

Certificate

Name: Sycda Reeha Quasar

Class: 4C7

Roll No: 14114802719

Exam No:

Institution _____

This is certified to be the bonafide work of the student in the
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Examiner's Signature

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Principal

Date:

Institution Rubber Stamp

(N.B: The candidate is expected to retain his/her journal till he/she passes in the subject.)

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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

Anita
114192

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.
```

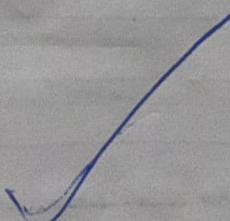
```
Scilab 6.1.0 Console
File Edit Control Applications ?
---> exec('C:\Users\DELL\Desktop\addition.sce', -1)
---> C = addition(2, 2, [1 2; 3 4], [5 6; 7 8])

"First matrix is"
1. 2.
3. 4.

"Second matrix is"
5. 6.
7. 8.

"Sum of matrices is"
C =
6. 6.
10. 12.
```

ADDITION USING FUNCTIONS



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

```

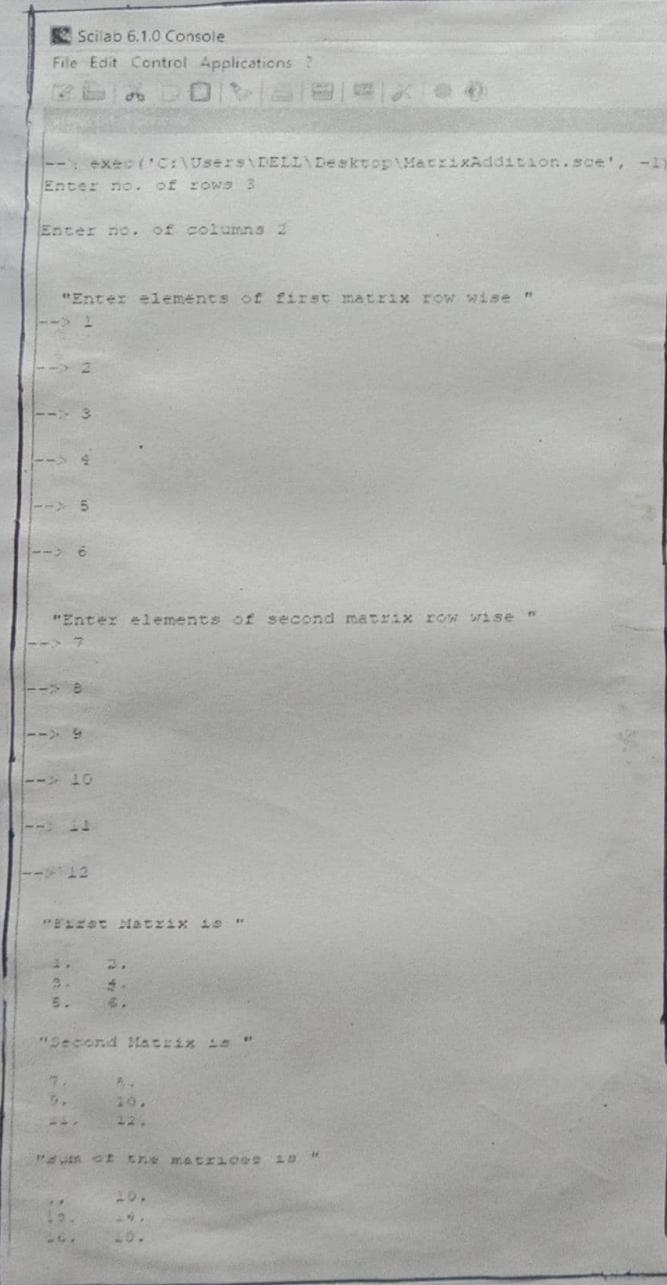
~~disp ('First Matrix is', A)~~

~~disp ('Second Matrix is', B)~~

~~disp ('Sum of matrices is', C)~~

~~Ans 11/4/2~~

OUTPUT



Scilab 6.1.0 Console

```
--> 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 "
1. 10.
12. 4.
10. 10.
```

