Date 18-03-2021

Expt. No. 1 Page No. 1.

Experiment-1

Aim: To perform following algebra on matrices with and without function using Scilab a) Addition of matrices
b) Finding transpose
c) Multiplication of matrices

A.1 Matrix Addition using function

```
function [C] = addition (m, n, A, B)
    C = zeros (m, n);
    C = A + B ;
    disp('First matrix is', A)
    disp('Second matrix is', B)
    disp('Sum of matrices is')
endfunction
```

A.2

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OUTPUT

Scilab 6.1.0 Console

File Edit Control Applications ?

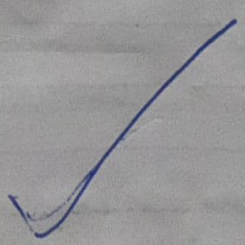
```
--> A = ones(2, 2)
 A  =

    1.    1.
    1.    1.

--> B = [2 3; 4 5]
 B  =

    2.    3.
    4.    5.

--> C = addition(2, 2, A, B)

 "First matrix is"

    1.    1.
    1.    1.

 "Second matrix is"

    2.    3.
    4.    5.

 "Sum of matrices is"
 C  =

    3.    4.
    5.    6.

-->
```

Scilab 6.1.0 Console

File Edit Control Applications ?

```
--> exec('C:\Users\DELL\Desktop\addition.sce', -1)

--> C = addition(2, 2, [1 2; 3 4], [5 6; 7 8])

 "First matrix is"

    1.    2.
    3.    4.

 "Second matrix is"

    5.    6.
    7.    8.

 "Sum of matrices is"
 C  =

    6.    8.
    10.   12.
```

ADDTION USING FUNCTIONS



Date _____

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A.2 Matrix addition without Function

```
m = input ('Enter no. of rows')
n = input ('Enter no of columns')
A = zeros (m, n)
B = zeros (m, n)
C = zeros (m, n)
disp ('Enter elements of first matrix row wise')
for i = 1:m
    for j = 1:n
        A(i, j) = input ('')
    end
end
disp ('Enter elements of second matrix row wise')
for i = 1:m
    for j = 1:n
        B(i, j) = input ('')
    end
end
for i = 1:m
    for j = 1:n
        C(i, j) = A(i, j) + B(i, j)
    end
end
disp ('First Matrix is', A)
disp ('Second Matrix is', B)
disp ('Sum of matrices is', C)
```

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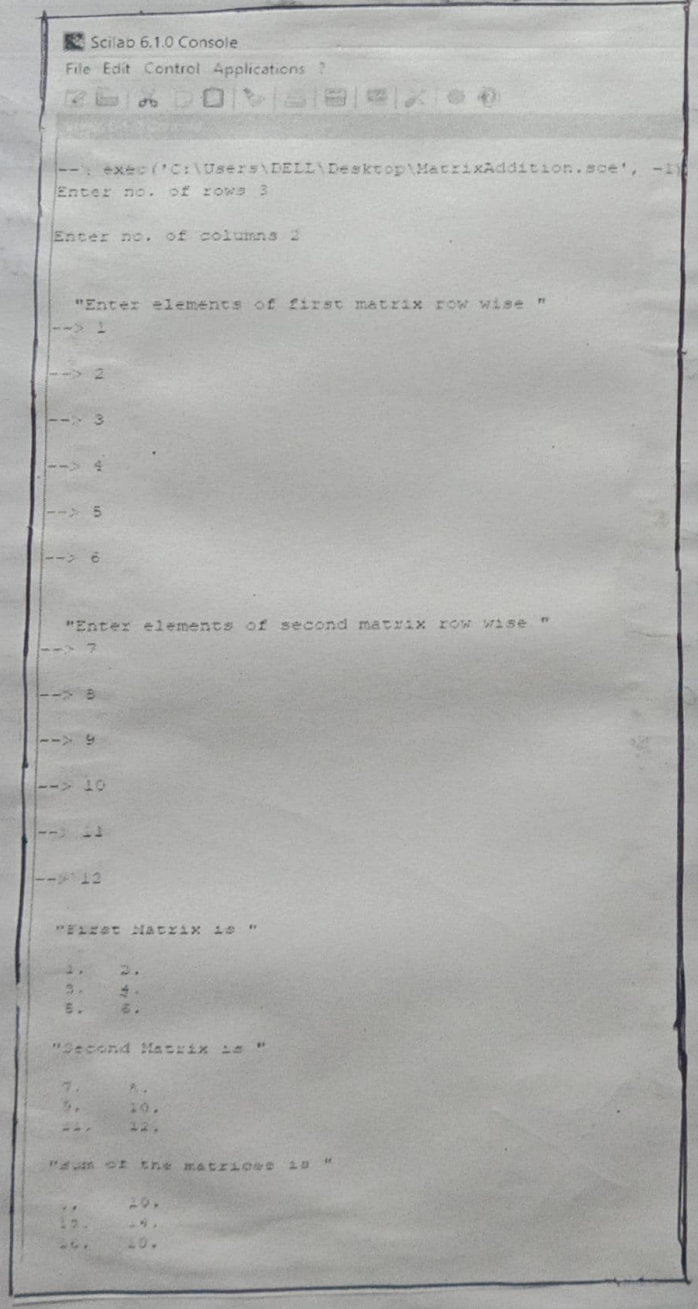
OUTPUT



