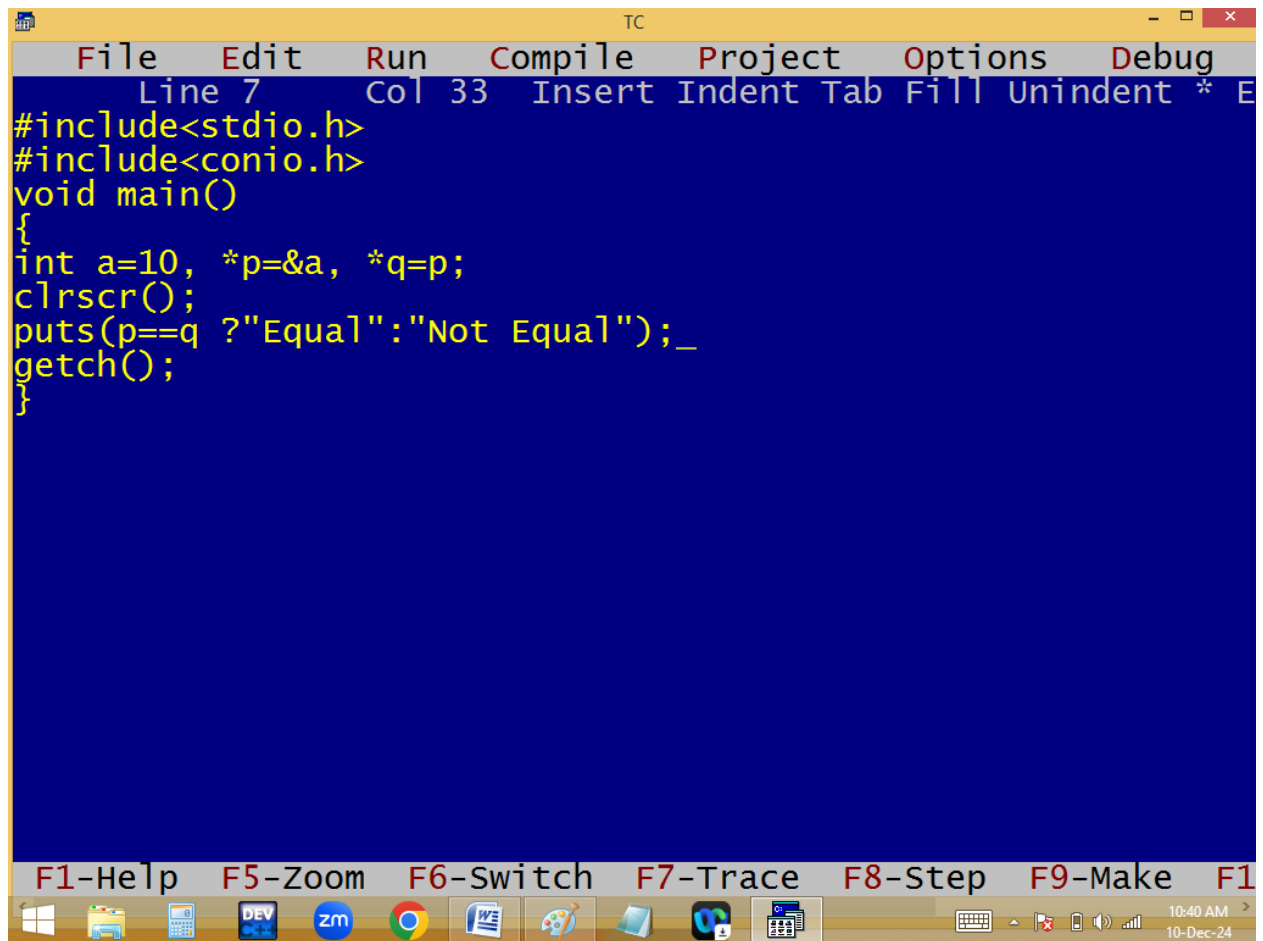
At the bottom of the window, there is a toolbar with function key shortcuts: "F1-Help", "F5-Zoom", "F6-Switch", "F7-Trace", "F8-Step", "F9-Make", and "F10-Run". The Windows taskbar is visible at the very bottom, showing various application icons and the system clock indicating 10:37 AM on 10-Dec-24.



```
TC
Enter a string jack and jill
j a j _
```

Pointer arithmetic:

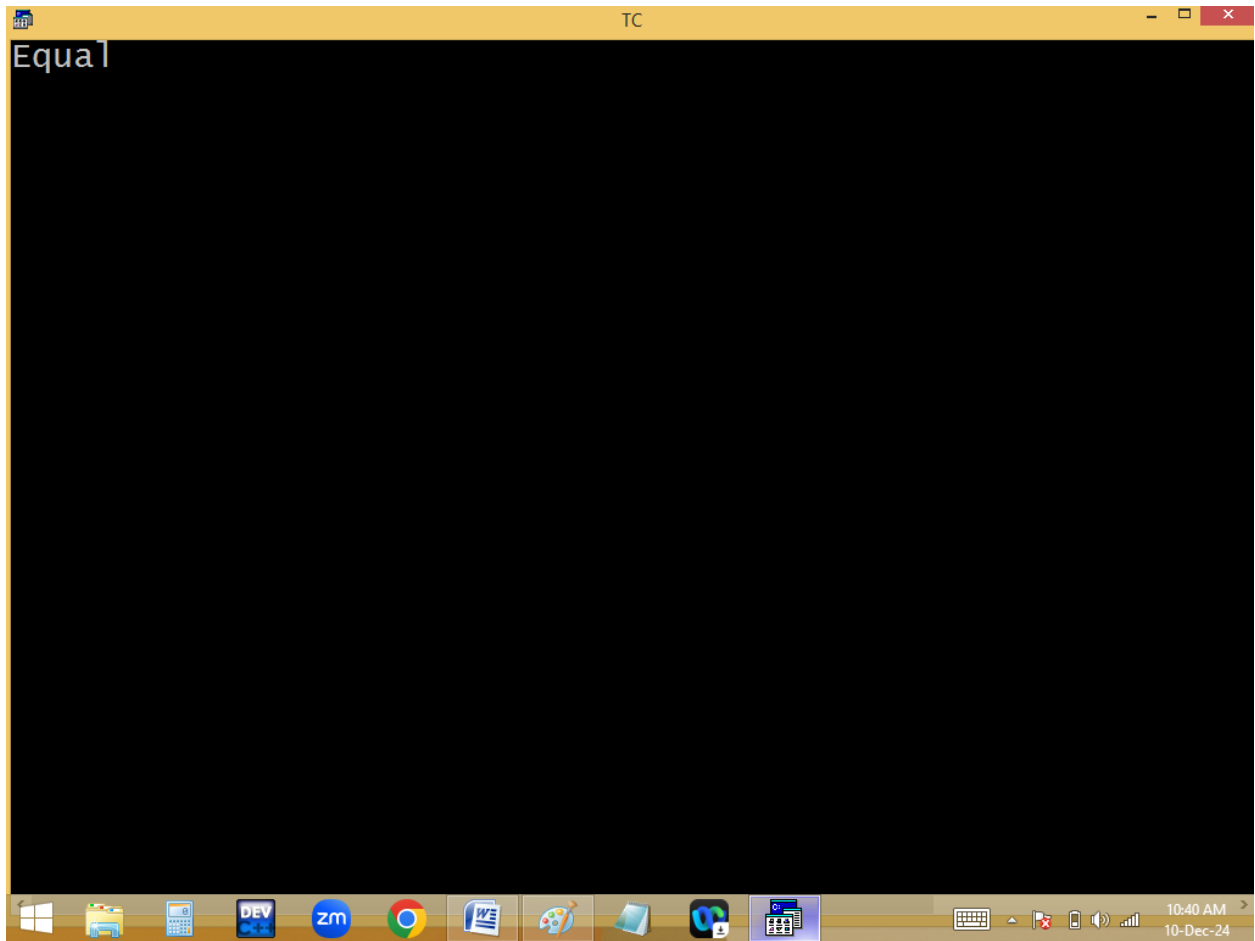
Like normal variables we can do copy, comparison, +, -, ++ and - - on pointers also. But we can't do *, % and / on pointers.

