


Reading and printing elements of a $n \times n$ matrix:

```
TC
File Edit Run Compile Project Options Debug
Line 16 Col 11 Insert Indent Tab Fill Unindent * E
#include<stdio.h>
#include<conio.h>
void main()
{
int a[10][10],nr,nc,r,c;
clrscr();
printf("Enter no of rows and columns ");
scanf("%d %d",&nr,&nc);
printf("Enter %d elements\n",nr*nc);
for(r=0;r<nr;r++)for(c=0;c<nc;c++)scanf("%d",&a[r][c]);
puts("Elements are ");
for(r=0;r<nr;r++)
{
for(c=0;c<nc;c++)
{
printf("%4d",a[r][c]);
}
printf("\n");
}
getch();
}
```

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

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```
TC
Enter no of rows and columns 2 3
Enter 6 elements
1 0 2 6 4 9 2
Elements are
  1  0  2
  6  4  9
```



```
TC
Enter no of rows and columns 3 3
Enter 9 elements
1 2 3 4 5 6 7 8 9
Elements are
  1  2  3
  4  5  6
  7  8  9
```

Transpose of $n \times n$ matrix:

```
TC
File Edit Run Compile Project Options Debug
Line 12 Col 1 Insert Indent Tab Fill Unindent * E
#include<stdio.h>
#include<conio.h>
void main()
{
int a[10][10],nr,nc,r,c;
clrscr();
printf("Enter no of rows and columns ");
scanf("%d %d",&nr,&nc);
printf("Enter %d elements\n",nr*nc);
for(r=0;r<nr;r++)for(c=0;c<nc;c++)scanf("%d",&a[r][c]);
puts("Transposed Elements are ");
for(c=0;c<nc;c++)
{
for(r=0;r<nr;r++)
{
printf("%4d",a[r][c]);
}
printf("\n");
}
getch();
}

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

```
TC
Enter no of rows and columns 2 3
Enter 6 elements
1 2 3
4 5 6
Transposed Elements are
  1  4
  2  5
  3  6
```

```
TC
Enter no of rows and columns 3 3
Enter 9 elements
1 2 3 4 5 6 7 8 9
Transposed Elements are
  1   4   7
  2   5   8
  3   6   9
```

```
for(c=0;c<3;c++)
{
  for(r=0;r<2;r++)
  {
    p(a[r] [c]);
  }
  p("\n");
}
```

1 0,0	2 0,1	3 0,2
4 1,0	5 1,1	6 1,2

1	4
2	5
3	6

r	c
0	1 0
0	1 1
0	1 2
	3

Method2:

```
TC
File Edit Run Compile Project Options Debug
Line 17 Col 20 Insert Indent Tab Fill Unindent * E
#include<stdio.h>
#include<conio.h>
void main()
{
int a[10][10],nr,nc,r,c;
clrscr();
printf("Enter no of rows and columns ");
scanf("%d %d",&nr,&nc);
printf("Enter %d elements\n",nr*nc);
for(r=0;r<nr;r++)for(c=0;c<nc;c++)scanf("%d",&a[r][c]);
puts("Transposed Elements are ");
for(r=0;r<nc;r++)
{
for(c=0;c<nr;c++)
{
printf("%4d",a[c][r]);
}
printf("\n");
}
getch();
}
F1-Help F5-Zoom F6-Switch F7-Trace F8-Step F9-Make F10-Run
```



```

TC
Enter no of rows and columns 5 2
Enter 10 elements
1 2
3 4
5 6
7 8
9 0
Transposed Elements are
  1   3   5   7   9
  2   4   6   8   0

