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SE-Comps B/Batch C

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

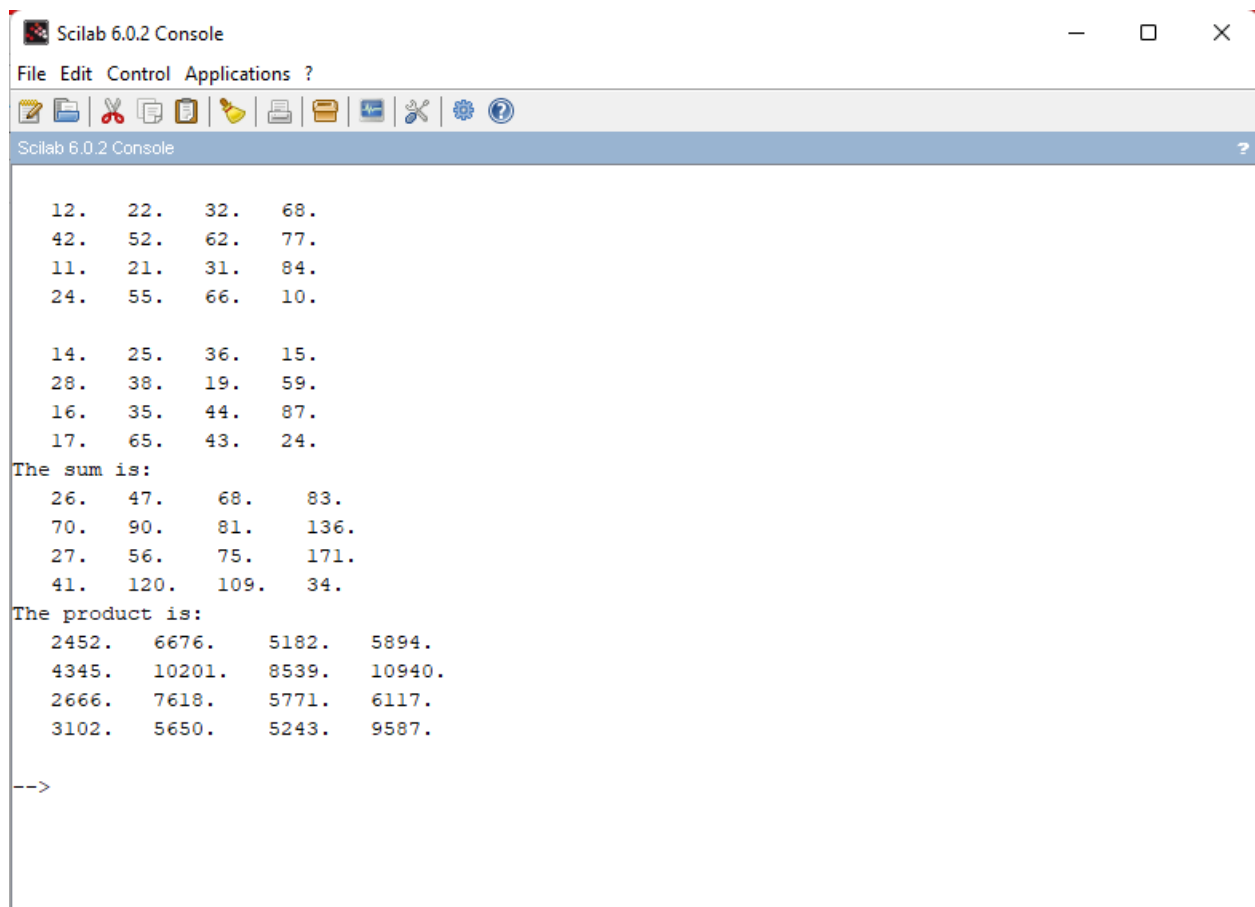**Program No.1** :- Write a program to input two matrices, calculate their sum and product

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 :-

```
Scilab 6.0.2 Console                                                    —   □   ×
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Scilab 6.0.2 Console                                                           ?


    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 A is : \n");
disp(triu(B));
printf("The lower triangular matrix of A 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 :
```

```
U.JJUJZ/I     U.UUJ/JI     U.UUZJJUY     U.ZJZU/4U
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,'c');
printf("The rowwise sum of A is: ");
disp(B);
C=sum(A,'r');
printf("The columwise sum of A is: ");
disp(C);
D=prod(A,'r');
printf("The columwise product of A is: ");
disp(D);
E=prod(A,'c');
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:
   9.
   7.
   6.
The columwise sum of A is:
   4.    9.    9.
The columwise product of A is:
   2.    24.    15.
The rowwise product of A is:
   15.
   8.
   6.

-->|
```