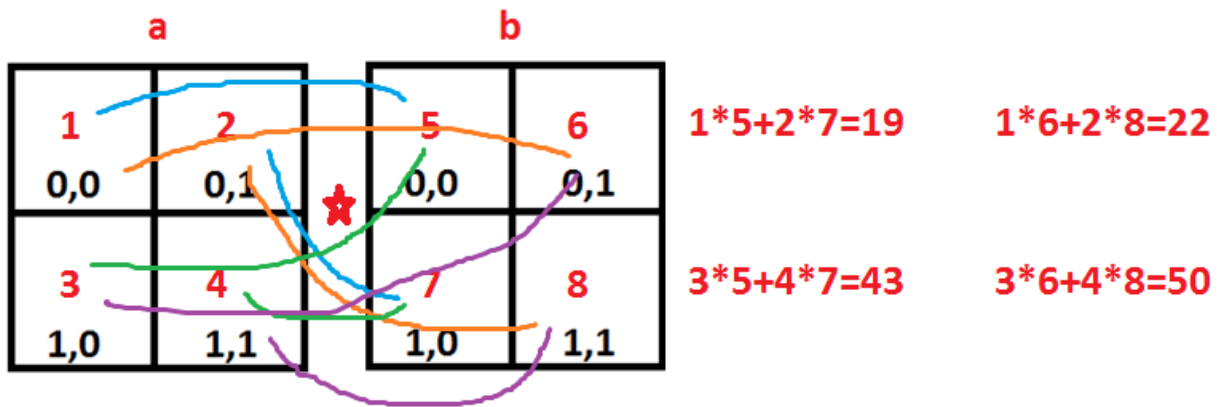


## Matrix multiplication:



```
TC
File Edit Run Compile Project Options Debug
Line 1 Col 21 Insert Indent Tab Fill Unindent * E
#include<stdio.h> #include<conio.h>
void main(){
int a[10][10],b[10][10];int nr,nc,r,c,k,s; clrscr();
printf("Enter no of rows and columns ");
scanf("%d%d",&nr,&nc);
printf("Enter %d elements for 1st array\n",nr*nc);
for(r=0;r<nr;r++)for(c=0;c<nc;c++)scanf("%d",&a[r][c]);
printf("Enter %d elements for 2nd array\n",nr*nc);
for(r=0;r<nr;r++)for(c=0;c<nc;c++)scanf("%d",&b[r][c]);
puts("Result elements are ");
for(r=0;r<nr;r++)
{
for(c=0;c<nc;c++)
{
for(k=s=0;k<nc;k++)
{s+=a[r][k]*b[k][c];}
printf("%4d",s);
}
printf("\n");
}
getch();
}
F1-Help F5-Zoom F6-Switch F7-Trace F8-Step F9-Make F10-Run
```

```

Enter no of rows and columns 2 2
Enter 4 elements for 1st array
1 2 3 4
Enter 4 elements for 2nd array
5 6 7 8
Result elements are
19 22
43 50

```

```

for( r=0; r<2; r++ )
{
  for(c=0;c<2;c++)
  {
    for( s=k=0;k<2;k++)
    {
      s+=a[r][k]*b[k][c];
    }
    p(s);
  }
  p("\n");
}

```

r	c	k	s
0	0	012	0+1*5=5+2*7=19 ✓
0	1	012	0+1*6=6+2*8=22 ✓
1	0	012	0+3*5=15+4*7=43 ✓
1	1	012	0+3*6+4*8=50 ✓

a		b	
1	2	5	6
0,0	0,1	0,0	0,1
3	4	7	8
1,0	1,1	1,0	1,1

✓✓✓  
 $1*5+2*7=19$   
 $1*6+2*8=22$   
 ✓✓✓  
 $3*5+4*7=43$   
 $3*6+4*8=50$

## 3-dimensional arrays:

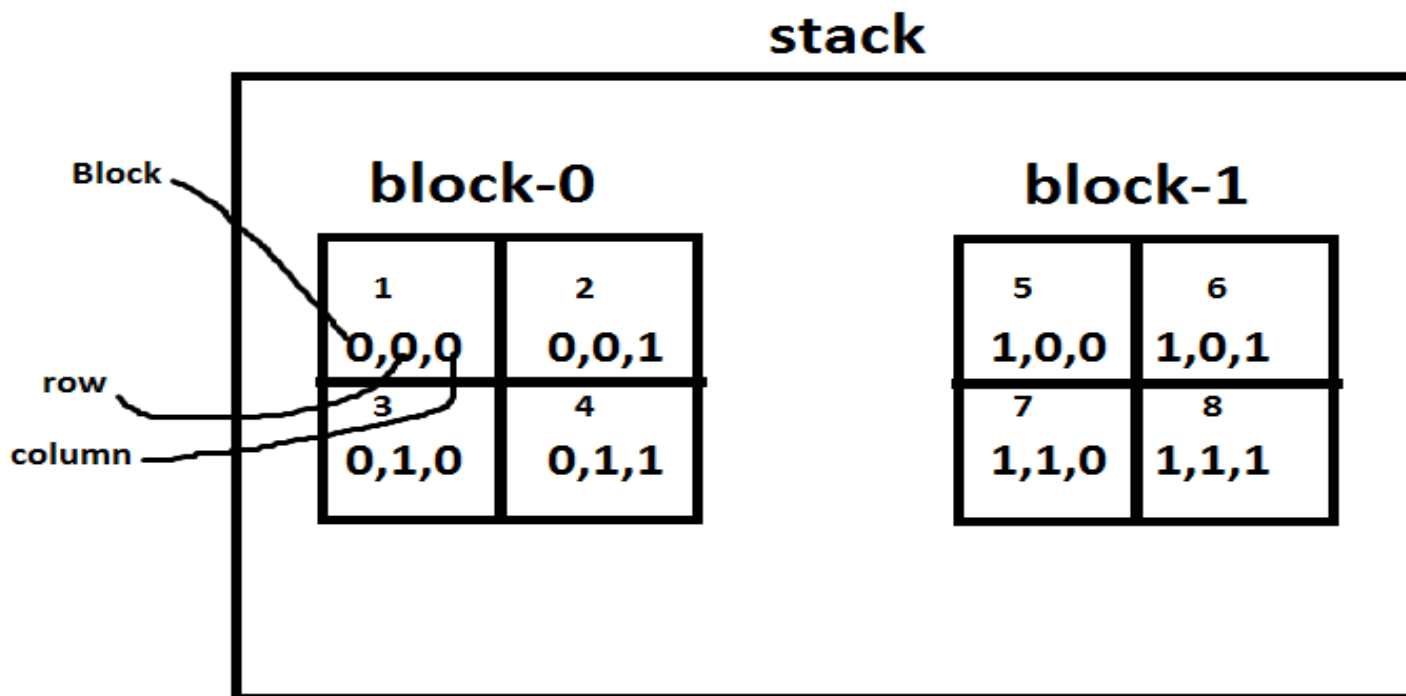
An array with several blocks, rows and columns.