MATRIX ADDITION WITHOUT FUNCTION

B.1 Matrix transpose with functions

function [B] = transpose (m, n, A)

B = zeros (m, n)

B = A'

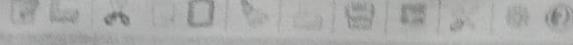
disp ('The matrix is ', A)

disp ('Transposed matrix is ')

end function

~~Anita
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OUTPUT

```
Scilab 6.1.0 Console
File Edit Control Applications ? 
--> exec('C:\Users\DELL\Desktop\transpose.sce', -1)

--> B = transpose(2, 2, [1 2; 5 6])

"The matrix is "
1. 2.
5. 6.

"Transposed matrix is "
B =
1. 5.
2. 6.

--> A = [1 2 3; 4 5 6]
A =
1. 2. 3.
4. 5. 6.

--> B = transpose(2, 3, A)

"The matrix is "
1. 2. 3.
4. 5. 6.

"Transposed matrix is "
B =
1. 4.
2. 5.
3. 6.

--> |
```

TRANSPOSE OF MATRIX

B.2 Matrix transpose without function

$m = \text{input}('Enter no. of rows of matrix')$

$n = \text{input}('Enter no. of columns of matrix')$

$A = \text{zeros}(m, n);$

$B = \text{zeros}(m, n);$

$\text{disp}('Enter elements of matrix row-wise')$

for $i = 1 : m$

 for $j = 1 : n$

$A(i, j) = \text{input}('');$

 end

end

for $i = 1 : n$

 for $j = 1 : m$

$B(i, j) = A(j, i);$

 end

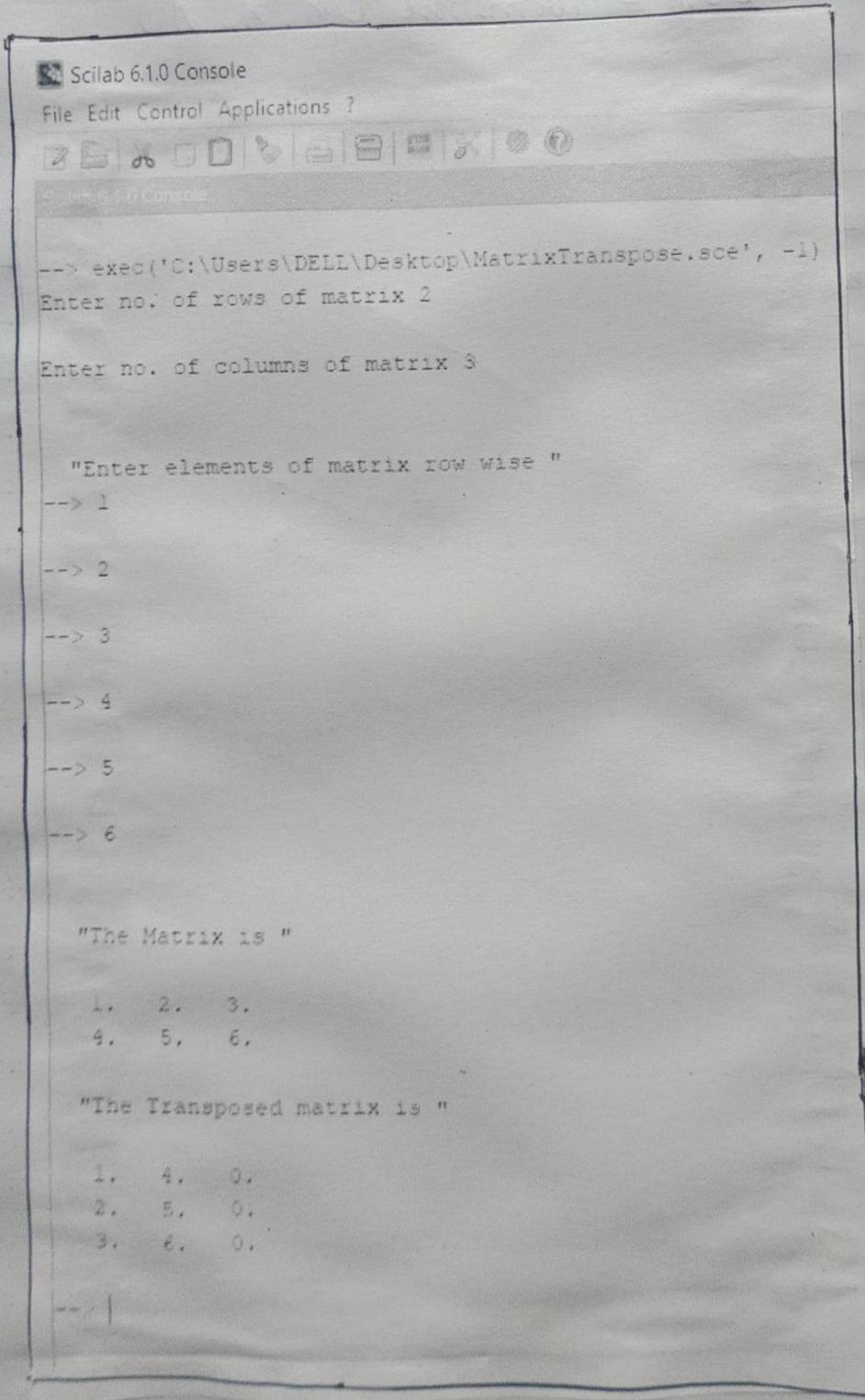
end

$\text{disp}('The matrix is ', A)$

$\text{disp}('The transposed Matrix is ', B)$

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1/4/21~~

OUTPUT



Scilab 6.1.0 Console
File Edit Control Applications ?

```
--> exec('C:\Users\DELL\Desktop\MatrixTranspose.sce', -1)
Enter no. of rows of matrix 2

Enter no. of columns of matrix 3

"Enter elements of matrix row wise "