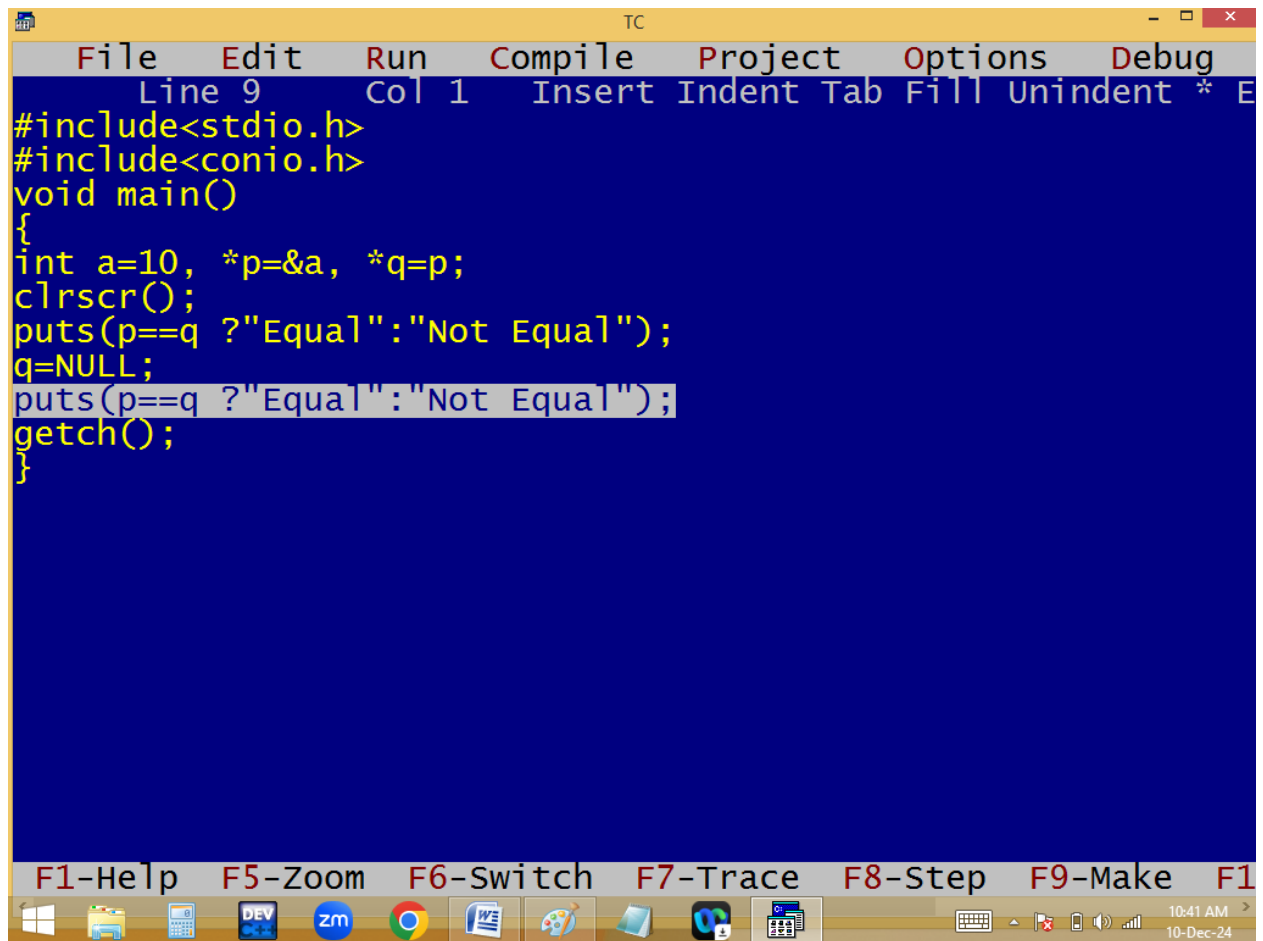


The image shows a screenshot of the Turbo C++ (TC) IDE. The window title is "TC". The menu bar includes File, Edit, Run, Compile, Project, Options, and Debug. The status bar at the top indicates "Line 7 Col 33" and lists editing options: Insert, Indent, Tab, Fill, Unindent, and *. The main editing area has a dark blue background with yellow text. The code is as follows:

```
#include<stdio.h>
#include<conio.h>
void main()
{
int a=10, *p=&a, *q=p;
clrscr();
puts(p==q ? "Equal": "Not Equal");_
getch();
}
```

The bottom of the window features a toolbar with icons for various functions and a row of function key shortcuts: F1-Help, F5-Zoom, F6-Switch, F7-Trace, F8-Step, F9-Make, and F10-Run. The Windows taskbar is visible at the very bottom, showing the Start button, taskbar icons for File Explorer, Calculator, DEV C++, Zoom, Chrome, Word, Paint, and VS Code, and the system tray with the date and time (10:40 AM, 10-Dec-24).





```
TC
File Edit Run Compile Project Options Debug
Line 9 Col 1 Insert Indent Tab Fill Unindent * E
#include<stdio.h>
#include<conio.h>
void main()
{
int a=10, *p=&a, *q=p;
clrscr();
puts(p==q ? "Equal" : "Not Equal");
q=NULL;
puts(p==q ? "Equal" : "Not Equal");
getch();
}
```

F1-Help F5-Zoom F6-Switch F7-Trace F8-Step F9-Make F10-Run

10:41 AM
10-Dec-24



TC

File Edit Run Compile Project Options Debug

Line 9 Col 7 Insert Indent Tab Fill Unindent * E

```
#include<stdio.h>
#include<conio.h>
void main()
{
int a=10, *p=&a, *q=p;
clrscr();
p=p*2;
p=p%2;
p=p/2;
getch();
}
```

Compiling

Main file: 9AM.C
Compiling: EDITOR → 9AM.C

	Total	File
Lines compiled:	321	321
Warnings:	1	1
Errors:	3	3

Available memory: 250K

Errors : Press any key

F1-Help F5-Zoom F6-Switch F7-Trace F8-Step F9-Make F10-Exit

10:42 AM
10-Dec-24

