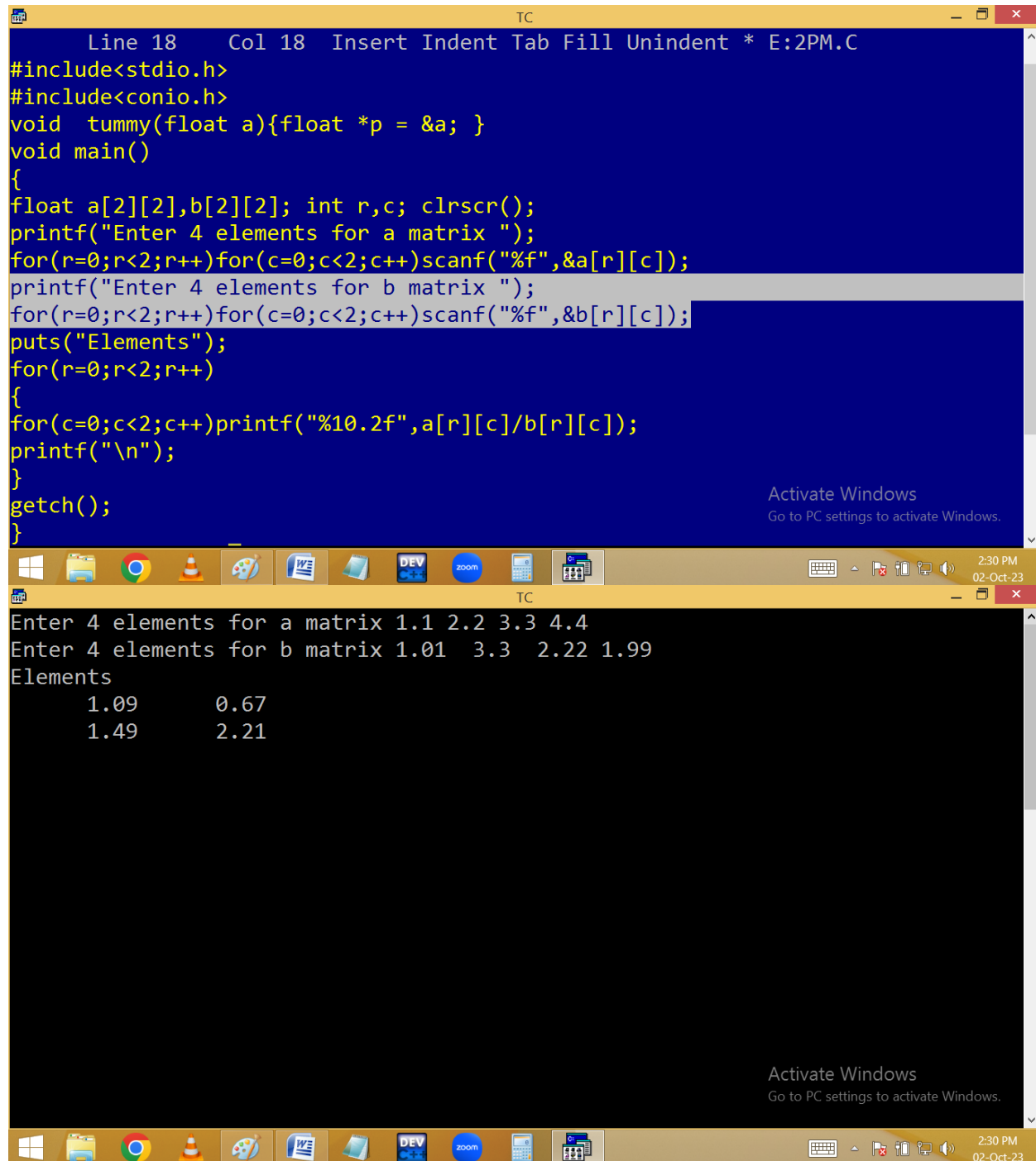


Finding fractions of $n \times n$ matrix i.e. a/b :



