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2022300118

SE-Comps B/Batch C

18th January 2024

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:

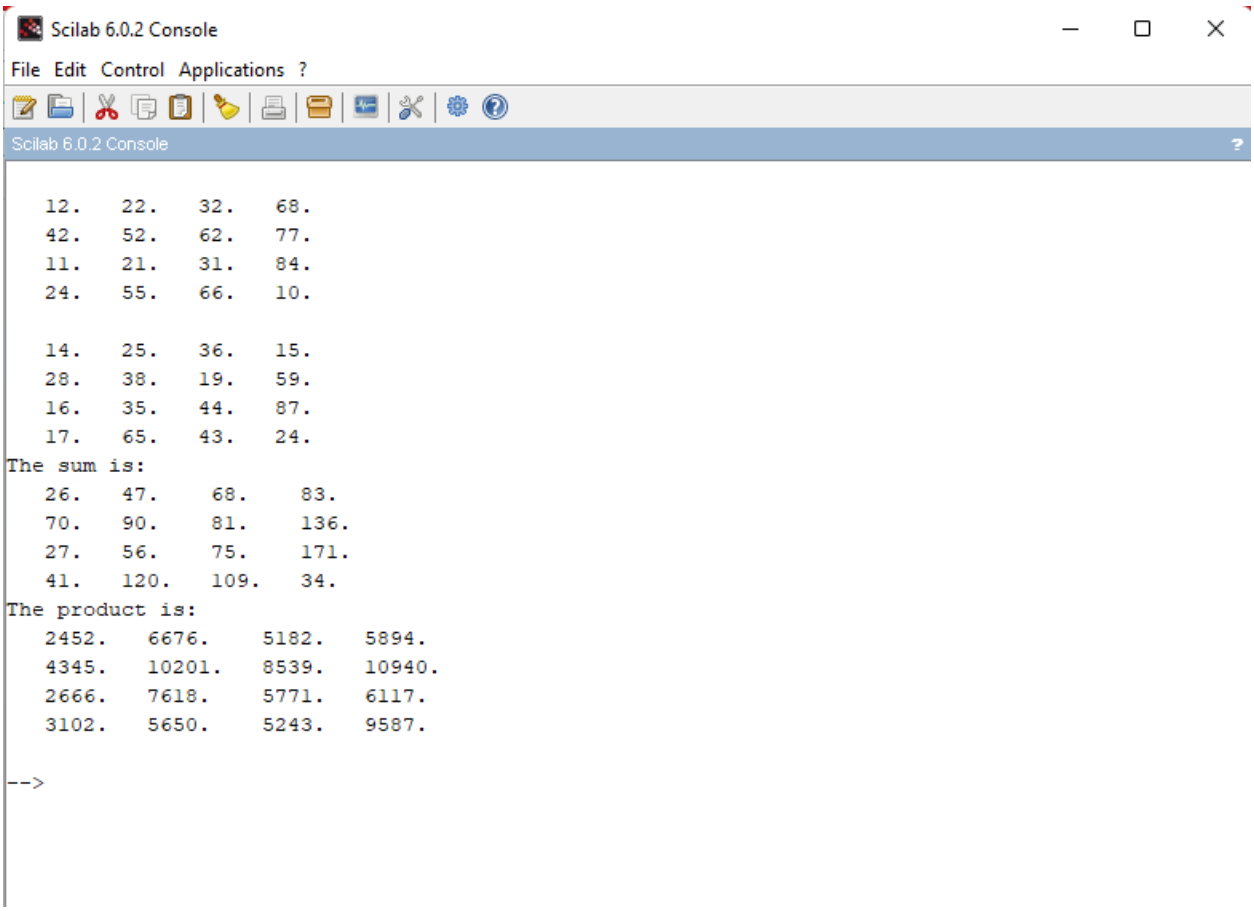
$$A=\begin{bmatrix}12 & 22 & 32 & 68\\ 42 & 52 & 62 & 77\\ 11 & 21 & 31 & 84\\ 24 & 55 & 66 & 10\end{bmatrix}$$

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

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
File Edit Control Applications ?
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 :
```

```
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

--> 
```

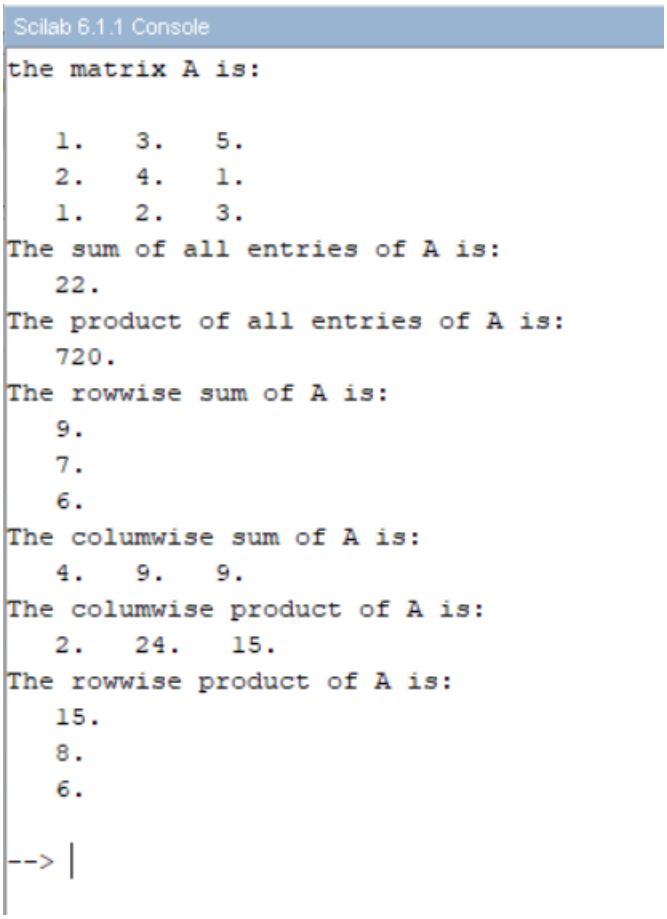
Program No. 5 :- Write a program to input a matrix, find the product and sum of all the elements of A. also print row wise and column wise sum and product of the matrix where:

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

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.
-->