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**SE-Comps B/Batch C**

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**Scilab no.1: Introduction to Scilab and its basic commands**

**Program No.1** :- Write a program to input two matrices, calculate their sum and product

where:

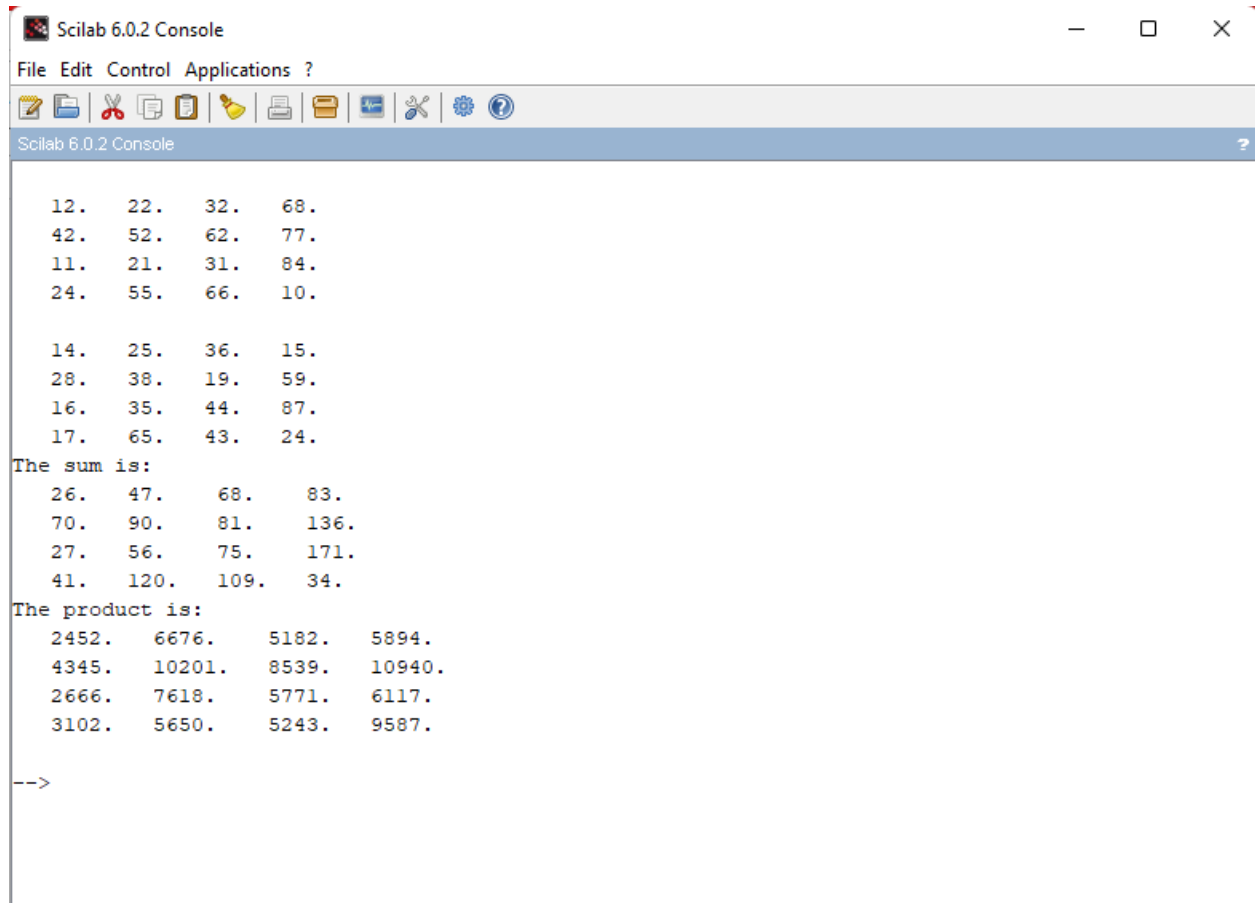
$$A = \begin{bmatrix} 12 & 22 & 32 & 68 \\ 42 & 52 & 62 & 77 \\ 11 & 21 & 31 & 84 \\ 24 & 55 & 66 & 10 \end{bmatrix}$$

$$B = \begin{bmatrix} 14 & 25 & 36 & 15 \\ 28 & 38 & 19 & 59 \\ 16 & 35 & 44 & 87 \\ 17 & 65 & 43 & 24 \end{bmatrix}$$