Scilab 6.1.0 Console

File Edit Control Applications ?

```
--> exec('C:\Users\DELL\Desktop\MatrixAddition.sce', -1)
Enter no. of rows 3

Enter no. of columns 2


  "Enter elements of first matrix row wise "
--> 1

--> 2

--> 3

--> 4

--> 5

--> 6


  "Enter elements of second matrix row wise "
--> 7

--> 8

--> 9

--> 10

--> 11

--> 12

 "First Matrix is "

   1.    2.
   3.    4.
   5.    6.

 "Second Matrix is "

   7.    8.
   9.    10.
   11.   12.

 "Sum of the matrices is "

   8.    10.
   12.   14.
   16.   18.
```

MATRIX ADDITION WITHOUT FUNCTION

Date _____

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B.1 Matrix transpose with functions

```
function [B] = transpose (m, n, A)
        B = zeros (m, n)
        B = A'
        disp ('The matrix is', A)
        disp ('Transposed matrix is')
end function
```

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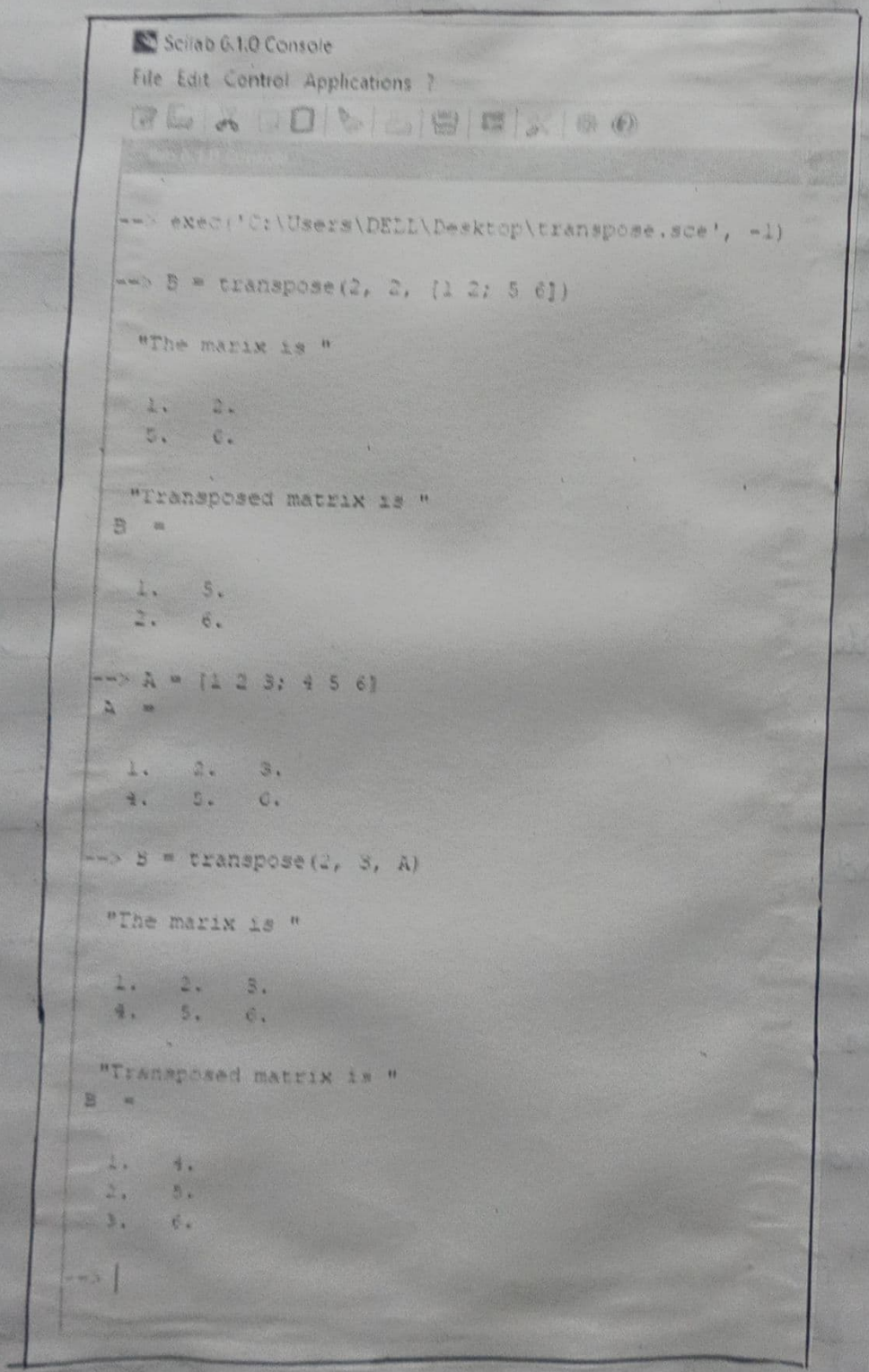
OUTPUT



TRANSPOSE OF MATRIX

Date

Expt. No. _____ Page No. 4

B.2 Matrix transpose without function

```
m = input ('Enter no. of rows of matrix')
n = input ('Enter no. of columns of matrix')
A = zeros(m, n);
B = zeros(m, n);
disp('Enter elements of matrix row-wise')
for i = 1:m
    for j = 1:n
        A(i, j) = input('');
    end
end
for i = 1:n
    for j = 1:m
        B(i, j) = A(j, i);
    end
end
disp('The Matrix is', A)
disp('The transposed Matrix is', B)
```