```

```

for(r=0;r<3;r++)
{
for(c=0;c<2;c++)
{
p(a[c][r]);
}
p("\n");
}

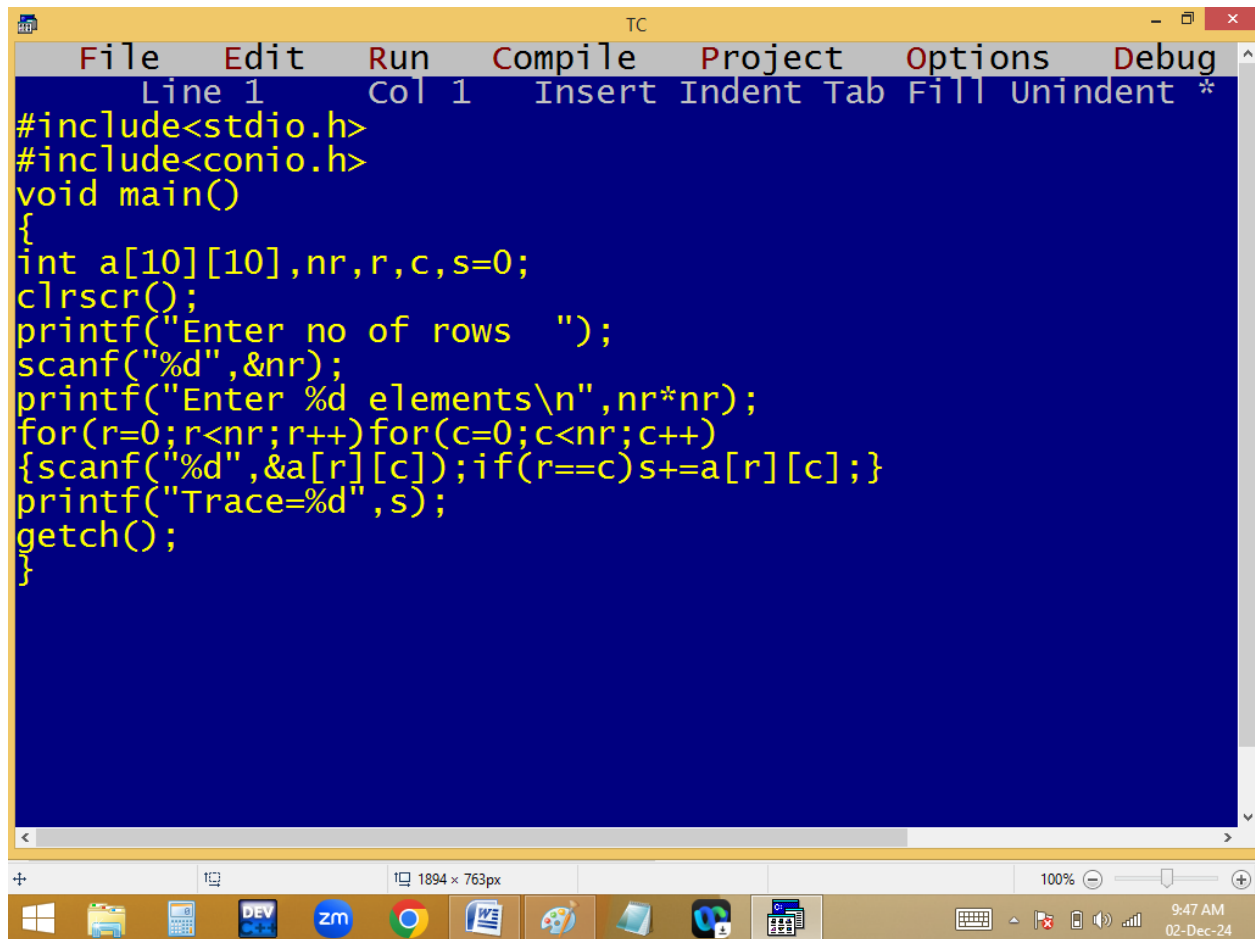
```

1 0,0	2 0,1	3 0,2
4 1,0	5 1,1	6 1,2

1	4
2	5
3	6

c	r
0	0
0	1
0	2

Finding trace of n*n matrix:



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". Below the menu bar, there is a status bar showing "Line 1", "Col 1", and a list of editing actions: "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][10],nr,r,c,s=0;
clrscr();
printf("Enter no of rows  ");
scanf("%d",&nr);
printf("Enter %d elements\n",nr*nr);
for(r=0;r<nr;r++)for(c=0;c<nr;c++)
{scanf("%d",&a[r][c]);if(r==c)s+=a[r][c];}
printf("Trace=%d",s);
getch();
}
```

At the bottom of the window, there is a taskbar with various application icons including Windows Explorer, Calculator, DEV C++, Zm, Google Chrome, Word, Paint, and a folder icon. The system tray on the right shows the date and time: "9:47 AM 02-Dec-24".