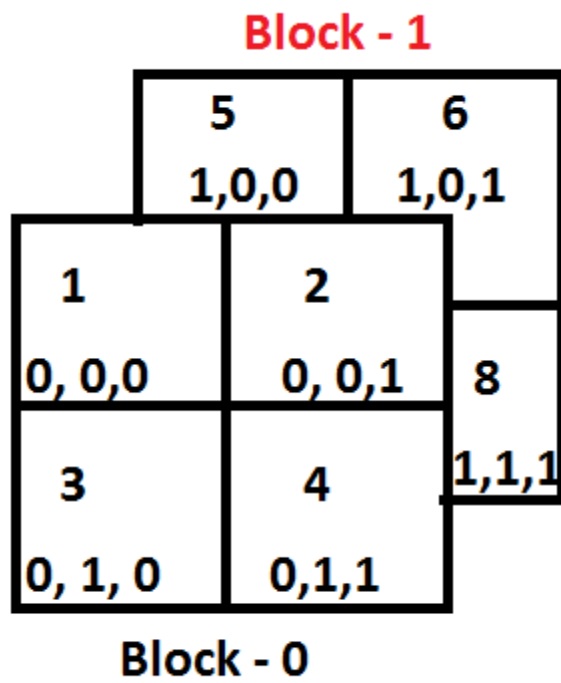
An array with 3 subscripting operators **[ ][ ]**.

### Syntax:

**datatype    variable [ blocks ] [ rows ] [ columns ];**

**Eg:** `int a[2][2][2]={1,2,3,4,5,6,7,8};`

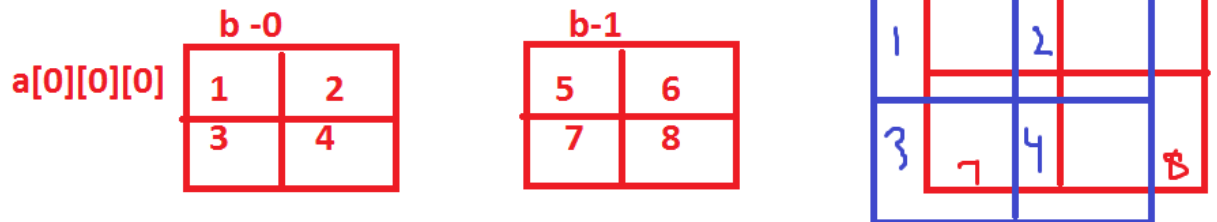




---

Eg:

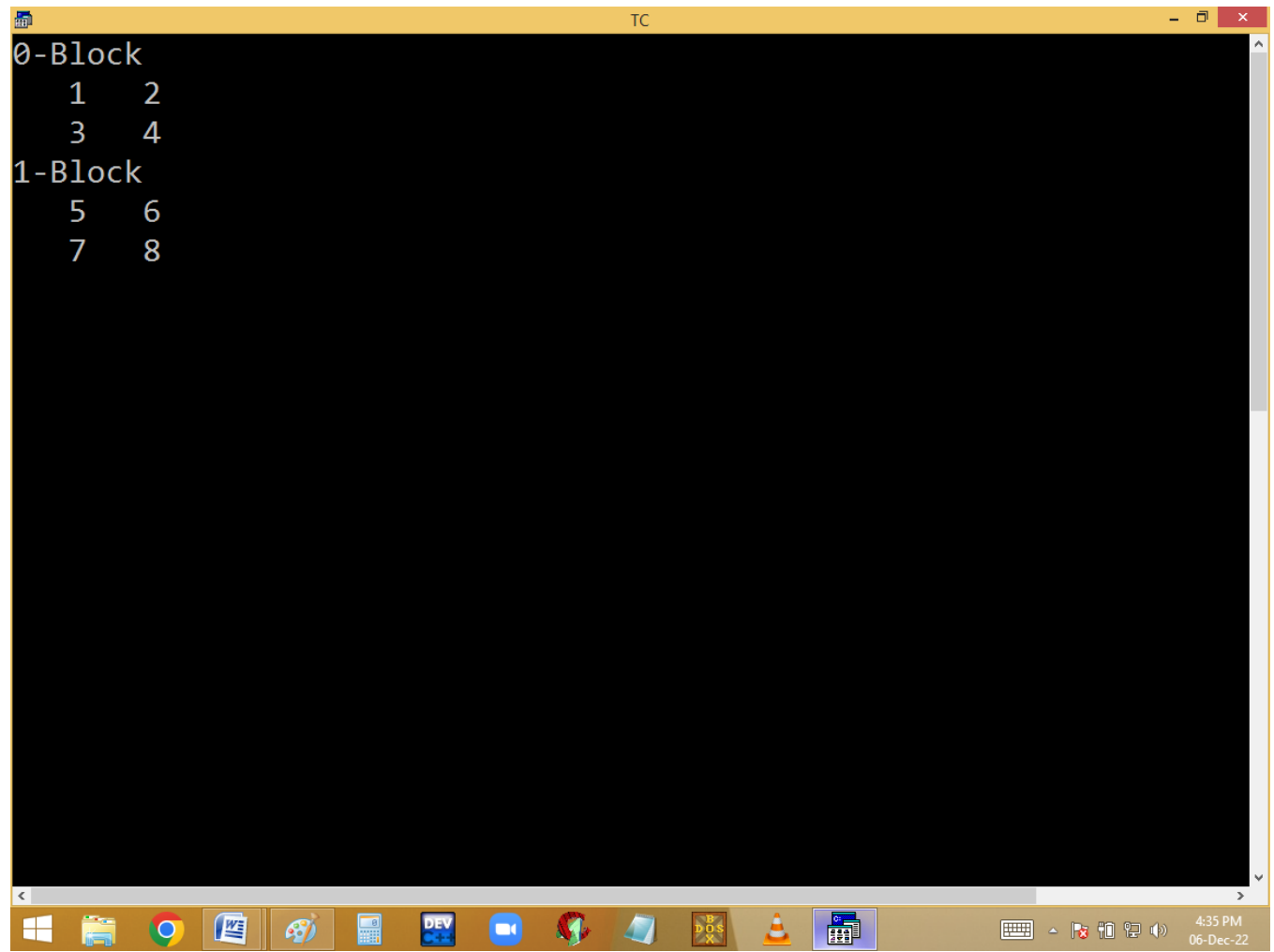
rows  
 int a[2][2][2]; an array with 3 subscripts [ ].  
 blocks columns



eg: int class[2][60][6];  
 datatype class[sections][stus][marks];

```

TC
File Edit Run Compile Project Options Debug Break/
Edit
Line 1 Col 2 Insert Indent Tab Fill Unindent * E:NONAM
#include<stdio.h>
#include<conio.h>
void main()
{
int a[2][2][2]={1,2,3,4,5,6,7,8},b,r,c;
clrscr();
for(b=0;b<2;b++)
{
printf("%d-Block\n",b);
for(r=0;r<2;r++)
{
for(c=0;c<2;c++) printf("%4d",a[b][r][c]);
printf("\n");
}
}
getch();
}
Watch
  
```



The screenshot shows a Windows 10 desktop environment. A terminal window titled 'TC' is open, displaying the following text:

```
0-Block
  1  2
  3  4
1-Block
  5  6
  7  8
```

The taskbar at the bottom contains various application icons including File Explorer, Google Chrome, Microsoft Word, Paint, Calculator, DEV, a video call icon, a game icon, a folder icon, a game box icon, a VLC media player icon, and a calendar icon. The system tray on the right shows the time as 4:35 PM and the date as 06-Dec-22.

## 4-dimensional array:

An array with several sets, blocks, rows and columns.