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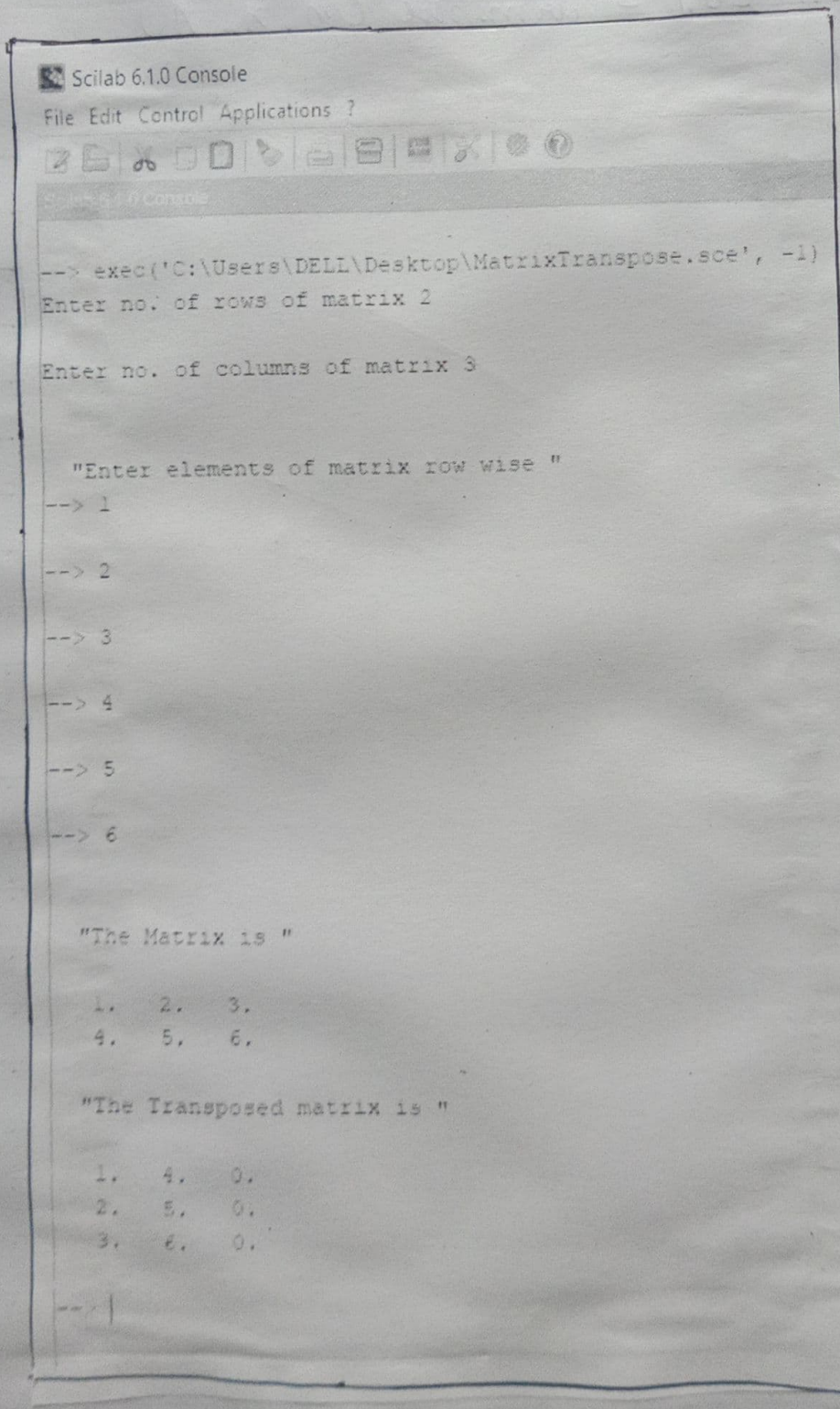
OUTPUT



TRANSPOSE OF MATRIX WITHOUT FUNCTION

Date _____

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C.1 Matrix multiplication with function

```
function [C] = multiplication (m, n, p, q, A, B)
        C = zeros (m, n)
        if n == p then
            disp ('Matrices are comfortable for multiplication')
        else
            disp ('Matrices are not comfortable for multiplication')
            abort
        end
        C = A * B
        disp ('First Matrix is', A)
        disp ('Second Matrix is', B)
        disp ('Product of matrices is')
endfunction
```