**Code :-**

```
clc;
A=[12 22 32 68;42 52 62 77;11 21 31 84;24 55 66 10];
B=[14 25 36 15;28 38 19 59;16 35 44 87;17 65 43 24];
disp(A);
disp(B);
C=A+B;
D=A*B;
printf("The sum is:")
disp(C);
printf("The product is:");
disp(D);
```

## Output :-



The image shows a screenshot of the Scilab 6.0.2 Console window. The window has a title bar with the Scilab logo and the text "Scilab 6.0.2 Console". Below the title bar is a menu bar with "File", "Edit", "Control", "Applications", and "?". Under the "Edit" menu, there is a toolbar with icons for file operations (new, open, save, print, etc.) and editing (copy, paste, undo, redo, etc.). The main area of the console displays the output of a script. It shows two 4x4 matrices, their sum, and their product. The output is as follows:

```
12.  22.  32.  68.  
42.  52.  62.  77.  
11.  21.  31.  84.  
24.  55.  66.  10.  
  
14.  25.  36.  15.  
28.  38.  19.  59.  
16.  35.  44.  87.  
17.  65.  43.  24.  
The sum is:  
26.  47.   68.   83.  
70.  90.   81.  136.  
27.  56.   75.  171.  
41. 120.  109.   34.  
The product is:  
2452.  6676.  5182.  5894.  
4345. 10201.  8539. 10940.  
2666.  7618.  5771.  6117.  
3102.  5650.  5243.  9587.  
  
-->
```

**Program No. 2:-** Write a program to input a matrix, find its determinant, trace and transpose where:

$$A = \begin{bmatrix} 1 & 3 & 5 \\ 2 & 4 & 1 \\ 1 & 2 & 3 \end{bmatrix}$$

**Code:-**

```
clc;
A=[1 3 5;2 4 1;1 2 3];
printf("Matrix A is:");
disp(A);
printf("Determinant of matrix A is: ");
disp(det(A));
printf("Transpose of matrix A is:");
disp(A');
printf("Trace of matrix A is: ");
disp(trace(A));
```

## Output :-

Scilab 6.1.1 Console

Matrix A is:

```
1.  3.  5.  
2.  4.  1.  
1.  2.  3.
```

Determinant of matrix A is:

```
-5.
```

Transpose of matrix A is:

```
1.  2.  1.  
3.  4.  2.  
5.  1.  3.
```

Trace of matrix A is:

```
8.
```

```
--> |
```

**Program No. 3** :- Write a program to extract lower and upper triangular matrix where:

$$A = \begin{bmatrix} 1 & 3 & 5 \\ 2 & 4 & 1 \\ 1 & 2 & 3 \end{bmatrix}$$

**Code** :-

```
clc
A=[1 3 5;2 4 1;1 2 3];
printf("The matrix A is: \n");
disp(A);
printf("The upper triangular matrix of A is : \n");
disp(triu(A));
printf("The lower triangular matrix of A is : \n");
disp(tril(A));
```

## Output :-

Scilab 6.1.1 Console

The matrix A is:

```
1.  3.  5.  
2.  4.  1.  
1.  2.  3.
```

The upper triangular matrix of A is :

```
1.  3.  5.  
0.  4.  1.  
0.  0.  3.
```

The lower triangular matrix of A is :

```
1.  0.  0.  
2.  4.  0.  
1.  2.  3.
```

-->

**Program no. 4** :- Generate 2 random matrices and print their sum and product. Also print their upper triangular as well as lower triangular matrices.

**Code** :-

```
clc
A=rand(4,4);
printf("The random matrix A is : \n");
disp(A);
B=rand(4,4);
printf("The random matrix B is : \n");
disp(B);
C=A+B;
D=A*B;
printf("Sum of two random matrices : \n ")
disp(C);
printf("Product of two random matrices : \n")
disp(D);
printf("The upper triangular matrix of A is : \n");
disp(triu(A));
printf("The lower triangular matrix of A is : \n");
disp(tril(A));
printf("The upper triangular matrix of B is : \n");
disp(triu(B));
printf("The lower triangular matrix of B is : \n");
disp(tril(B));
```

**Output :-**

```
Scilab 6.1.1 Console
The random matrix A is :

    0.2113249    0.6653811    0.8782165    0.7263507
    0.7560439    0.6283918    0.068374    0.1985144
    0.0002211    0.8497452    0.5608486    0.5442573
    0.3303271    0.685731    0.6623569    0.2320748

The random matrix B is :

    0.2312237    0.3076091    0.3616361    0.3321719
    0.2164633    0.9329616    0.2922267    0.5935095
    0.8833888    0.2146008    0.5664249    0.5015342
    0.6525135    0.312642    0.4826472    0.4368588

Sum of two random matrices :

    0.4425486    0.9729902    1.2398526    1.0585226
    0.9725071    1.5613534    0.3606007    0.7920239
    0.8836099    1.064346    1.1272735    1.0457915
    0.9828406    0.998373    1.1450041    0.6689335

Product of two random matrices :

    1.4426541    1.1013342    1.1188796    1.2228744
    0.5007732    0.8955684    0.5915868    0.7451077
    1.0345724    1.083364    0.8287611    1.0234536
    0.9613657    0.956071    0.8070328    0.9502918

The upper triangular matrix of A is :

    0.2113249    0.6653811    0.8782165    0.7263507
    0.          0.6283918    0.068374    0.1985144
    0.          0.          0.5608486    0.5442573
    0.          0.          0.          0.2320748

The lower triangular matrix of A is :

    0.2113249    0.          0.          0.
    0.7560439    0.6283918    0.          0.
    0.0002211    0.8497452    0.5608486    0.
    0.3303271    0.685731    0.6623569    0.2320748

The upper triangular matrix of A is :
```



0.3303271 0.003731 0.0023303 0.2320710

The upper triangular matrix of A is :

0.2312237	0.3076091	0.3616361	0.3321719
0.	0.9329616	0.2922267	0.5935095
0.	0.	0.5664249	0.5015342
0.	0.	0.	0.4368588

The lower triangular matrix of A is :

0.2312237	0.	0.	0.
0.2164633	0.9329616	0.	0.
0.8833888	0.2146008	0.5664249	0.
0.6525135	0.312642	0.4826472	0.4368588

--> |

---

**Program No. 5** :- Write a program to input a matrix, find the product and sum of all the elements of A. also print row wise and column wise sum and product of the matrix where:

$$A = \begin{bmatrix} 1 & 3 & 5 \\ 2 & 4 & 1 \\ 1 & 2 & 3 \end{bmatrix}$$

**Code** :-

```
clc;
A=[1 3 5;2 4 1;1 2 3];
printf("the matrix A is: \n");
disp(A);
S=sum(A);
printf("The sum of all entries of A is: ");
disp(S);
P=prod(A);
printf("The product of all entries of A is:");
disp(P);
B=sum(A,'r');
printf("The rowwise sum of A is: ");
disp(B);
C=sum(A,'c');
printf("The columnwise sum of A is: ");
disp(C);
D=prod(A,'c');
printf("The columnwise product of A is: ");
disp(D);
E=prod(A,'r');
printf("The rowwise product of A is: ");
disp(E);
```

## Output :-

```
Scilab 6.1.1 Console
the matrix A is:

  1.   3.   5.
  2.   4.   1.
  1.   2.   3.
The sum of all entries of A is:
  22.
The product of all entries of A is:
  720.
The rowwise sum of A is:
  4.   9.   9.
The columnwise sum of A is:
  9.
  7.
  6.
The columnwise product of A is:
  15.
  8.
  6.
The rowwise product of A is:
  2.  24.  15.

-->
```