An array with 4 subscripting operators **[ ] [ ] [ ] [ ]**

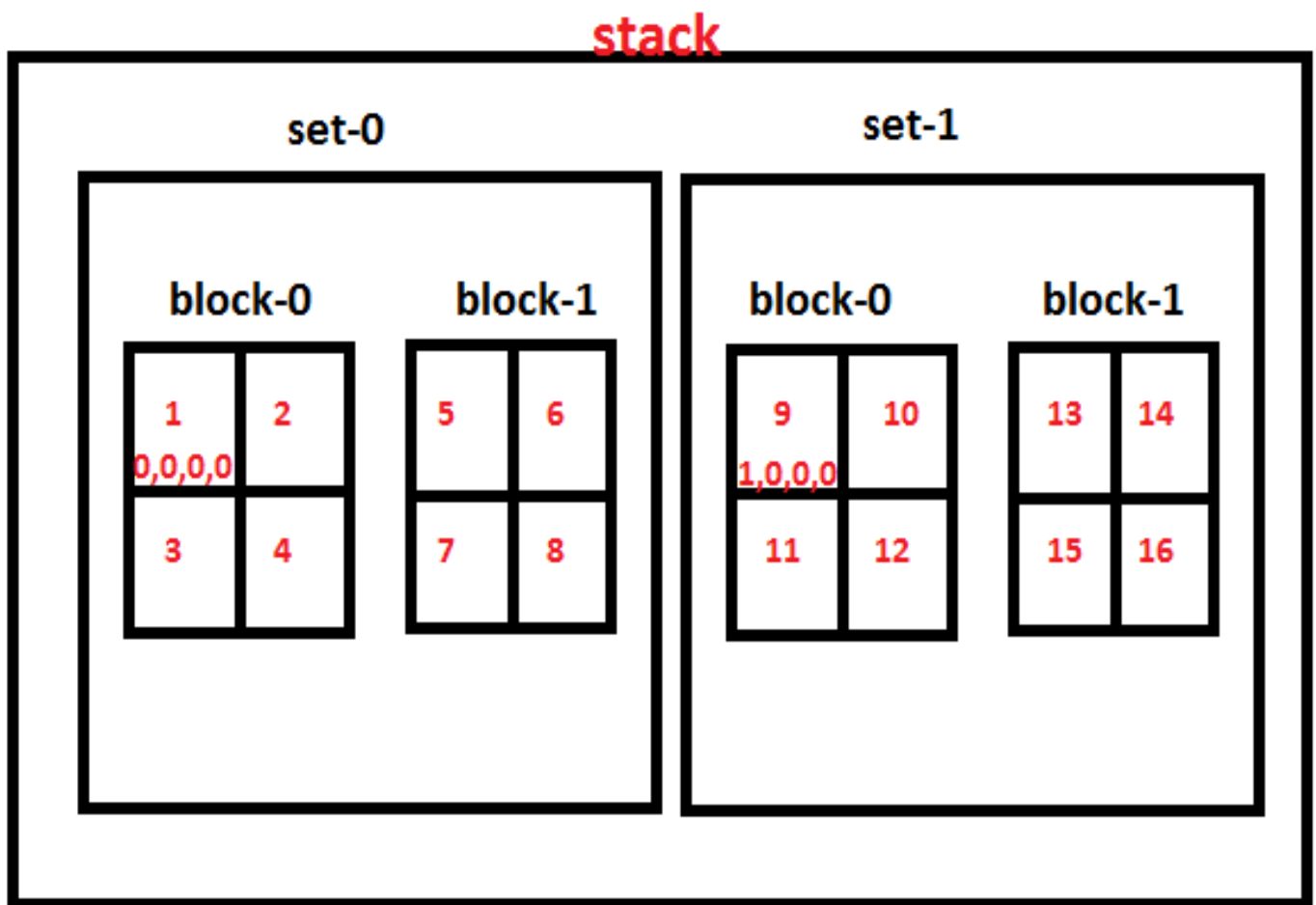
▪

Syntax:

**datatype variable [ sets ] [ blocks ] [ rows ] [ cols ];**

**eg:**

**int a[2] [2] [2] [2]= {1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16};**

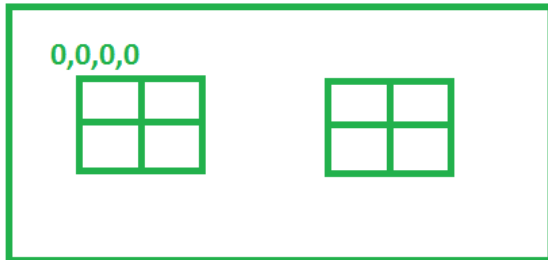




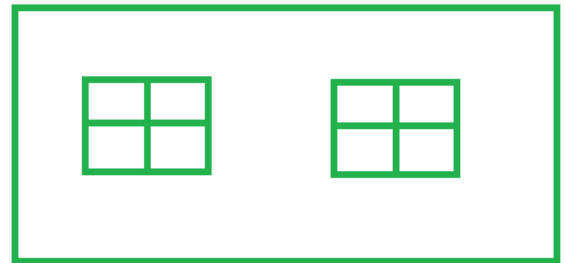
```
datatype var[class][sec][stu][marks];  
int      school[5][2][60][6];
```

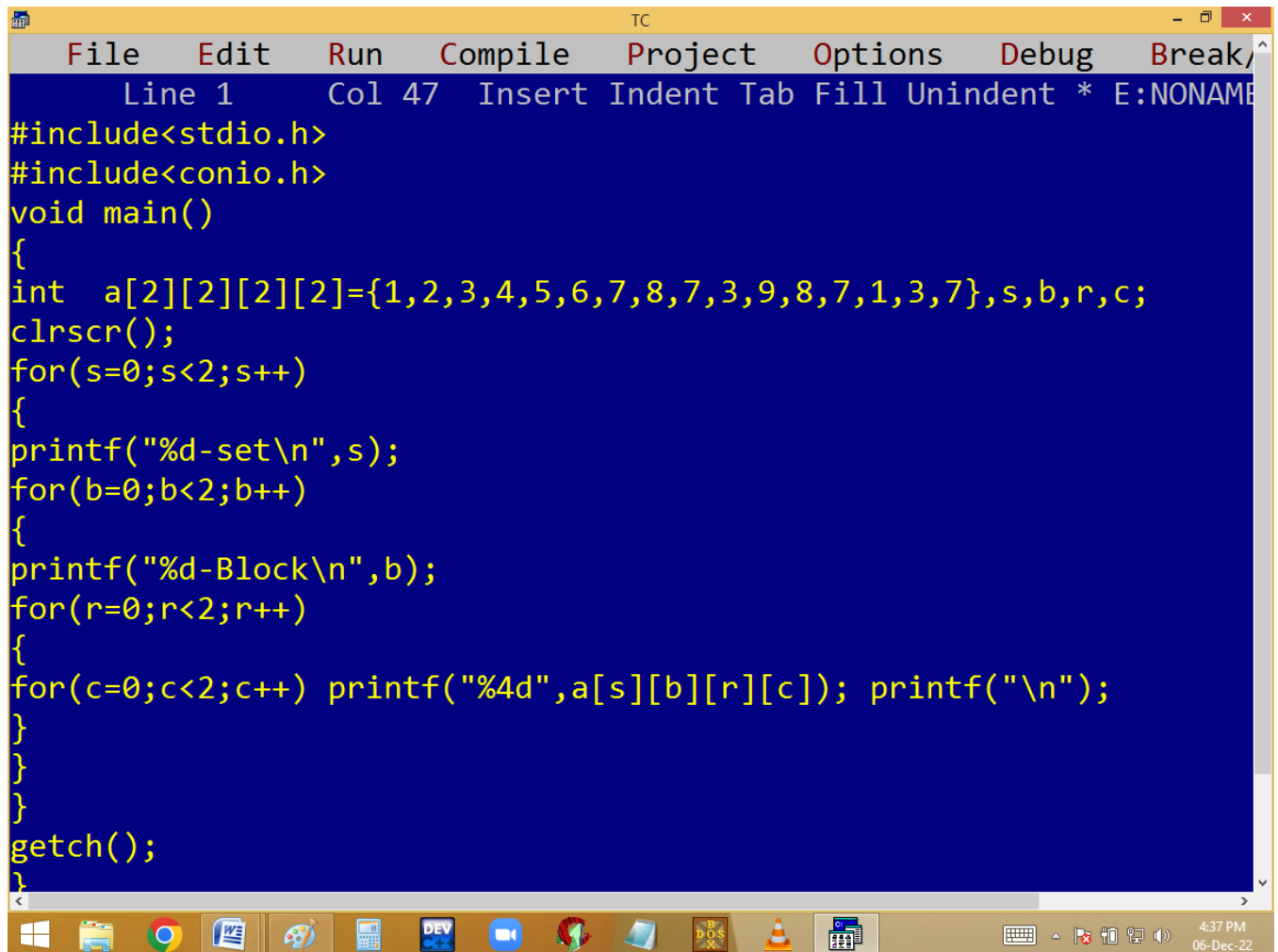
set  
rows  
int a[2][2][2][2]; an array with 3 subscripts [ ].  
blocks columns