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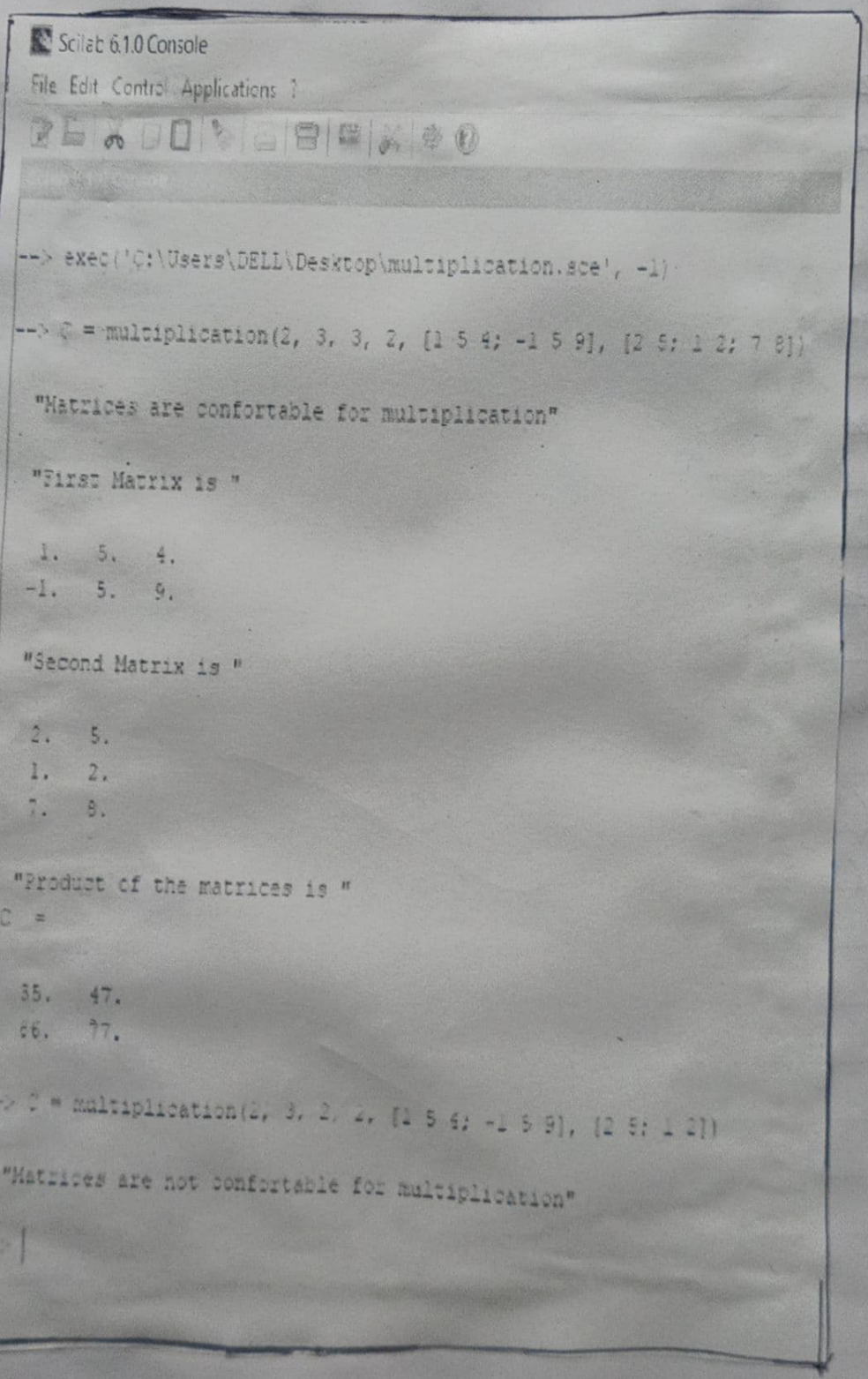
OUTPUT



MULTIPLICATION OF MATRICES

Date _____

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C.2 Matrix multiplication without function

```
m = input('Enter no. of rows of first Matrix')
n = input('Enter no. of columns of first Matrix')
p = input('Enter no. of rows of second Matrix')
q = input('Enter no. of columns of second Matrix')
if n==p then
    disp('Matrices are comfortable for multiplication')
else
    disp('Matrices are not comfortable for multiplication')
    abort
end
A = zeros(m, n)
B = zeros(p, q)
C = zeros(m, q)
disp('Enter elements of first matrix row wise')
for i = 1:m
    for j = 1:n
        A(i, j) = input('')
    end
end
disp('Enter elements of second matrix row wise')
for i = 1:p
    for j = 1:q
        B(i, j) = input('')
    end
end
for i = 1:m
    for j = 1:q
```

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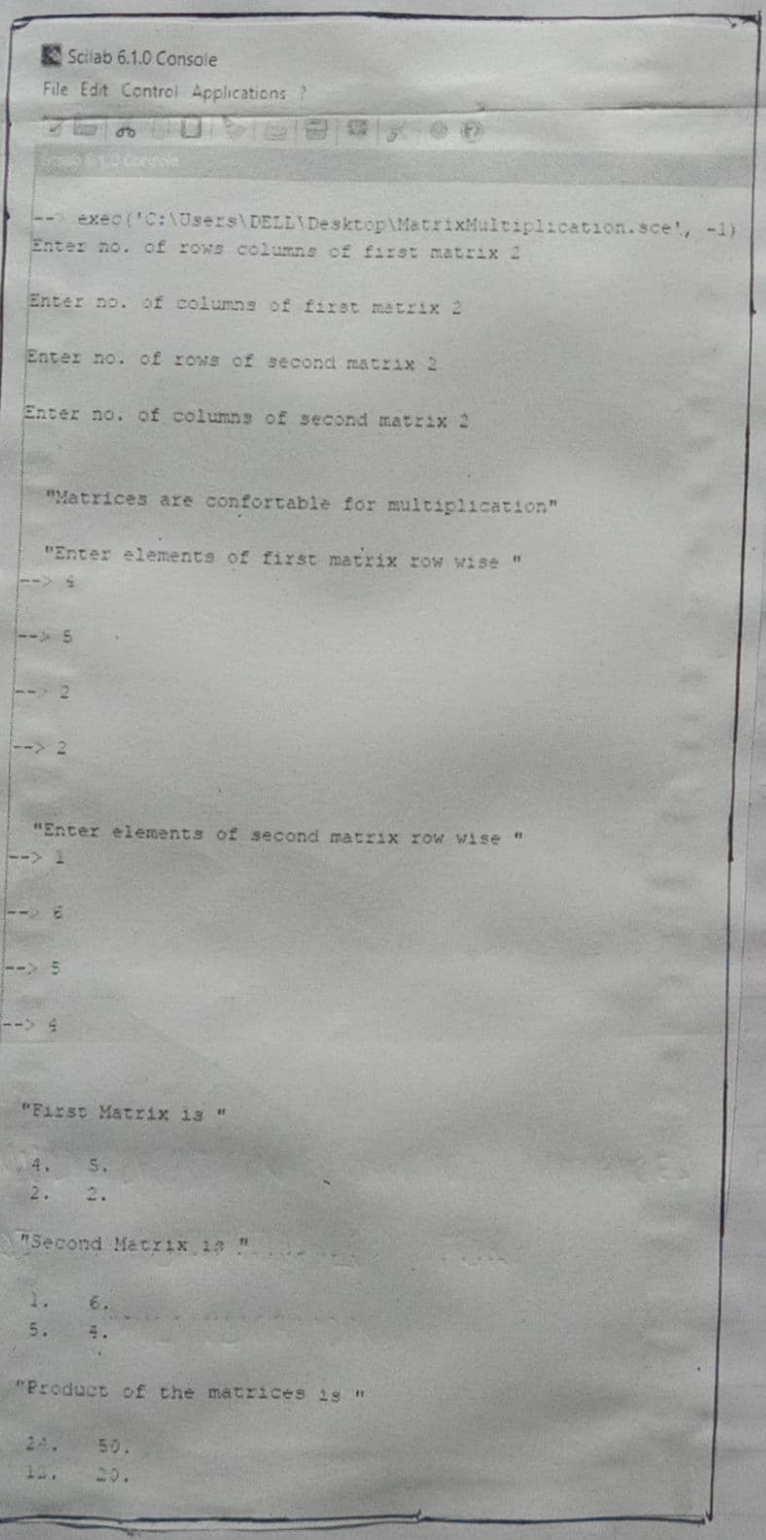
OUTPUT



MATRIX MULTIPLICATION WITHOUT FUNCTION

```
            for k = 1:n
                C(i,j) = (A(i,j) * B(k,j)) + C(i,j)
            end
        end
    end
    disp ('First matrix is', A)
    disp ('Second matrix is', B)
    disp ('Product of matrices is', C)
```

