Shri Shankaracharya Institute of Professional Management and Technology, Raipur

Department of Computer Science & Engineering

Lab Manual

Software Laboratory (SciLAB / MATLAB)

3rd Semester

SSIPMT

Submitted by:

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Student Name : _____

Soft Computing Lab

Experiment 01

AIM :-

Implementing Arithmetic Operations on Vectors in Scilab.

Objective :-

Learn to handle vectors and performing basic arithmetical operations on it.

A Multiple	A Divide Vectors	An Exponential vectors
$x = t \sin t$	$y = (t-1)/(t+1)$	$z = [\sin(t2)/(t2)]$

Code :-

```
/* Creating Vectors t with 10 elements
1 to 10 */.

// A multiple vector
t = linspace (1,10,10);

disp ("Multiply vectors")
y = sin(t);
x = t * y";
disp(x);

disp ("A Divide vectors");
w = (t-1)/(t+1);
```

OUTPUT

```
Startup execution:
  loading initial environment

--> exec('/media/kite/86C65FF6C65FE549/scilab-6.0.2/softComputing/vectors.sci', -1)

Multiply Vectors

   4.3677289

A Divide Vectors

   0.7425743

A Exponential Vectors

   0.0046454

-->
```

Date_____

```
        disp (w);

    disp (" A Exponential   vectors")
        b = sin ( t* 2);
        c = b / ( t* 2);
            disp (c);
```

OUTPUT

```
Scilab 6.0.2 Console

--> exec('/media/kite/86C65FF6C65FE549/scilab-6.0.2/softComputing/logBaseTen.sci',-1)
Enter value of x:500

   2.69897

   16.19382

-->|
```

Date.

Experiment : 02

Aim : Sci Lab program to perform Logarithmic Operations.

Objective : Learn to perform basic Log base 10 and power operations in scilab. Finding log base 10 of any given new number.

Code :

Sci Lab Code :

```
/* Sci Lab program to illustrate use
of Logarithum operator with base 10.
*/

x = input ("Enter value of x :")
y = log 10 (x);

print("value is", x)
    disp(y);

// log base 10 with power.
z = log10(x^6);
    disp(z);
```

Date_____

Experiment : 03

Aim :- Sci Lab program to illustrate exponen-tial Operations.

Objective :- How to use exponential power of any given number and print it on scilab console.

Code :-

```
/* Sci Lab program to illustrate exponential
powers

        e^pi /150    in    scilab.
    */


    y = input (" Enter a value you want in
    power of e :");
        x =  exp(y);
        disp(x);


    // Direct Format
        disp ( % e^ y)
```

OUTPUT

```
Scilab 6.0.2 Console

--> exec('/media/kite/86C65FF6C65FE549/scilab-6.0.2/softComputing/ePowers.sci',-1)
Enter a value you want in power of e:12

   162754.7914190039155073

   162754.7914190003828196
```

Date_____

Experiment : 04

Aim :- Sci Lab program to calculate area of circle.

Objective :- How to use some mathematical symboles in scilab Like pi. And using it calculating area of circle.

Code :-

```
/* Sci Lab Program to calculate area of
a circle

Area = pi * r^r
*/

r = input ("Enter radius of a circle (in cm): ")

AREA = %p * (r^2);

msg = "Area of the circle is:";
    disp (AREA (AREA, msg)
```

OUTPUT

```
Scilab 6.0.2 Console

..> exec('/media/kite/86C65FF6C65FE549/scilab-6.0.2/softComputing/areaOfCircle.sci',-1)
Enter radius of a circle(in cm):12

Area of the circle is:

452.38934211693020870370
```

Date_____

Exp : 05

Aim : Wrote a Program to solve line equation in scilab.

Objective : How to find value of y coordinate from given values of x - coordinate, intercept and slope of line.

Code :

```
/* Sci Lab Program to solve line eqn

    y = m*x + c
    where m = slope of line
        x = x - coordinate
        c - intercept
        y = y - coordinate

*/
    m = 0.5;
    c = -2;
    x = linspace (0, 10, 21);
    y = m*x + c ;
    disp(y);
    plot (x, y);
```

OUTPUT

```
Scilab 6.0.2 console

--> exec('/media/kite/86C65FF6C65FE549/scilab-6.0.2/softComputing/LineEquation.sci',-1)

    column 1 to 15

-2.  -1.75  -1.5  -1.25  -1.  -0.75  -0.5  -0.25  0.  0.25  0.5  0.75  1.  1.25  1.5

    column 16 to 21

1.75  2.  2.25  2.5  2.75  3.
```

Experiment : 06

Aim :- Write a program to solve trigonometric equation in scilab.

Objective :- How to use trigonometric functions in scilab. And applying them in other mathematical operations.

Code :-

```
/* Sci Lab program to solve a simple trigono-
metry equation

y = Sin^2 (%.pi/3) + cos^2(%.pi/3)  it
generates error
    y = (sin (%.pi/3))^2 + (cos (%.pi/3))^2;
No error   correct answer */

x = input ("Enter value of Theta :")
y = ( sin (%.pi/3)^2 + cos(%.pi/3))^2;
    disp(y);


y = (sin (x))^2 + (cos (x))^2
    y = (sin (x))^2 + ((cos(x))^2;
        disp(y);
```

OUTPUT

Scilab 6.0.2 Console

```
--> exec('/media/kite/86C65FF6C65FE549/scilab-6.0.2/softComputing/TrigonometryOperation.sci',-1)
Enter value of Theta : 45

With  Pi
    1.
With  variable x:
    1.

    1
```

Date

Experiment : 07

Aim :- write a program to solve Complex Number problems.

Objective :- How to work with complex number and handling real and imaginary part of a number.

Code :

/* Sci Lab program to solve a complex number with trigonometry equation.

$y = (\cos(\% \cdot pi/3))^2 + i (\sin(\% \cdot pi/3))^2 ;$
No error Correct answer
$y = real + Imaginary ; */$

$x = input("Enter value of Theta : ")$
$y = \% \cdot i * (\sin(\% \cdot pi/3)) + (\cos \% \cdot pi/3)) ;$
disp(y);

$y = (\sin(x))^2 + (\cos(x))^2 ;$
disp(y);

OUTPUT

```
--> exec('/media/kite/86C65FF6C65FE549/scilab-6.0.2/softComputing/ComplexNumberTrig.sci',-1)
Enter value of Theta : 60

0.5000000000000000111022 + 0.8660254037844385960599i

1.
```

Experiment : 08

Aim :- write a program compute cross product of two vectors u and v.

Objective :- How to get every value of any vector and using direct access to produce cross product of given two vectors.

code :-

```
/* Sci Lab Program for vector cross product */

x = input ("Enter vector x= ") // vector x
y = input ("Enter vector y= ") // vector ys

z(1,1) = x(1,2)*y(1,3) - x(1,3)*y(1,2);
z(1,2) = x(1,1)*y(1,3) - x(1,3)*y(1,1);
z(1,3) = x(1,1)*y(1,2) - x(1,2)*y(1,1);

disp(z);
```

OUTPUT

Scilab 6.0.2 Console

```
--> exec('/media/kite/86C65FF6C65FE549/scilab-6.0.2/softComputing/9CrossProduct.sci', -1)
Enter vector x=[2,3,44]

Enter Vector y=[5,6,12]

  -228.   -196.   -3.
```

Exp - 09

Aim :- Write a program to find factorial of given a number using function.

Objective :- How to declare and define functions in scilab. 2mpliment factorial finder

facto (argument _ number)

Code :-

```
/* Sci Lab Program to illustrate calculating
factorial using function recursion */

function fact = facto(x)  // Function Defination
    if x > 1 then
        fact = x * facto (x-1);
    else
        fact = 1;
    end
disp (fact);
end function

x = input (" Enter a number for factorial
: ")
facto(x); // calling function
```

OUTPUT

```
Scilab 6.0.2 Console:

--> exec('/media/kite/86C65FF6C65FE549/scilab-6.0.2/softComputing/8Recursionfactorial.sci', -1)
Enter a number for factorial: 6

1.

2.

6.

24.

120.

720.
```

Experiment : 10

Aim :- Write a pro program for plotting
e and sin(x).

Objective :- How to use scilab built in functions
to plot charts on values generated during
mathematical operations.

Code :-

```
/* Sci Lab Program for ploating e and Sin x */

x = linspace (0, 4, 10);
disp (x, " x matrix : ");
w = exp (-0.4 * x );
y = sin(20) * w ;

disp (y);
plot (y);
```
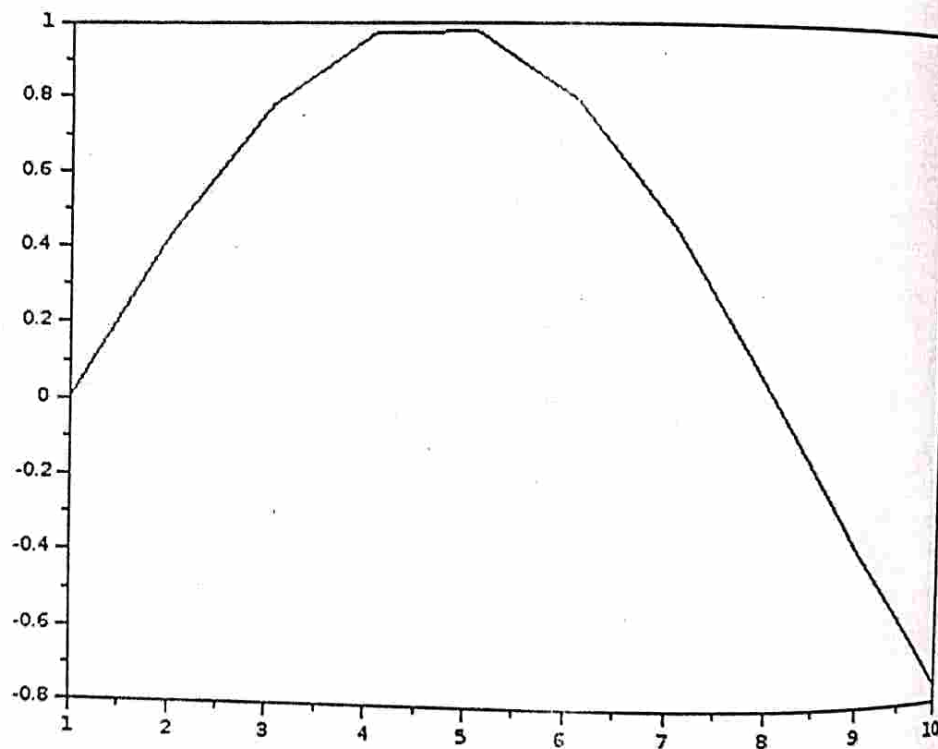
Graphic window number 0

Experiment 11

Aim : ~~Write~~ Write a program to check a given ~~matrix~~ matrix is symmetric or not.

Objective : How to implement decision making statements in scilab. And performing transpose of matrix.

Code :

```
/* Sci lab program for checking a given
matrix is symmetry or not.

A matrix is symmetry if it's transpose
is same as actual matrix.

        A = A'
       */
a = input (" Enter a Matrix : ");
    b = a'
if    a==b then
 disp (" Given matrix is symmetric :")
 else
 disp (" Given matrix is Not-symmetric :")
 end
```

OUTPUT

Scilab 6.0.2 Console

```
--> exec('/media/kite/86C65FF6C65FE549/scilab-6.0.2/softComputing/11SymmetryMatrix.sci',-1)
Enter a Matrix:[1,2,3;3,2,1]

Given matrix is Not-symmetric.

--> exec('/media/kite/86C65FF6C65FE549/scilab-6.0.2/softComputing/11SymmetryMatrix.sci',-1)
Enter a Matrix:[1,0;0,1]

Given matrix is symmetric.
```