```
TC
Enter no of rows 3
Enter 9 elements
1 2 3
4 5 6
-1 7 -5
Trace=1
```

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```

Enter no of rows 2
Enter 4 elements
1 2
3 9
Trace=10

```

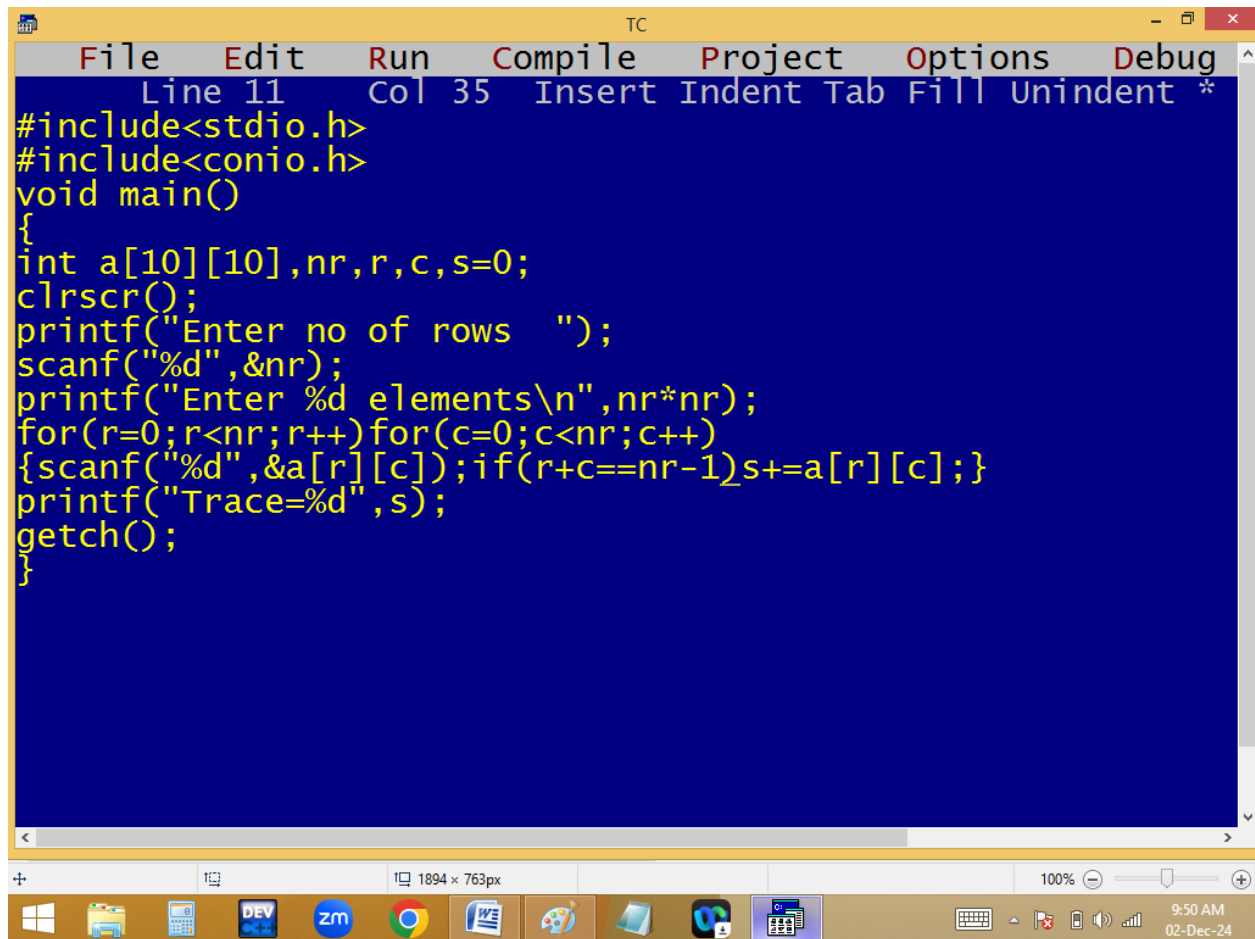
Sum of principle diagonal elements:

`if(r==c)s+=a[r][c];`

1	2	3
0,0	0,1	0,2
4	5	6
1,0	1,1	1,2
-1	7	-5
2,0	2,1	2,2

Y C S
0 ✓ 0 1 2 0+1+5+-5 ⇒ trace = 1
1 0 1 2
2 0 1 2

Finding sum of right diagonal elements:



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 11", "Col 35", and lists editing actions: "Insert", "Indent", "Tab", "Fill", "Unindent", and "*". The main editing area has a dark blue background with yellow text. It contains the following C code:

```
#include<stdio.h>
#include<conio.h>
void main()
{
int a[10][10],nr,r,c,s=0;
clrscr();
printf("Enter no of rows  ");
scanf("%d",&nr);
printf("Enter %d elements\n",nr*nr);
for(r=0;r<nr;r++)for(c=0;c<nr;c++)
{scanf("%d",&a[r][c]);if(r+c==nr-1)s+=a[r][c];}
printf("Trace=%d",s);
getch();
}
```

Below the code editor, there is a toolbar with icons for zooming, running, and other functions. The status bar at the bottom shows the window size "1894 x 763px", zoom level "100%", and the system clock "9:50 AM 02-Dec-24". The Windows taskbar is visible at the very bottom with various application icons.

```
TC
Enter no of rows 3
Enter 9 elements
1 2 3
4 5 6
-1 7 -5
Trace=7
```

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if(r+c==nr-1)s+=a[r][c];