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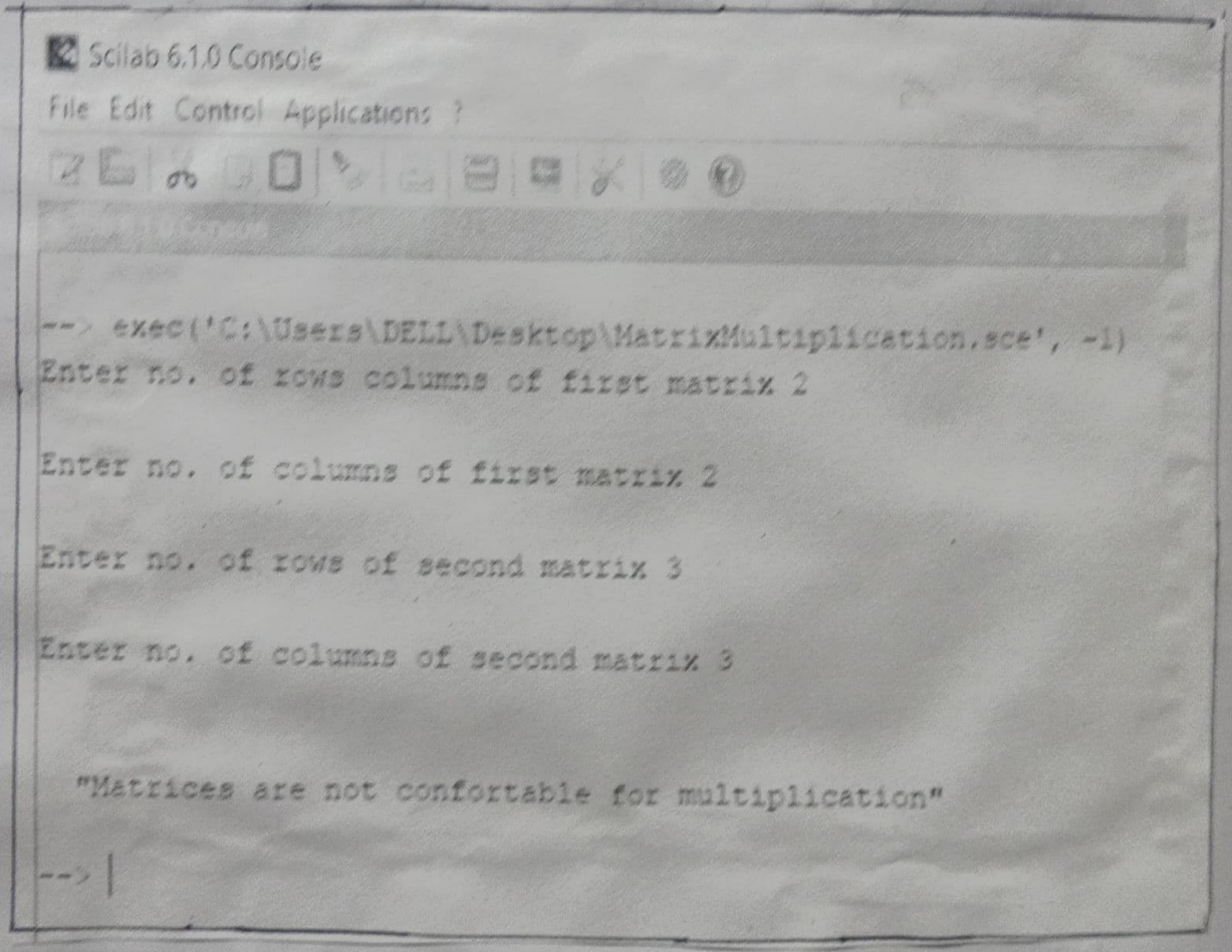
OUTPUT



MATRIX MULTIPLICATION WHEN MATRICES ARE NOT COMPATABLE FOR MULTIPLICATION

Date 25-03-2021

Expt. No. 2 Page No. 8

Experiment-2

Aim: To find the inverse of any 3 by 3 matrix by Gauss Jordan Method

Source Code:

```
function [B] = invr(A)
    B = eye(3,3)
    disp('Given Matrix A is :- ', A)
    if (det(A)==0) then
        disp('Matrix is singular, Inverse does not exist')
        abort
    end
    Aug = [A, B]
    if (Aug(1,1)==0 & Aug(2,1)~=0) then
        C(1,:) = Aug(1,:)
        Aug(1,:) = Aug(2,:)
        Aug(2,:) = C(1,:)
    elseif (Aug(1,1)==0 & Aug(3,1)~=0) then
        C(1,:) = Aug(1,:)
        Aug(1,:) = Aug(3,:)
        Aug(3,:) = C(1,:)
    end
    Aug(1,:) = Aug(1,:)/Aug(1,1)
    Aug(2,:) = Aug(2,:) - Aug(2,1) * Aug(1,:)
    Aug(3,:) = Aug(3,:) - Aug(3,1) * Aug(1,:)
    if (Aug(2,2)==0) then
```