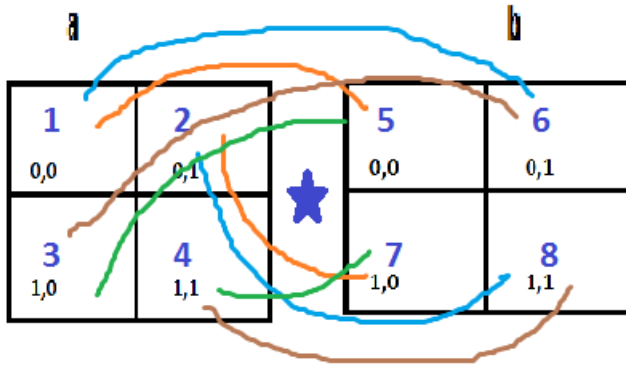
The screenshot shows the Turbo C++ (TC) IDE with a C program that calculates the fraction of elements in two 2x2 matrices. The program prompts the user to enter elements for matrix 'a' and matrix 'b', then displays the results of the division $a[r][c]/b[r][c]$ for each element.

```
Line 18 Col 18 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void tummy(float a){float *p = &a; }
void main()
{
float a[2][2],b[2][2]; int r,c; clrscr();
printf("Enter 4 elements for a matrix ");
for(r=0;r<2;r++)for(c=0;c<2;c++)scanf("%f",&a[r][c]);
printf("Enter 4 elements for b matrix ");
for(r=0;r<2;r++)for(c=0;c<2;c++)scanf("%f",&b[r][c]);
puts("Elements");
for(r=0;r<2;r++)
{
for(c=0;c<2;c++)printf("%10.2f",a[r][c]/b[r][c]);
printf("\n");
}
getch();
}
```

Enter 4 elements for a matrix 1.1 2.2 3.3 4.4
Enter 4 elements for b matrix 1.01 3.3 2.22 1.99
Elements

1.09	0.67
1.49	2.21

Matrix multiplication:



$$1*5+2*7=19$$

$$1*6+2*8=22$$

$$3*5+4*7=43$$

$$3*6+4*8=50$$

```
TC
#include<stdio.h>
#include<conio.h>
void main()
{
int a[2][2],b[2][2],r,c,k,s; clrscr();
printf("Enter 4 elements for a matrix ");
for(r=0;r<2;r++)for(c=0;c<2;c++)scanf("%d",&a[r][c]);
printf("Enter 4 elements for b matrix ");
for(r=0;r<2;r++)for(c=0;c<2;c++)scanf("%d",&b[r][c]);
puts("Elements");
for(r=0;r<2;r++)
{for(c=0;c<2;c++)
{for(k=s=0;k<2;k++) s+=a[r][k] * b[k][c];
printf("%4d",s);
}
printf("\n");
}
getch();
}
```

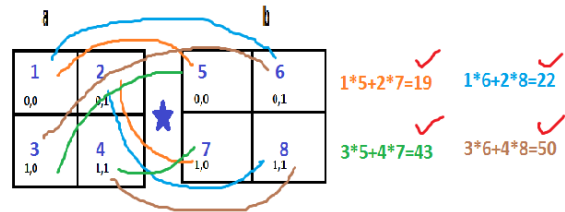
Enter 4 elements for a matrix 1 2 3 4
Enter 4 elements for b matrix 5 6 7 8
Elements
19 22
43 50

```

for(r=0;r<2;r++)
{
for(c=0;c<2;c++)
{
s=0;
for(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=18+4*8=50



3-dimensional arrays:

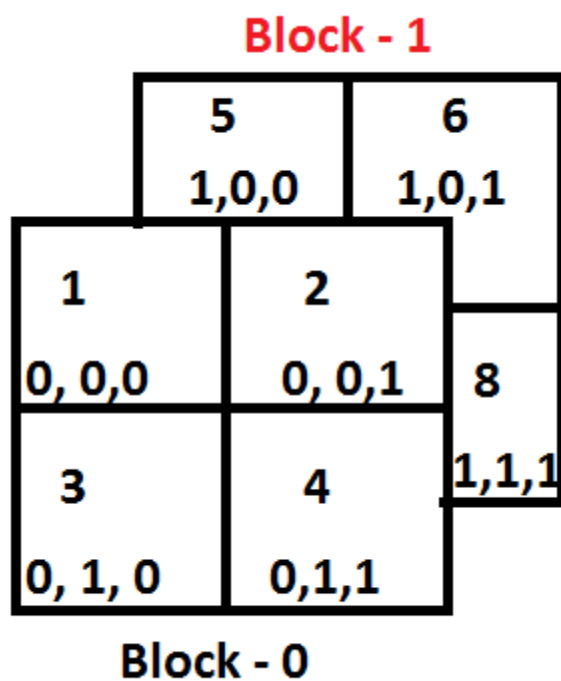
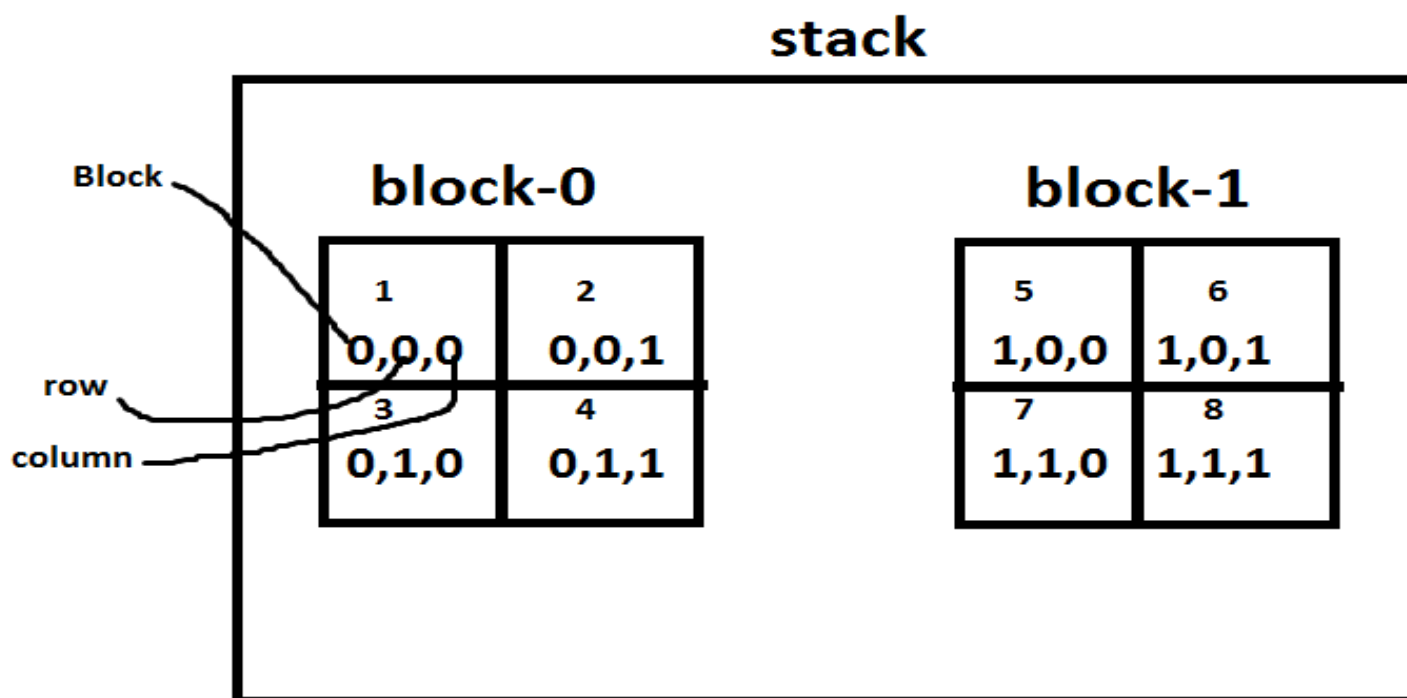
An array with several blocks, rows and columns.

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

Syntax:

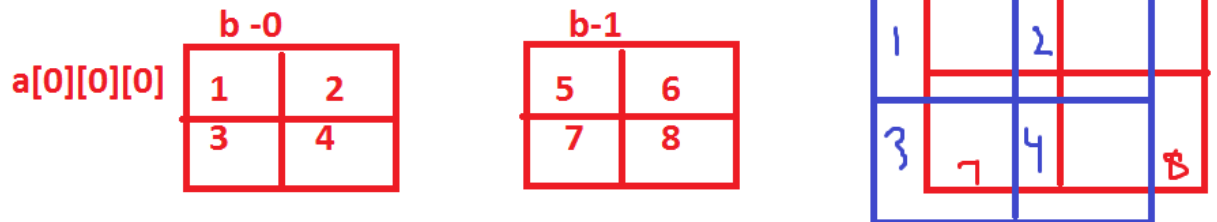
datatype variable [blocks] [rows] [columns];

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

```

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

4-dimensional array:

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

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

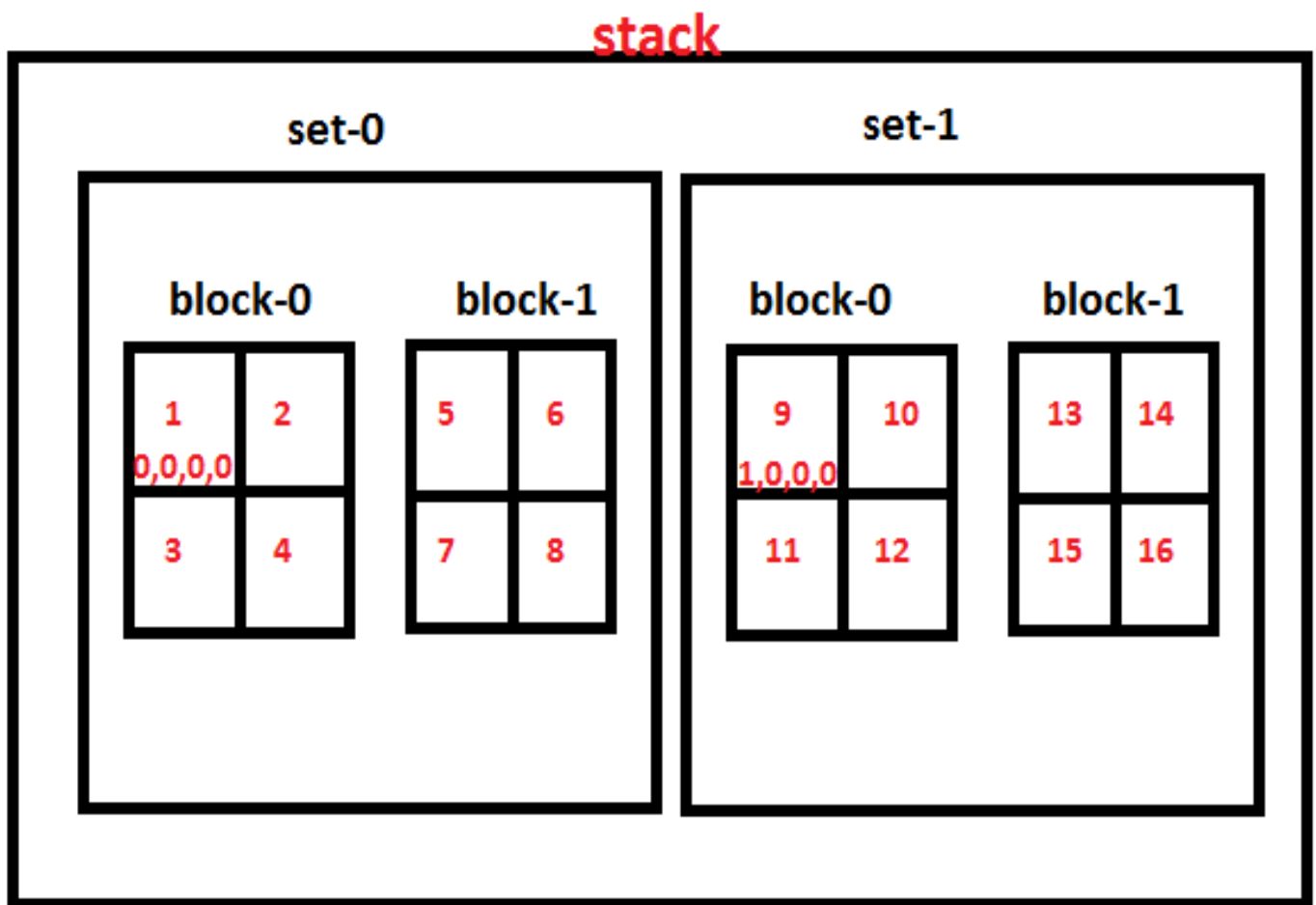
▪

Syntax:

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

eg:

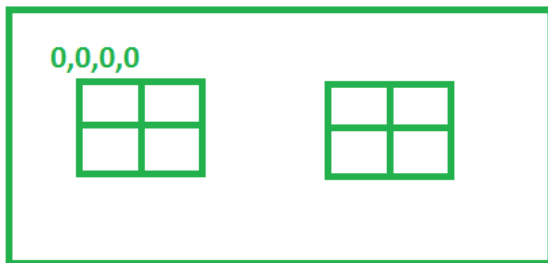
int a[2] [2] [2] [2]= {1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16};



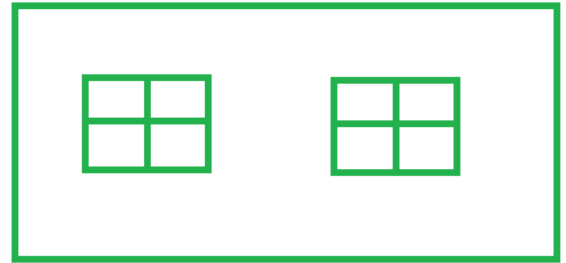

```
datatype var[class][sec][stu][marks];  
int      school[5][2][60][6];
```

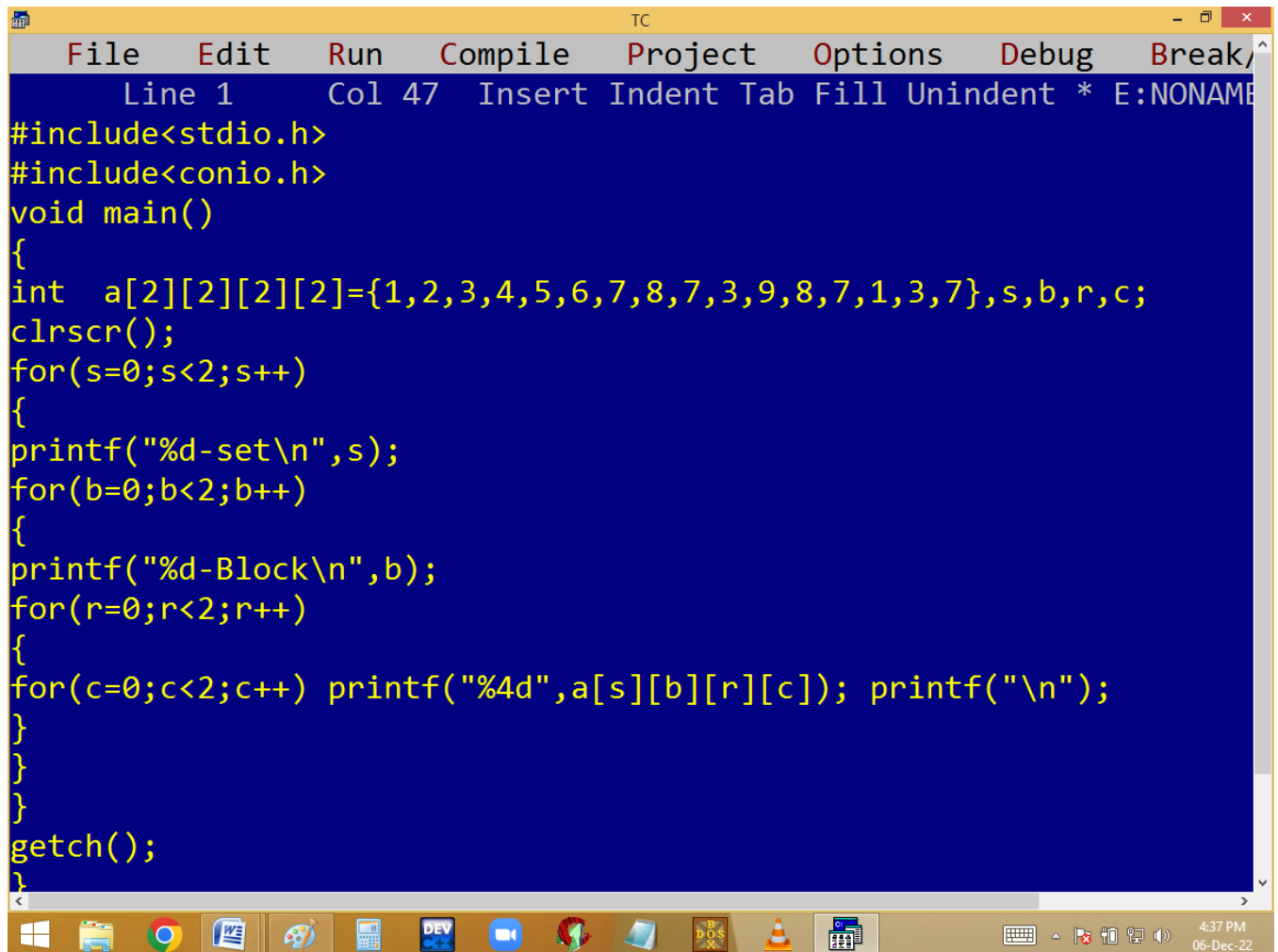
set
rows
int a[2][2][2][2]; an array with 3 subscripts [].
blocks columns

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 prints its elements in a formatted manner. 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.