set-0



set-1





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", "Debug", and "Break/". The status bar at the top indicates "Line 1", "Col 47", and "Insert Indent Tab Fill Unindent \* E:NONAME". The main editing area has a dark blue background with yellow text. The code is a C program that defines a 2D array 'a' and iterates through it using nested loops. The code is as follows:

```
#include<stdio.h>
#include<conio.h>
void main()
{
int  a[2][2][2][2]={1,2,3,4,5,6,7,8,7,3,9,8,7,1,3,7},s,b,r,c;
clrscr();
for(s=0;s<2;s++)
{
printf("%d-set\n",s);
for(b=0;b<2;b++)
{
printf("%d-Block\n",b);
for(r=0;r<2;r++)
{
for(c=0;c<2;c++) printf("%4d",a[s][b][r][c]); printf("\n");
}
}
}
getch();
}
```

The Windows taskbar is visible at the bottom, showing various application icons and the system clock indicating 4:37 PM on 06-Dec-22.

```
TC
0-set
0-Block
  1  2
  3  4
1-Block
  5  6
  7  8
1-set
0-Block
  7  3
  9  8
1-Block
  7  1
  3  7
```

## STRINGS

- A group of characters is called string.
- It is one dimensional character array.
- It is alpha-numeric.
- It is an implicit pointer.
- It is a derived data type.

## Note:

- One byte should be left for Null char( **\0** ). Otherwise we are getting garbage or junk values. Null char indicates string is completed.
- String variable Size can't be less than string. Otherwise we are getting error.
- Using **=** operator, we can't copy a string into another. We have to use strcpy() or copy character by character manually.
- Using **==** (comparison) operator, we can't compare two strings. Use strcmp() or compare the characters one by one manually.

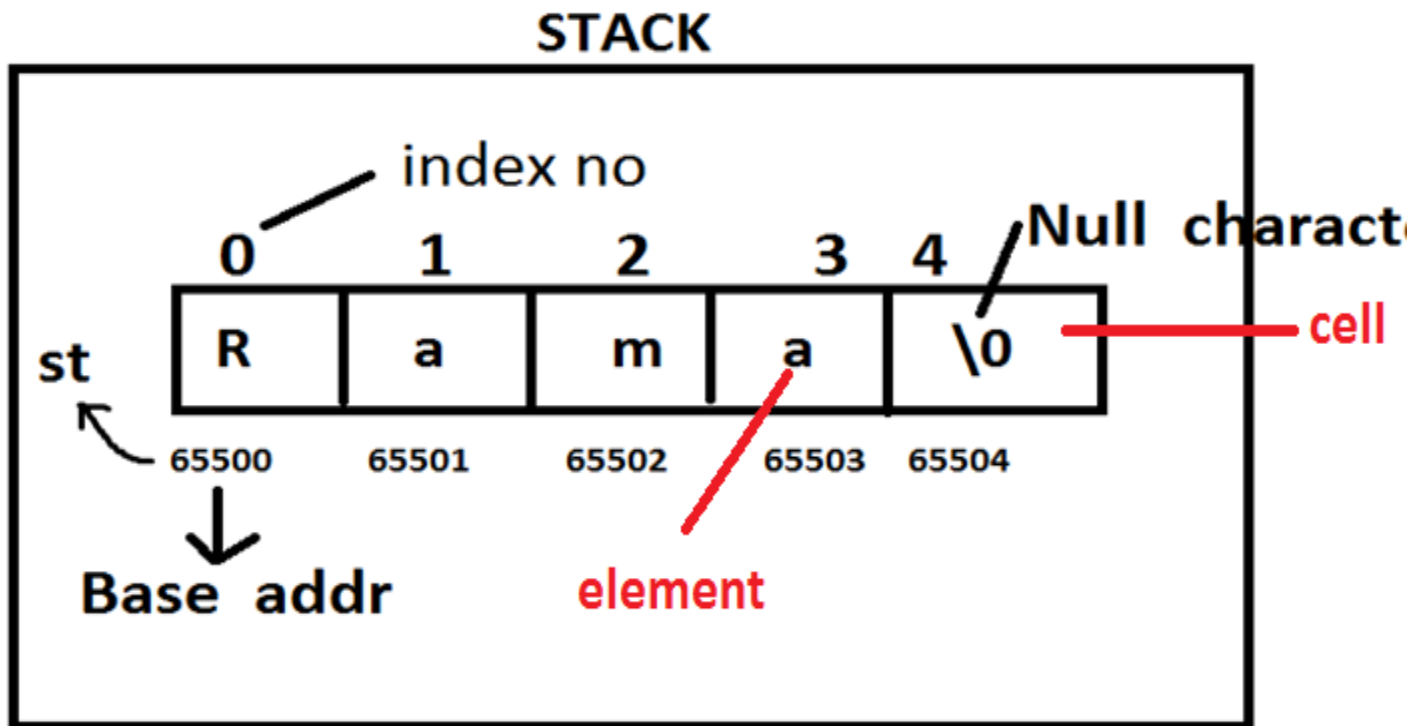
## **Syntax:**

**char variable [size] = "string";**

**or**

`char variable[ ]="string";`

**Eg:** `char st[5] = "Rama";`



**Note:** String is implicit pointer because of string variable stores base address.

**String declaration methods:**

`char st[5] = "rama";` Ok

`char st[20] = "Naresh It";` Ok

char st [4] = { 'r', 'a', 'm' }; Ok → char array.

char st[3]= "ram"; It gives garbage values in printing.

char st [3] = "rama"; error

char st[0]; error

char st[0]="abc"; Ok

char st[-5]; error

char st[5.5]; error

char st[5%3]; Ok → char st[2];

char st[3+2]; → st[5] → Ok

char st[ ] ="Ram"; Ok.

char st[ ] ; error

int n=20;