--> 1
--> 2
--> 3
--> 4
--> 5
--> 6

"The Matrix is "
1. 2. 3.
4. 5. 6.

"The Transposed matrix is "
1. 4. 0.
2. 5. 0.
3. 6. 0.

-->
```

TRANSPOSE OF MATRIX WITHOUT FUNCTION

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

~~Anita
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OUTPUT

```
Scilab 6.1.0 Console
File Edit Control Applications 1
B E X D M A C S P F V I O U Z Y Q R

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

--> C = multiplication(2, 3, 3, 2, [1 5 4; -1 5 9], [2 5; 1 2; 7 8])
"Matrices are comfortable for multiplication"

"First Matrix is "

1. 5. 4.
-1. 5. 9.

"Second Matrix is "

2. 5.
1. 2.
7. 8.

"Product of the matrices is "
C =
35. 47.
66. 77.

--> C = multiplication(2, 3, 3, 2, [1 5 4; -1 5 9], [2 5; 1 2])
"Matrices are not comfortable for multiplication"
-->
```

MULTIPLICATION OF MATRICES

C.2 Matrix multiplication without function

$m = \text{input}('Enter no. of rows of first Matrix')$

$n = \text{input}('Enter no. of columns of first Matrix')$

$p = \text{input}('Enter no. of rows of second Matrix')$

$q = \text{input}('Enter no. of columns of second Matrix')$

If $n = p$ then

disp ('Matrices are comfortable for multiplication')

else

disp ('Matrices are not comfortable for multiplication')

abort

end

$A = \text{zeros}(m, n)$

$B = \text{zeros}(p, q)$

$C = \text{zeros}(m, q)$

disp ('Enter elements of first matrix row wise')

for $i = 1:m$

for $j = 1:n$

$A(i, j) = \text{input}()$

end

end

disp ('Enter elements of second matrix row wise')

for $i = 1:p$

for $j = 1:q$

$B(i, j) = \text{input}()$

end

end

for $i = 1:m$

for $j = 1:q$

OUTPUT

```
Scilab 6.1.0 Console
File Edit Control Applications ?
Scilab 6.1.0 Console

--> exec('C:\Users\DELL\Desktop\MatrixMultiplication.sce', -1)
Enter no. of rows columns of first matrix 2

Enter no. of columns of first matrix 2

Enter no. of rows of second matrix 2

Enter no. of columns of second matrix 2

"Matrices are comfortable for multiplication"

"Enter elements of first matrix row wise "
--> 4
--> 5
--> 2
--> 2

"Enter elements of second matrix row wise "
--> 1
--> 6
--> 5
--> 4

"First Matrix is "
4. 5.
2. 2.

"Second Matrix is "
1. 6.
5. 4.

"Product of the matrices is "
24. 50.
12. 20.
```

MATRIX MULTIPLICATION WITHOUT FUNCTION

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

✓
~~Amrit
11/4/21~~

OUTPUT

```
Scilab 6.1.0 Console
File Edit Control Applications ?
--- exec('C:\Users\DELL\Desktop\MatrixMultiplication.sce', -1)
Enter no. of rows columns of first matrix 2
Enter no. of columns of first matrix 2
Enter no. of rows of second matrix 3
Enter no. of columns of second matrix 3
"Matrices are not comfortable for multiplication"
--- |
```

MATRIX MULTIPLICATION WHEN MATRICES ARE
NOT COMPATABLE FOR
MULTIPLICATION

Experiment-2

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

Source Code:

```

function [B] = inv(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

```

CONSOLE

OUTPUT

```
Scilab 6.1.0 Console
File Edit Control Applications ?
Solve Help Window 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. 0.
1. 3. 7.
0. -1. -2.

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

"Given Matrix A is :- "
1. 6. 1.
3. 9. 2.
0. -1. 3.

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

INVERSE OF A MATRIX - SINGULAR MATRIX CASE
PRINTING INVERSE

$$C(3,:) = \text{Aug}(2,:)$$

$$\text{Aug}(2,:) = \text{Aug}(3,:)$$

$$\text{Aug}(3,:) = C(2,:)$$

end

$$\text{Aug}(2,:) = \text{Aug}(2,:)/\text{Aug}(2,2)$$

$$\text{Aug}(1,:) = \text{Aug}(1,:)-\text{Aug}(1,2)*\text{Aug}(2,:)$$

$$\text{Aug}(3,:) = \text{Aug}(3,:)-\text{Aug}(3,2)*\text{Aug}(2,:)$$

$$\text{Aug}(3,:) = \text{Aug}(3,:)/\text{Aug}(3,3)$$

$$\text{Aug}(1,:) = \text{Aug}(1,:)-\text{Aug}(1,3)*\text{Aug}(3,:)$$

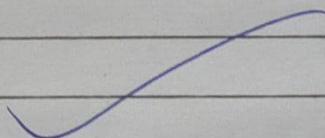
$$\text{Aug}(2,:) = \text{Aug}(2,:)-\text{Aug}(2,3)*\text{Aug}(3,:)$$

$$\text{Aug}(:,1:3) = []$$

$$B = \text{Aug}(:,1:3), ^o$$

disp ('The inverse of given matrix is :-')

endifunction

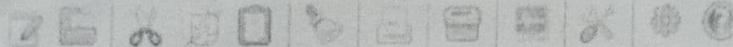


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OUTPUT

Scilab 6.1.0 Console

File Edit Control Applications ?



Scilab 6.1.0 Console

```
--> 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:- "

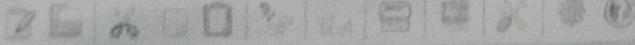
B =

```
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

Experiment - 3

Aim : To find Eigen Values and Eigen Vector of a 2×2 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];
end

```

$$v_2 = [0; 1],$$

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);