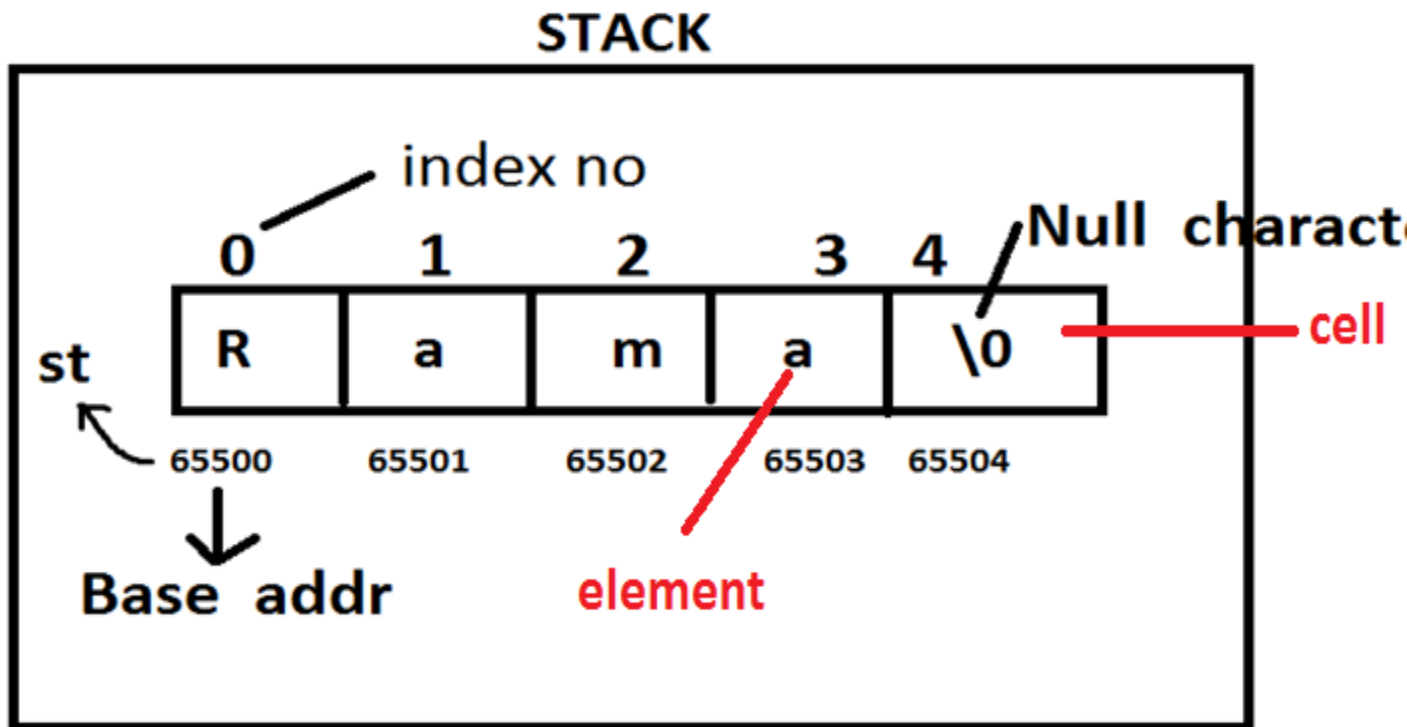
Syntax:

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

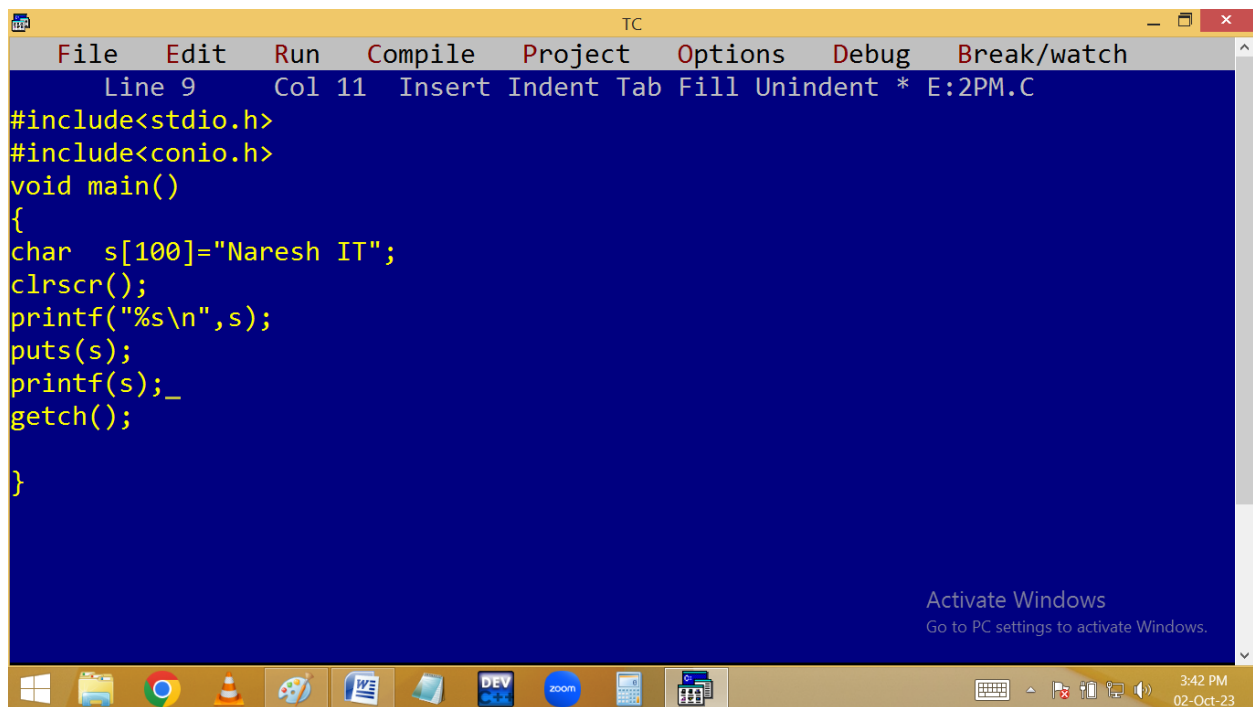
#define n 20

char st[n]; Ok

Note: String variable size always constant positive integer value.

Eg:

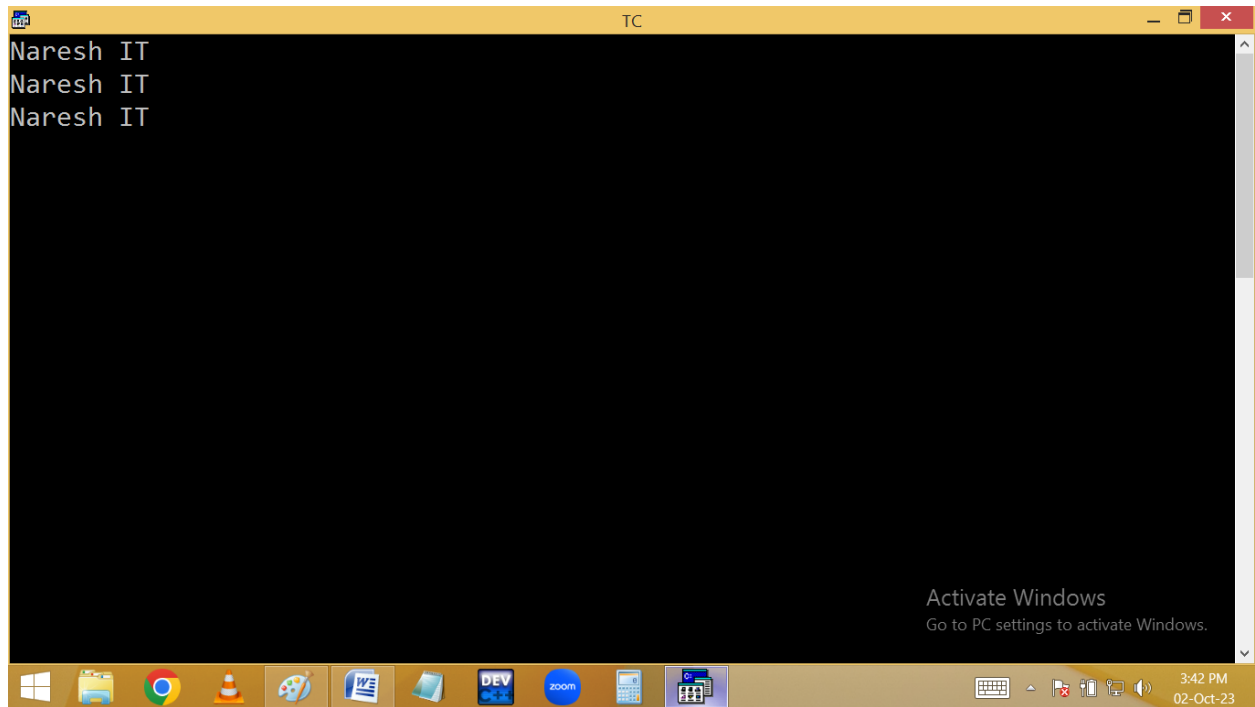
Direct initialization of a string:



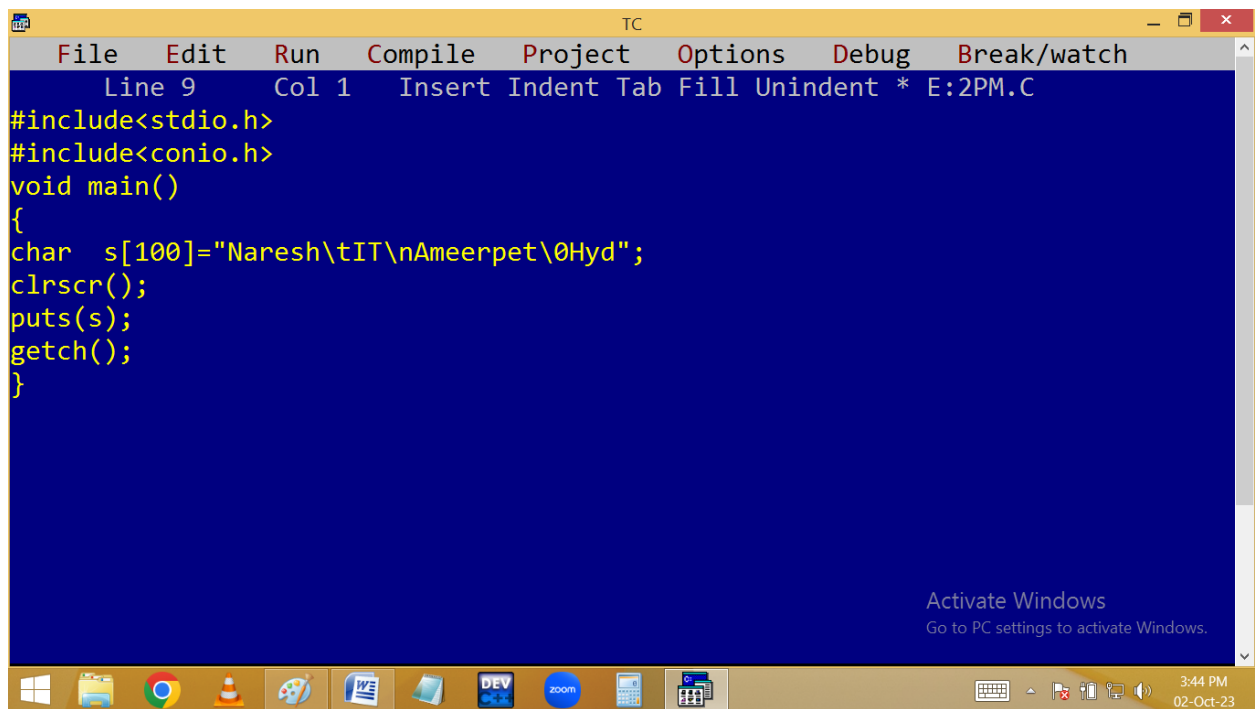
The screenshot shows a Turbo C++ (TC) IDE window. The menu bar includes File, Edit, Run, Compile, Project, Options, Debug, and Break/watch. The status bar at the top indicates 'Line 9 Col 11 Insert Indent Tab Fill Unindent * E:2PM.C'. The code in the editor is as follows:

```
#include<stdio.h>
#include<conio.h>
void main()
{
char s[100]="Naresh IT";
clrscr();
printf("%s\n",s);
puts(s);
printf(s);_
getch();
}
```

An 'Activate Windows' watermark is visible in the bottom right corner of the IDE window. The Windows taskbar at the bottom shows various application icons and the system clock indicating 3:42 PM on 02-Oct-23.



```
Naresh IT
Naresh IT
Naresh IT
```



```
File Edit Run Compile Project Options Debug Break/watch
Line 9 Col 1 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
char s[100]="Naresh\tIT\nAmeerpet\0Hyd";
clrscr();
puts(s);
getch();
}
```