1 0,0	2 0,1	3 0,2
4 1,0	5 1,1	6 1,2
-1 2,0	7 2,1	-5 2,2

sum=7

$$\frac{n}{3-1}=2$$

Finding row sum and column sum:

```
#include<stdio.h>

#include<conio.h>

void main()

{

int a[10][10],nr,r,c,rs,cs;

clrscr();

printf("Enter no of rows ");

scanf("%d",&nr);

printf("Enter %d elements\n",nr*nr);

for(r=0;r<nr;r++)for(c=0;c<nr;c++)scanf("%d",&a[r][c]);

for(r=0;r<nr;r++)

{

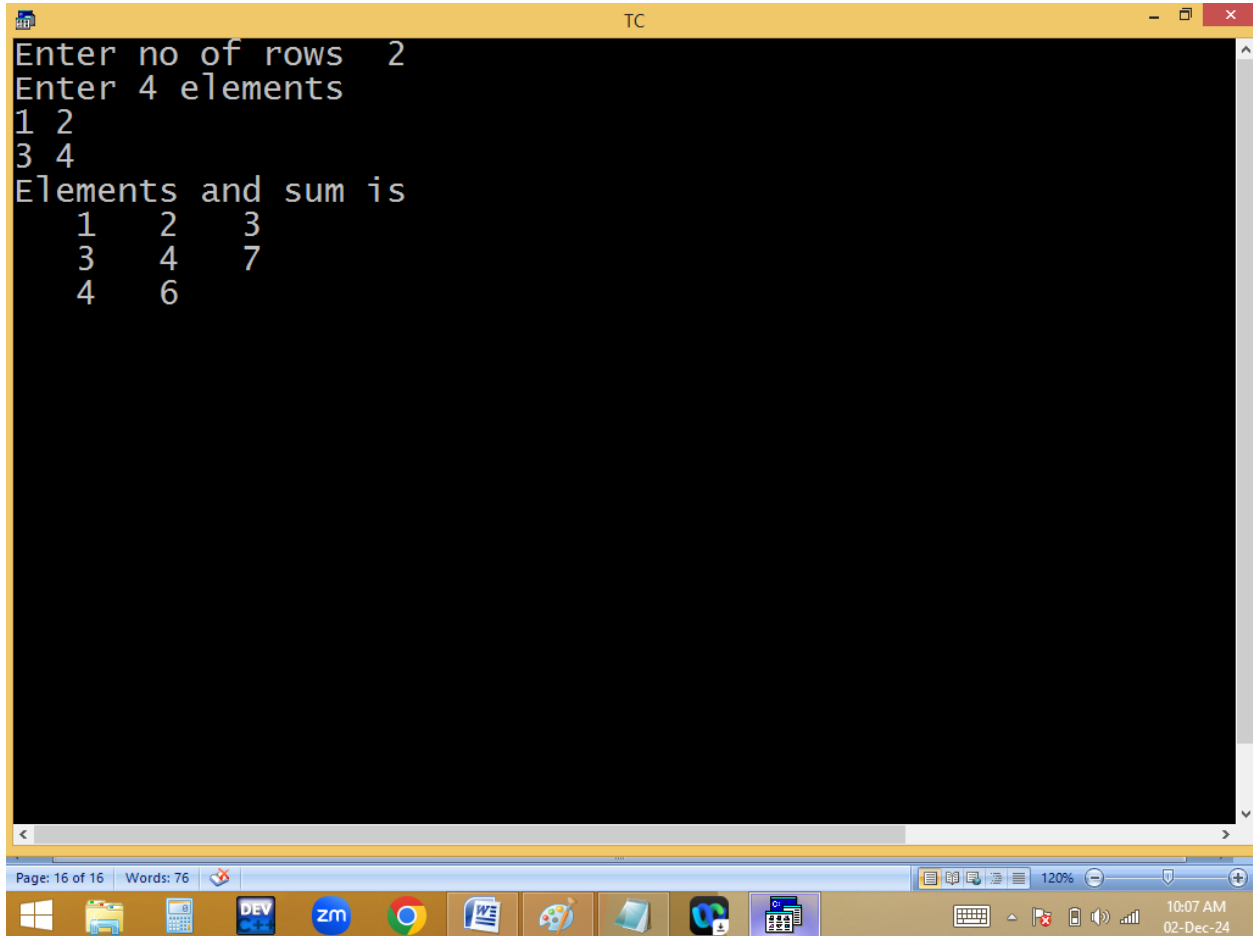
for(rs=cs=c=0;c<nr;c++)

{

rs+=a[r][c]; cs+=a[c][r];
```

```
}  
  
a[r][c]=rs; a[c][r]=cs;  
  
}  
  
puts("Elements and sum is");  
for(r=0;r<=nr;r++)  
{  
    for(c=0;c<=nr;c++)  
    {  
        if(r==nr && c==nr)continue; else printf("%4d",a[r][c]);  
    }  
  
    printf("\n");  
}  
  
getch();
```


}



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

```
Enter no of rows 2
Enter 4 elements
1 2
3 4
Elements and sum is
  1  2  3
  3  4  7
  4  6
```

Below the terminal window, a Microsoft Word document is open, showing "Page: 16 of 16" and "Words: 76". The Windows taskbar at the bottom contains several icons, including the Start button, File Explorer, Calculator, DEV, zm, Chrome, Word, Paint, and a folder icon. The system tray on the right shows the time as 10:07 AM and the date as 02-Dec-24.

```
TC
File Edit Run Compile Project Options Debug
Line 24 Col 19 Insert Indent Tab Fill Unindent *
printf("Enter %d elements\n",nr*nr);
for(r=0;r<nr;r++)for(c=0;c<nr;c++)scanf("%d",&a[r][c]);
for(r=0;r<nr;r++)
{
for(rs=cs=c=0;c<nr;c++)
{
rs+=a[r][c]; cs+=a[c][r];
}
a[r][c]=rs; a[c][r]=cs;
}
puts("Elements and sum is");
for(r=0;r<=nr;r++)
{
for(c=0;c<=nr;c++)
{
if(r==nr && c==nr); else printf("%4d",a[r][c]);
}
printf("\n");
}
getch();
}
```

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```

Enter no of rows 2
Enter 4 elements
1 2
3 4
Elements and sum is
1 2 3
3 4 7
4 6

```