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CONSOLE OUTPUT

Scilab 6.1.0 Console

File Edit Control Applications ?

```
--> B = inv([2 0 0; 3 0 2; 7 0 3])

 "Given Matrix A is -: "

    2.    0.    0.
    3.    0.    2.
    7.    0.    3.

 "Matrix is singular, Inverse does not exist."

--> B = inv([1 0 4; 2 -2 1; -1 1 -1])

 "Given Matrix A is -: "

    1.    0.    4.
    2.   -2.    1.
   -1.    1.   -1.

 "The inverse of given matrix is:- "
 B  =

    1.    4.    8.
    1.    3.    7.
    0.   -1.   -2.

--> B = inv([2 6 1; 3 9 2; 0 -1 3])

 "Given Matrix A is -: "

    2.    6.    1.
    3.    9.    2.
    0.   -1.    3.

 "The inverse of given matrix is:- "
 B  =
```

INVESE OF A MATRIX - SINGULAR MATRIX CASE PRINTING INVERSE

Date _____

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```
C(2,:) = Aug(2,:)
Aug(2,:) = Aug(3,:)
Aug(3,:) = C(2,:)
end
Aug(2,:) = Aug(2,:)/Aug(2,2)
Aug(1,:) = Aug(1,:) - Aug(1,2) * Aug(2,:)
Aug(3,:) = Aug(3,:) - Aug(3,2) * Aug(2,:)
Aug(3,:) = Aug(3,:)/Aug(3,3)
Aug(1,:) = Aug(1,:) - Aug(1,3) * Aug(3,:)
Aug(2,:) = Aug(2,:) - Aug(2,3) * Aug(3,:)
Aug(:,1:3) = []
B = Aug(:,1:3),°
disp('The inverse of given matrix is :-')
endfunction
```

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OUTPUT

Scilab 6.1.0 Console

File Edit Control Applications ?

```
--> B = inv([2 6 1; 3 9 2; 0 -1 3])

 "Given Matrix A is -: "

   2.    6.    1.
   3.    9.    2.
   0.   -1.    3.

 "The inverse of given matrix is:- "
B  =

   29.   -19.    3.
  -9.     6.   -1.
  -3.     2.    0.

-->
```

INVERSE OF MATRIX

Scilab 6.1.0 Console

File Edit Control Applications ?

```
--> B = inv([2 0 0; 3 0 2; 7 0 3])

 "Given Matrix A is -: "

   2.    0.    0.
   3.    0.    2.
   7.    0.    3.

 "Matrix is singular, Inverse does not exist"

-->
```

INVERSE NOT POSSIBLE

Date 15-04-2021

Expt. No. 3 Page No. 10.

Experiment - 3

Aim : To find Eigen Values and Eigen Vector of a 2x2 matrices

Source Code :

```
clc;
disp("Enter the matrix row wise");
for i = 1:2
    for j = 1:2
        A(i,j) = input('');
    end
end
trace = A(1,1) + A(2,2);
determinant = A(1,1) * A(2,2) - A(1,2) * A(2,1);
disp("The characteristic Equation is : ");
disp('e^2 + ' + string(-trace) + '*e ' + string(determinant) + '=0');
e1 = (trace + sqrt(trace^2 - 4 * determinant)/2;
e2 = (trace - sqrt(trace^2 - 4 * determinant)/2;
if A(1,2) ~= 0 then
    v1 = [A(1,2); e1 - A(1,1)];
    v2 = [A(1,2); e2 - A(1,1)];
elseif A(2,1) ~= 0 then
    v1 = [e1 - A(2,2); A(2,1)];
    v2 = [e2 - A(2,2); A(2,1)];
else
    v1 = [1; 0];
```

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Date _____

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```
        V2 = [0; 1];
end
disp("First Eigen value is: ", e1);
disp("First Eigen vector is: ", V1);
disp("Second Eigen Value is: ", e2);
disp("Second Eigen vector is: ", V2);
```

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