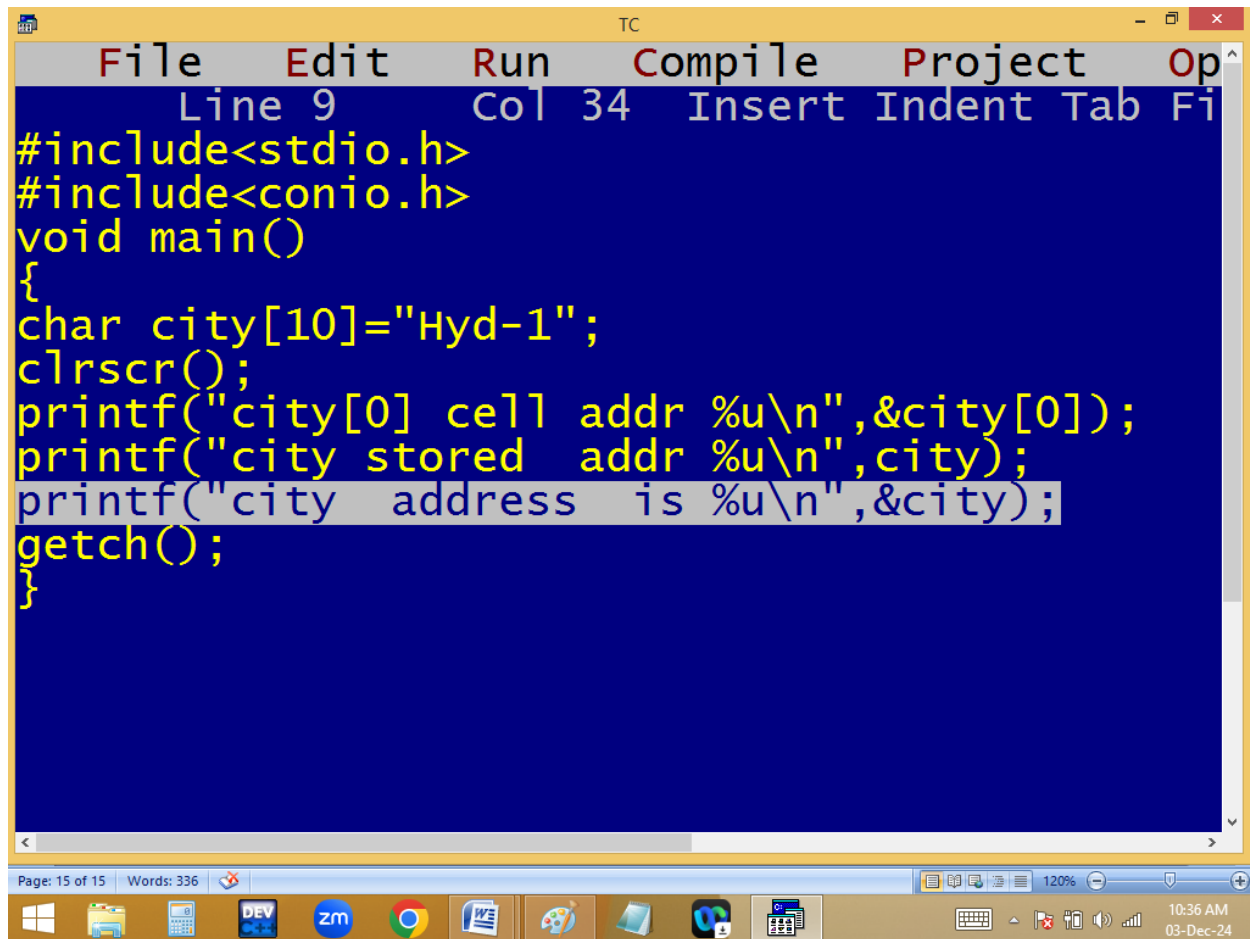
char st[n]; No

#define n 20

char st[n]; Ok

**Note:** String variable size always constant positive integer value.

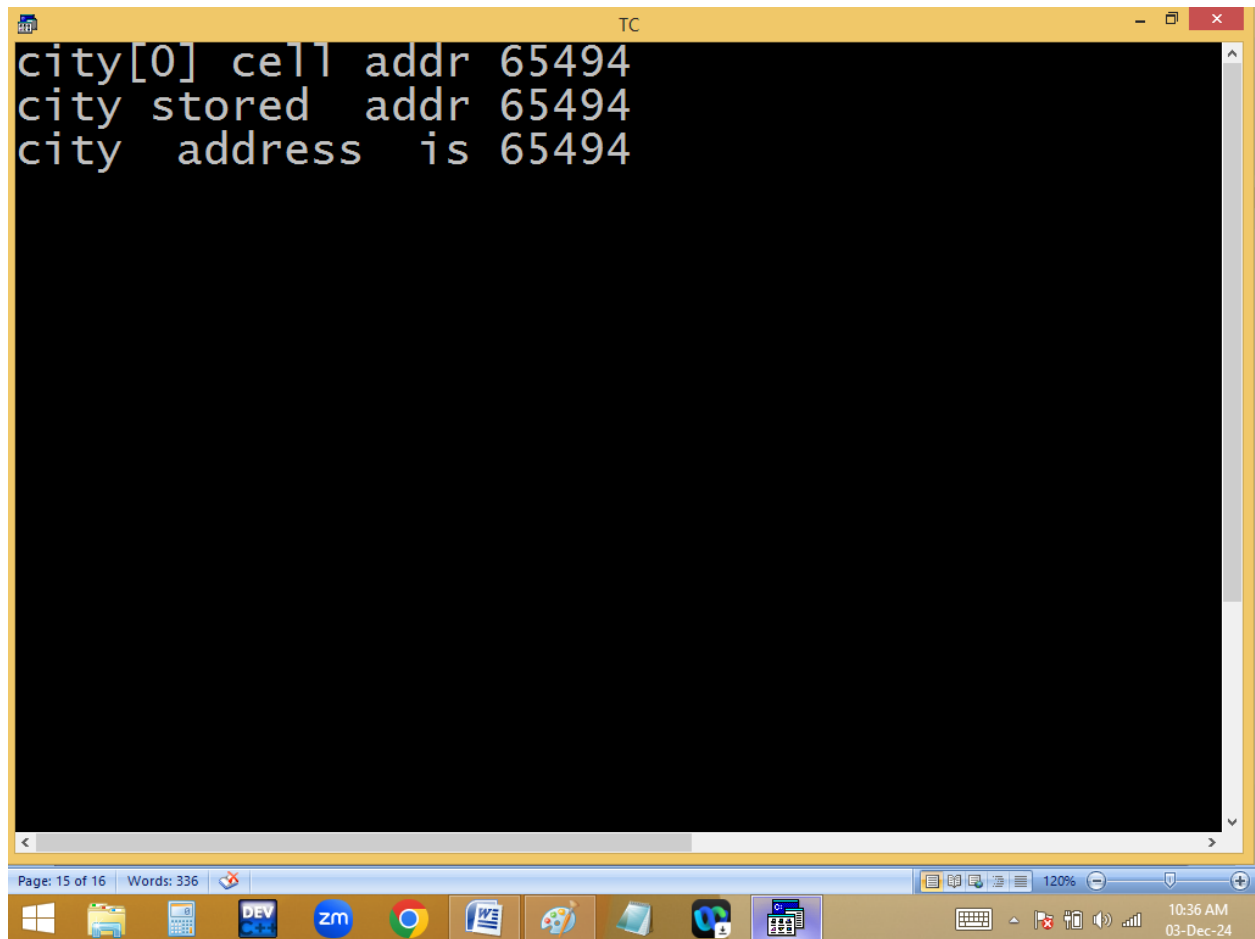
Finding string address:



```
TC
File Edit Run Compile Project Op
Line 9 Col 34 Insert Indent Tab Fi
#include<stdio.h>
#include<conio.h>
void main()
{
char city[10]="Hyd-1";
clrscr();
printf("city[0] cell addr %u\n",&city[0]);
printf("city stored addr %u\n",city);
printf("city address is %u\n",&city);
getch();
}
```

Page: 15 of 15 Words: 336 120% 03-Dec-24 10:36 AM



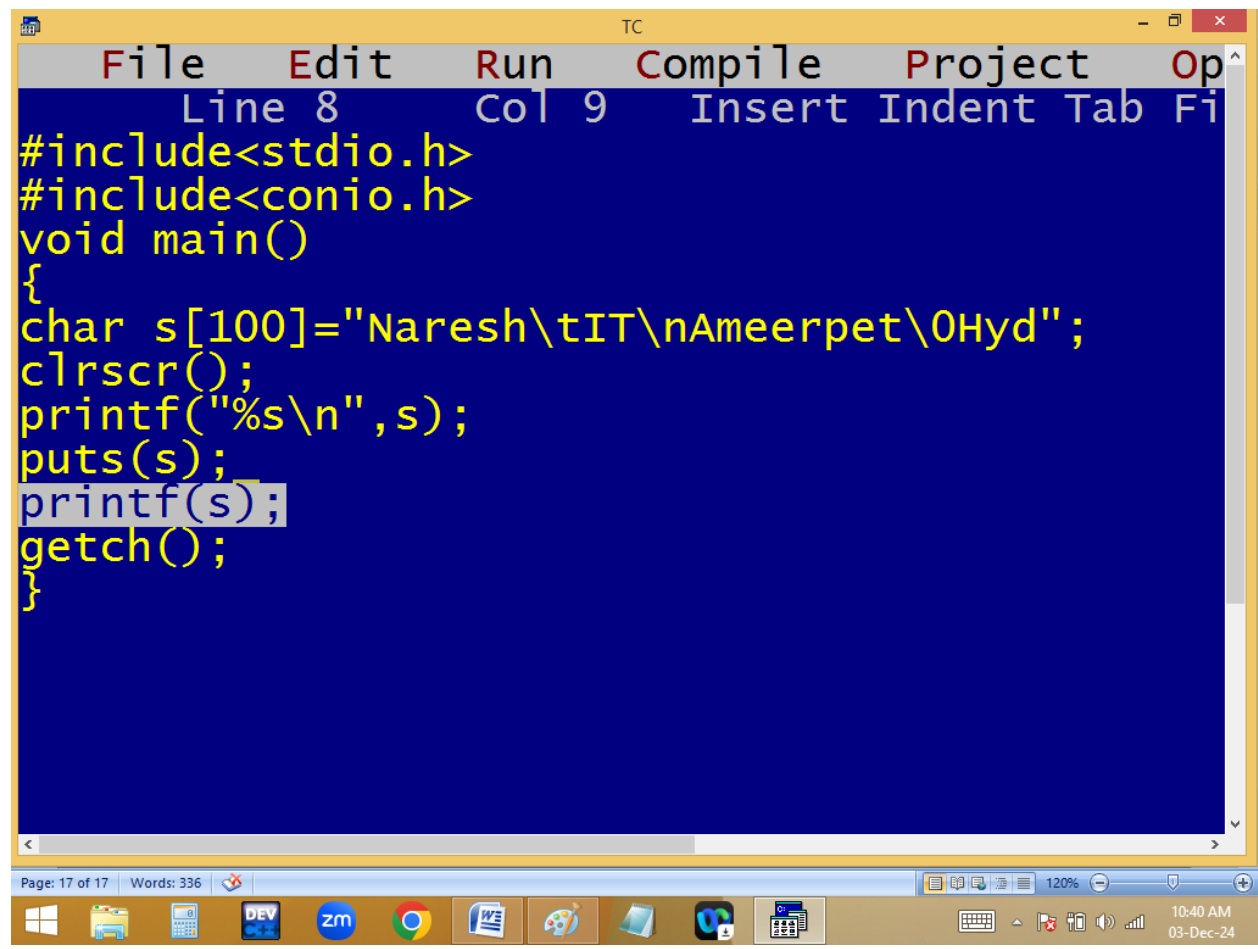


The screenshot shows a Turbo C++ (TC) IDE window with a black background and white text. The text displays the memory address of a string variable 'city' at three different points: 'city[0] cell addr 65494', 'city stored addr 65494', and 'city address is 65494'. The window's title bar is yellow and contains the text 'TC'. The status bar at the bottom of the window shows 'Page: 15 of 16' and 'Words: 336'. The Windows taskbar is visible at the bottom of the screen, showing various application icons and the system clock indicating 10:36 AM on 03-Dec-24.

```
city[0] cell addr 65494
city stored  addr 65494
city  address is 65494
```

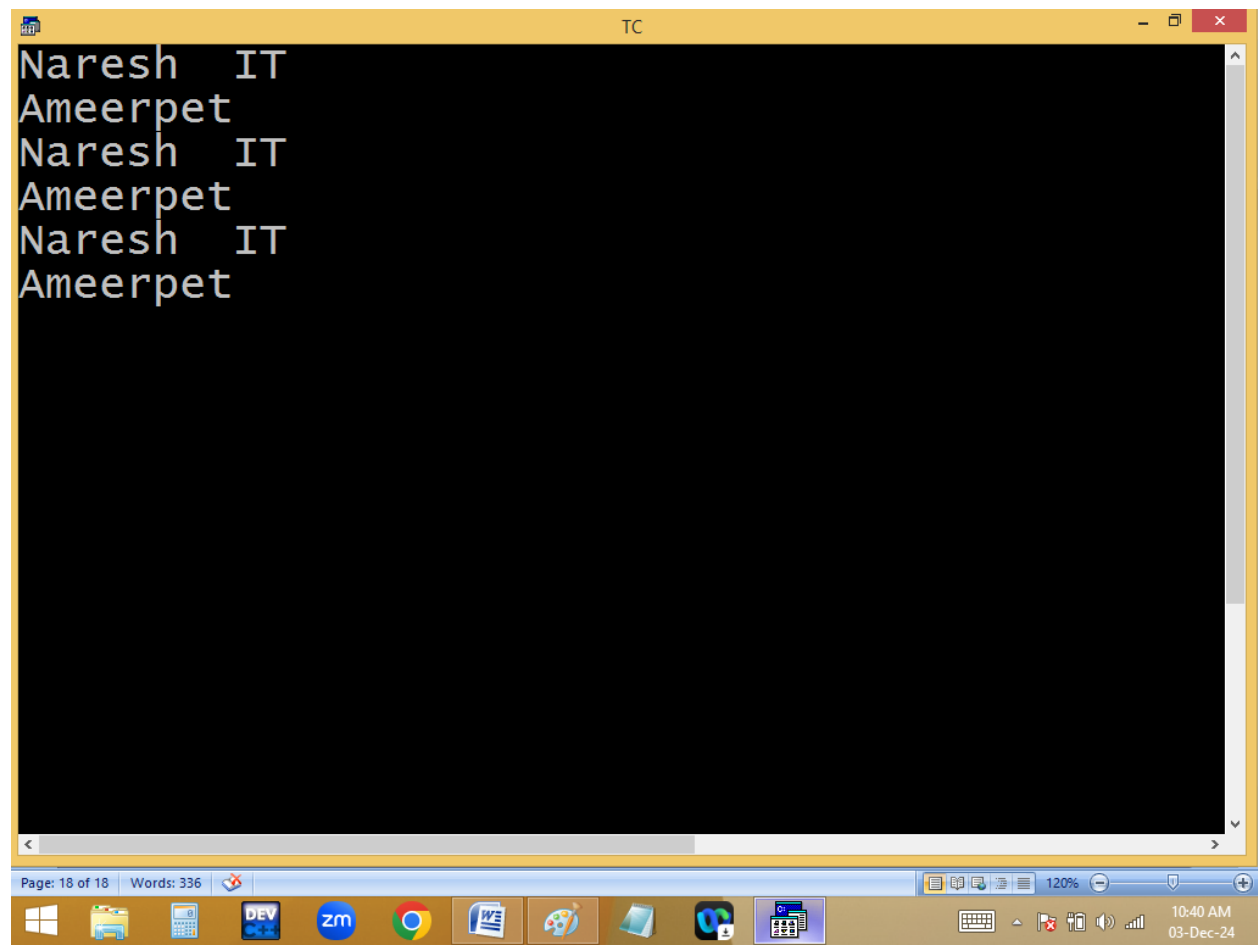
**Eg:**

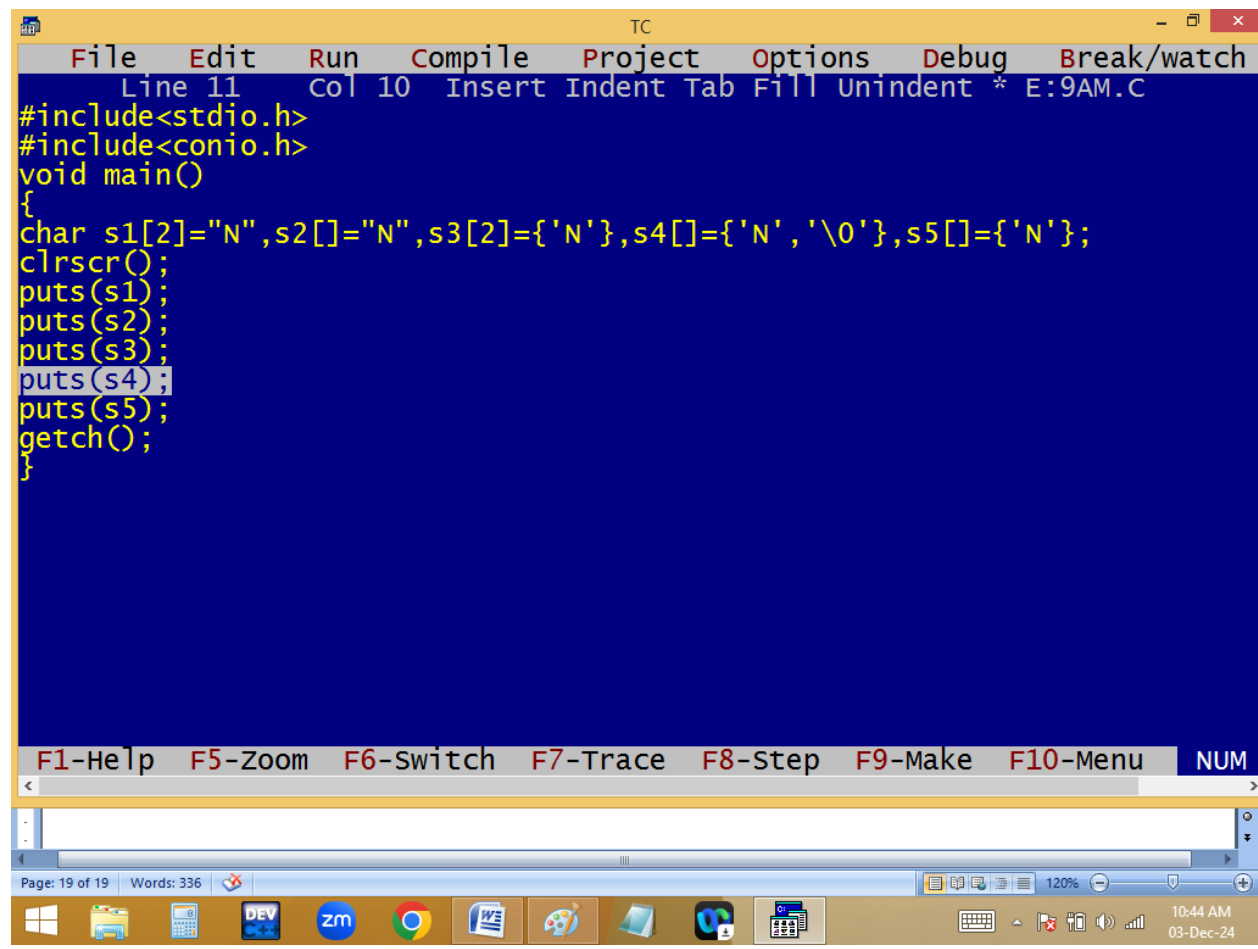
**Direct initialization of a string:**



```
File Edit Run Compile Project Op
Line 8 Col 9 Insert Indent Tab Fi
#include<stdio.h>
#include<conio.h>
void main()
{
char s[100]="Naresh\tIT\nameerpet\0Hyd";
clrscr();
printf("%s\n",s);
puts(s);
printf(s);
getch();
}
```

Page: 17 of 17 Words: 336 120% 10:40 AM 03-Dec-24

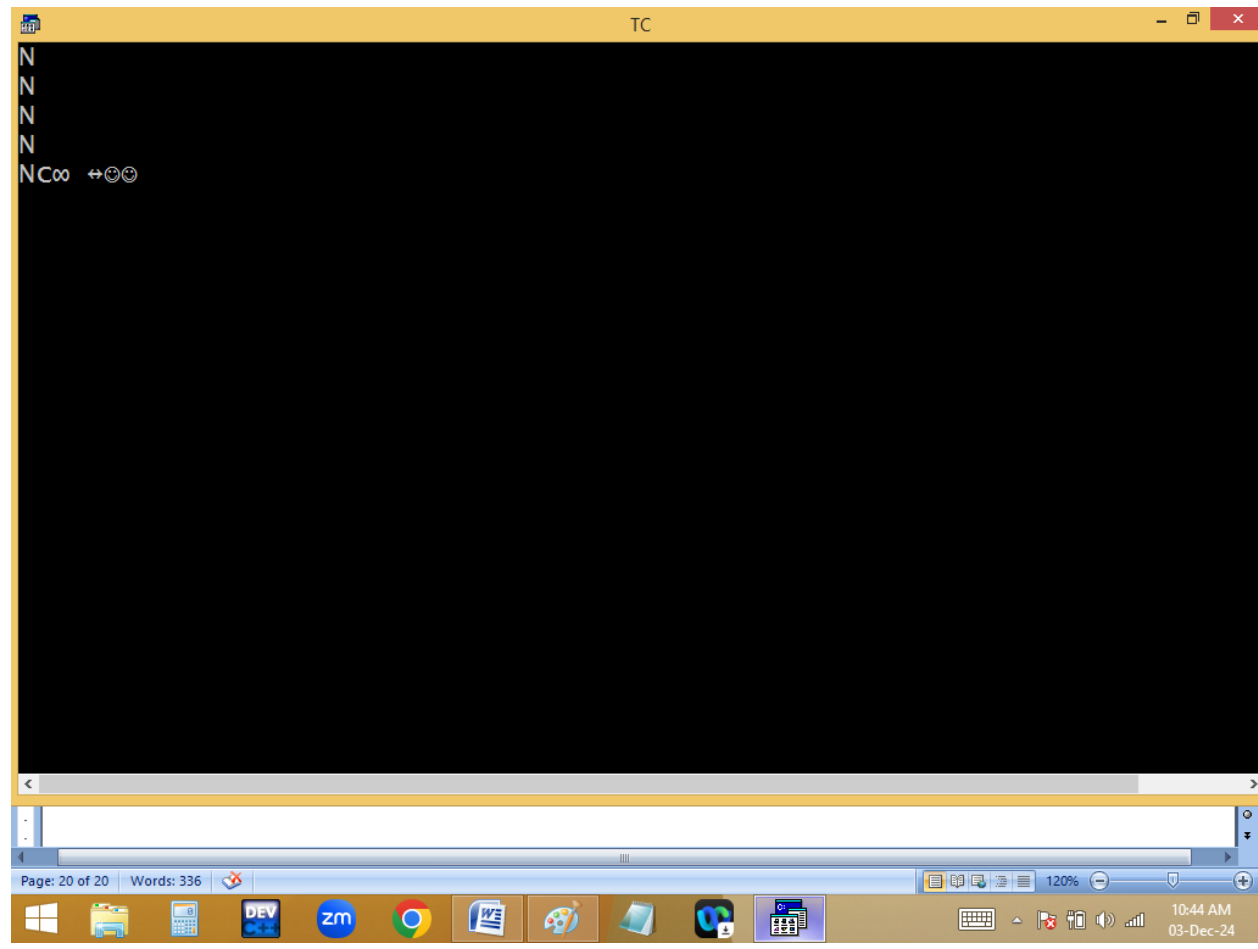




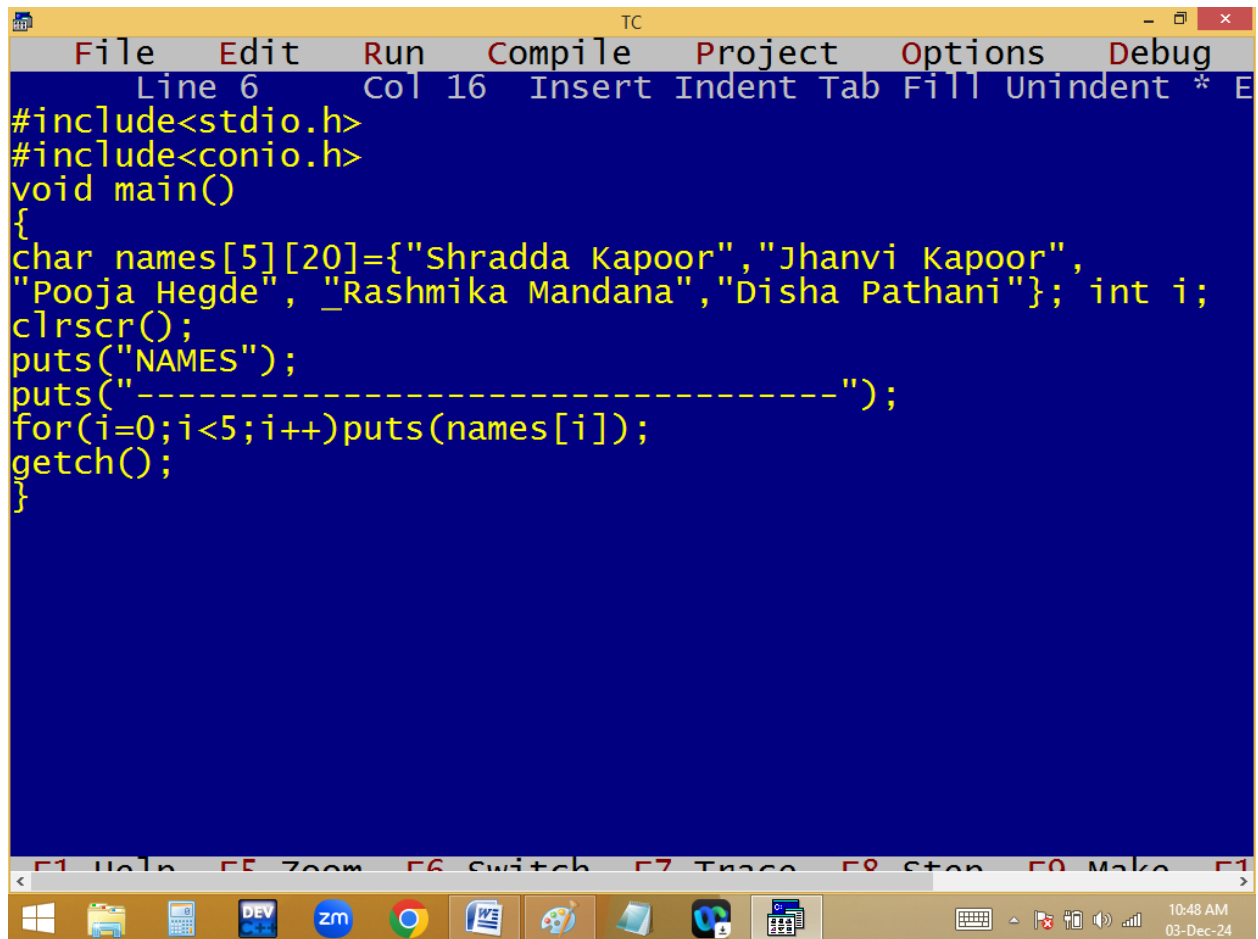
The image shows a screenshot of the Turbo C++ (TC) IDE. The main window has a dark blue background with yellow text. The menu bar at the top includes File, Edit, Run, Compile, Project, Options, Debug, and Break/watch. The status bar at the top indicates 'Line 11 Col 10' and 'Insert Indent Tab Fill Unindent \* E:9AM.C'. The code in the editor is as follows:

```
#include<stdio.h>
#include<conio.h>
void main()
{
char s1[2]="N",s2[]="N",s3[2]={'N'},s4[]={'N','\0'},s5[]={'N'};
clrscr();
puts(s1);
puts(s2);
puts(s3);
puts(s4);
puts(s5);
getch();
}
```

Below the code editor is a toolbar with function key shortcuts: F1-Help, F5-Zoom, F6-Switch, F7-Trace, F8-Step, F9-Make, F10-Menu, and NUM. The bottom status bar shows 'Page: 19 of 19' and 'Words: 336'. The Windows taskbar at the very bottom displays various application icons and the system clock showing '10:44 AM 03-Dec-24'.



**Storing of multiple strings:**



The image shows a screenshot of a Turbo C++ (TC) IDE window. The title bar at the top reads "TC". Below it is a menu bar with the following options: File, Edit, Run, Compile, Project, Options, and Debug. Under the "Run" menu, there is a submenu with the following options: Line 6, Col 16, Insert, Indent, Tab, Fill, Unindent, \*, and 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()
{
char names[5][20]={"Shradda Kapoor","Jhanvi Kapoor",
"Pooja Hegde", "Rashmika Mandana","Disha Pathani"}; int i;
clrscr();
puts("NAMES");
puts("-----");
for(i=0;i<5;i++)puts(names[i]);
getch();
}
```

At the bottom of the window, there is a status bar with the following text: F1 Help, F5 Zoom, F6 Switch, F7 Trace, F8 Stop, F9 Make, F10. Below the status bar is a Windows taskbar with various icons, including the Start button, File Explorer, Calculator, DEV C++, ZOOM, Google Chrome, Microsoft Word, Paint, and a folder icon. The system clock in the bottom right corner shows the time as 10:48 AM and the date as 03-Dec-24.