```

for(r=0;r<2;r++)
{
for(rs=cs=c=0;c<2;c++)
{
rs+=a[r][c];
cs+=a[c][r];
}
a[r][c]=rs; ✓
a[c][r]=cs;
}

```

$\frac{r}{0}$	$\frac{c}{0 \mid 2}$	$\frac{rs}{0+1+2=3}$	$\frac{cs}{0+1+4=5}$
1	$0 \mid 2$	$0+4+5=9$	$0+2+5=7$

✓

1 0,0	2 0,1	3 0,2
4 1,0	5 1,1	9 1,2
5 2,0	7 2,1	2,2

Printing below output:

9 0,0	0 0,1	4 0,2	2 0,3
1 1,0	7 1,1	6 1,2	8 1,3

	Even	Odd	Zero
1-row	2	1	1
2-row	2	2	0

```
TC
File Edit Run Compile Project Options Debug
Line 1 Col 32 Insert Indent Tab Fill Unindent *
#include<stdio.h>
#include<conio.h>
void main()
{
int a[10][10],nr,nc,r,c,e,o,z; clrscr();
printf("Enter no of rows and columns ");
scanf("%d%d",&nr,&nc);
printf("Enter %d elements\n",nr*nc);
for(r=0;r<nr;r++)for(c=0;c<nc;c++)scanf("%d",&a[r][c]);
puts("\t Even\todd\tZero");
puts("-----");
for(r=0;r<nr;r++)
{
for(e=o=z=c=0;c<nc;c++)
{
if(a[r][c]==0)z++;else if(a[r][c]%2==0)e++;else o++;
}
printf("%d-row\t %d\t%d\t%d\n",r+1,e,o,z);
}
getch();
}
```

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```

TC
Enter no of rows and columns 2 4
Enter 8 elements
9 0 4 2
1 7 6 8

Even    Odd    Zero
-----
1-row   2      1      1
2-row   2      2      0

```

```

puts("\tEven\tOdd\tZero");
puts("-----");
for(r=0;r<2;r++)
{
for(e=o=z=c=0;c<4;c++)
{
if(a[r][c]==0)z++;
else if(a[r][c]%2==0)e++;
else o++;
}
p("%d-row\t%d\t%d\t%d\n",r+1,e,o,z);
}

```

2 2 2 0

9	0	4	2
0,0	0,1	0,2	0,3
1	7	6	8
1,0	1,1	1,2	1,3

	Even	Odd	Zero
1-row	2	1	1
2-row	2	2	0

$\frac{r}{0}$ $\frac{c}{01234}$ $\frac{e}{012}$ $\frac{o}{01}$ $\frac{z}{01}$
 1 0123 012 012 0

Finding fractions of $n \times n$ matrix:

a/b matrix:

```
TC
File Edit Run Compile Project Options Debug
Line 21 Col 11 Insert Indent Tab Fill Unindent *
#include<stdio.h> #include<conio.h>
void dummy(float a){float *p=&a;}
void main()
{float a[10][10],b[10][10];int nr,nc,r,c; 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("%f",&a[r][c]);
printf("Enter %d elements for 1st array\n",nr*nc);
for(r=0;r<nr;r++)for(c=0;c<nc;c++)scanf("%f",&b[r][c]);

puts("Elements are");
puts("-----");
for(r=0;r<nr;r++)
{
for(c=0;c<nc;c++)
{
printf("%10.2f",a[r][c]/b[r][c]);
}
printf("\n");
}getch(); }
```



```
TC
Enter no of rows and columns 2 2
Enter 4 elements for 1st array
5.5 3.3 7.25 9.12
Enter 4 elements for 1st array
4.5 8.8 2.22 6.5
Elements are
-----
      1.22      0.37
      3.27      1.40
```

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```
TC
Enter no of rows and columns 2 2
Enter 4 elements for 1st array
1 2 3 4
Enter 4 elements for 1st array
5 6 7 8
Elements are
-----
      0.20      0.33
      0.43      0.50
```

a		b			
5.5	3.3	4.5	8.8	1.22	0.38
0,0	0,1	0,0	0,1		
7.25	9.12	2.22	6.5	3.27	1.40
1,0	1,1	1,0	1,1		

Matrix multiplication:

