Date 1.2.24

Expt. No. 1. Page No.

PRACTICAL - 1

AIM : To write a program for demonstration of matrix addition without using function and with using function.

SOFTWARE USED : SCILAB

SOURCE CODE :

1) Without function

```
// Matrix Addition script file
clc
m=input("enter number of rows of the Matrix: ");
n=input("enter number of columns of the Matrix: ");
disp('enter the first Matrix')
for i=1:m
   for j=1:n
   A(i,j)=input('\');
    end
end
disp('enter the second Matrix')
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('The first matrix is')
disp(A)
disp('The Second matrix is')
disp(B)
disp('The sum of the two matrices is')
disp(C)
```

Teacher's Signature

OUTPUT :

```
The first matrix is

    1.    2.
    3.    4.
The second matrix is

    5.    6.
    7.    8.
The sum of the two matrices is:

    6.    8.
   10.    12.
```

OUTPUT:

```
The first matrix is

    1.    2.
    3.    4.
The second matrix is

    5.    6.
    7.    8.
The sum of the two matrices is:

    6.    8.
   10.   12.
```

2) Using Function :

```
// Matrix Addition
clc
function []=addition(m, n, A, B)
C=zeros(m,n);
C=A+B;
disp('The first matrix is')
disp (A)
disp('The Second matrix is')
disp (B)
disp('The sum of two matrices is')
disp (C)
endfunction
```

THEORY :

let A, B be two matrices of size 2×2 each

$$A = \begin{bmatrix} 1 & 6 \\ 4 & 2 \end{bmatrix} \quad , \quad B = \begin{bmatrix} 9 & 3 \\ 2 & 1 \end{bmatrix}$$

let, C be the ~~sor~~ difference of A, B

$$C = A - B = \begin{bmatrix} 1 & 6 \\ 4 & 2 \end{bmatrix} - \begin{bmatrix} 9 & 3 \\ 2 & 1 \end{bmatrix} = \begin{bmatrix} -8 & 3 \\ 2 & 1 \end{bmatrix}$$

OUTPUT :

```
"The first Matrix is: "

 1.    6.
 4.    2.

"The second Matrix is: "

 9.    3.
 2.    1.

"The Subtraction of Matrix is: "

-8.    3.
 2.    1.
```

Expt. No. 1B

Date 1·2·24

Page No.

PRACTICAL - 1B

AIM : W.A.P. to perform matrix subtraction without using function and with using function.

SOFTWARE USED : SCILAB

SOURCE CODE :

1) Without Function

```
% Matrix Subtraction script file
clc
m=input("enter number of rows of the matrix: ");
n=input("enter number of columns of the matrix: ");
disp('enter the first matrix')
for i=1:m
    for j=1:n
        A(i,j)=input('');
    end
end
disp('enter the second matrix')
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); % subtract corresponding elements
    end
end
disp('The first matrix is')
disp(A)
disp('The Second matrix is')
disp(B)
disp('The difference of the two matrices is') disp(C)
```

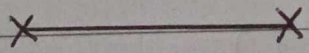
Teacher's Signature

Expt. No. _____ Date _____

Page No. _____

2) With using Function :

```
% Matrix Subtraction
clc
function []=subtraction(m,n,A,B)
C=zeros(m,n);
C=A-B;
disp('The first matrix is')
disp(A)
disp('The Second matrix is')
disp(B)
disp('The difference of two matrices is')
disp(C)
endfunction
```



THEORY

let, A & B be two matrices of order $m \times n$ & $p \times q$ such that, no. of columns of matrix A = no. of rows of matrix B

i.e., $n = p$ then only matrix multiplication is possible

Here, $A = \begin{bmatrix} 1 \\ 3 \end{bmatrix}_{2\times1}$

$B = \begin{bmatrix} 3 & 2 \end{bmatrix}_{1\times2}$

So, $n = p \Rightarrow 1 = 1$

$\therefore A \times B = \begin{bmatrix} 1 \\ 3 \end{bmatrix} \begin{bmatrix} 3 & 2 \end{bmatrix}$

$A \times B = \begin{bmatrix} 3 & 2 \\ 9 & 6 \end{bmatrix}$

Date 15 2 24

Expt. No. 2

Page No.

PRACTICAL - 2

AIM : WAP to perform matrix multiplication with and without using function

SOFTWARE USED - SCILAB

SOURCE CODE :

1) Without using Function :

```
// matrix multiplication script file
clc
m=input("Enter number of rows of the first Matrix: ");
n=input("Enter number of columns of the first Matrix: ");
p=input("Enter number of rows of the second Matrix: ");
q=input("Enter number of columns of the second Matrix: ");
if n==p
 disp('Matrices are conformable for multiplication')
else
  disp('Matrices are not conformable for multiplication')
  break;
end
disp('enter the first Matrix')
for i=1:m
  for j=1:n
  A(i,j)=input('');
  end
end
disp('enter the second Matrix')
for i=1:p
  for j=1:q
  B(i,j)=input('');
  end
end
C=zeros(m,q);
for i=1:m
 for j=1:q
   for k=1:n
 C(i,j)=C(i,j)+A(i,k)*B(k,j);
   end
end
end
disp('The first matrix is')
disp(A)
disp('The Second matrix is')
disp(B)
disp('The product of the two matrices is')
disp(C)
```

OUTPUT :

```
 Warning : redefining function: multiplication

-->multiplication(2,1,1,2,[1;3],[3 2])

Matrices are conformable for multiplication

The first matrix is

   1.
   3.

The Second matrix is

   3.    2.

The multiplication of two matrices is

   3.    2.
   9.    6.

-->
```

Expt. No. _____ Date _____

Page No. _____

2) With using Function :

```
// Matrix Multiplication
clc
function [ ] = multiplication(m, n, p, q, A, B)
C=zeros(m,n);
if n==p
disp('Matrices are conformable for multiplication')
else
disp('Matrices are not conformable for multiplication')
break;
end
C=A*B
disp('The first matrix is')
disp (A)
disp('The Second matrix is')
disp (B)
disp('The multiplication of two matrices is')
disp (C)
endfunction
```

13/02/23

Date 15.2.24

Expt. No. 3. Page No.

PRACTICAL - 3

AIM : W.A.P to find transpose of a matrix with and without using function.

SOFTWARE USED : SciLab

SOURCE CODE :

1) Without using Function :

```
// matrix transpose script file
clc
m=input("Enter number of rows of the Matrix: ");
n=input("Enter number of columns of the Matrix: ");
disp('Enter the Matrix')
for i=1:m
   for j=1:n
   A(i,j)=input('');
    end
end
B=zeros(n,m);
for i=1:n
 for j=1:m
 B(i,j)=A(j,i)
 end
end
disp('Entered matrix is')
disp(A)
disp('Transposed matrix is')
disp(B)
```

Teacher's Signature

THEORY :

let A be a matrix of order $m \times n$

then, A^T is defined as the transpose of A such that rows are interchanged with columns

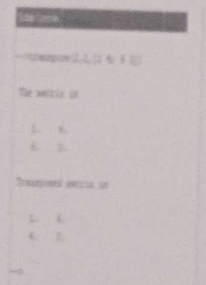
$\therefore$ order of $A^T = n \times m$

eg; $A = \begin{bmatrix} 1 & 4 & 6 \\ 3 & 2 & 8 \end{bmatrix}_{2\times 3} \Rightarrow A^T = \begin{bmatrix} 1 & 3 \\ 4 & 2 \\ 6 & 8 \end{bmatrix}_{3\times 2}$

OUTPUT :

```
Scilab Console

Enter number of rows of the Matrix: 2
Enter number of columns of the Matrix: 2

 Enter the Matrix
\1
\2
\8
\6

 Entered matrix is

    1.    2.    2.
    8.    6.    6.

 Transposed matrix is

    1.    8.
    2.    6.

-->
```

OUTPUT :



2) Using Function :

```
// Matrix Transpose function file
function []=transpose(m, n, A)
B=zeros(m,n);
B=A'
disp('The matrix is')
disp (A)
disp('Transposed matrix is')
disp (B)
endfunction
```

Date 29.2.24

Expt. No. 4.

Page No.

PRACTICAL - 4

AIM : To find the Binomial Distribution of given n and p is not given.

SOFTWARE USED : Scilab

SOURCE CODE :

```
clc
clear all
disp("enter no of observation")
n=input('\')
disp("enter the vlaue of x")
for i=1:n
   X(1,i)=input('\')
end
disp("enter no of frequency")
for j=1:n
   F(1,j)=input('\')
end
disp("Mean of the distribution is")
MEA=sum(F.*X)/sum(F)
disp(MEA)
p=MEA/n
EF=sum(F)*binomial(p,n-1)
disp("Given frequencies")
disp(F)
disp("Expected frequencies")
disp(EF)
plot2d3(0:n-1, F)
plot2d(0:n-1,EF)
```

Teacher's Signature

THEORY :

Here's an example to show how to fit a Binomial Distribution when p is not given,

x	f	$f.x$
0	36	0
1	40	40
2	22	44
3	2	6
	$\Sigma f = 100 = N$	$\Sigma f.x = 90$

Here, $n = 3$

Mean, $\frac{\Sigma f(x)}{\Sigma f} = \frac{90}{100} = 0.9$

P & q → np = mean

$3.(p) = 0.9 \Rightarrow p = 0.3$

$q = 1 - p = 0.7$

Now,

$P(X=x) = {}^nC_x p^x q^{n-x}$

$\therefore P(X=0) = {}^3C_0 (0.3)^0 (0.7)^3 = 0.342$

$P(X=1) = {}^3C_1 (0.3)^1 (0.7)^2 = 0.441$

$P(X=2) = {}^3C_2 (0.3)^2 (0.7)^1 = 0.189$

$P(X=3) = {}^3C_3 (0.3)^3 (0.7)^0 = 0.027$

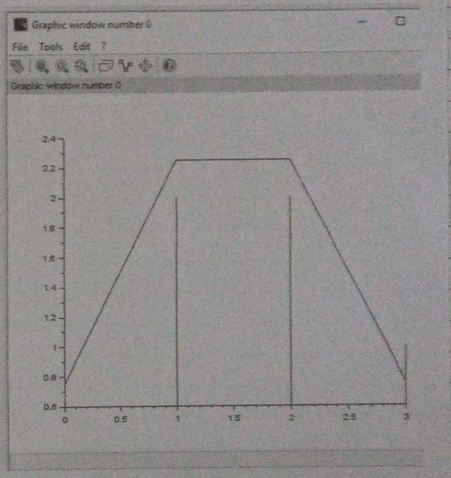
Binomial Distribution

x	$P(x)$	$N.P(x)$	E_i (Expected Freq.)	O_i (Obs Freq.)
0	0.342	34.2	34	36
1	0.441	44.1	44	40
2	0.189	18.9	19	22
3	0.027	2.7	3	2
			$\Sigma f = N = 100$	$\Sigma f = 100$

Expt. No. _____ Page No. _____

OUTPUT :

```
"enter no of observation"
 \4
 "enter the value of x"
 \2
 \1
 \3
 \2
 "enter no of frequency"
 \1
 \2
 \2
 \1
 "Mean of the distribution is"
  2.
 "Given frequencies"
  1.  2.  2.  1.
 "Expected frequencies"
  0.75  2.25  2.25  0.75
```



THEORY :

→ To fit a Binomial Distribution when p is given,

$p = 0.4140$

$q = 1 - p = 0.586$

x	f
0	15
1	22
2	6
3	12
4	9

Now,

$P(X = x) = {}^{n}C_{x}\, p^{x} q^{n-x}$

→ $P(0) = {}^{4}C_{0}(0.414)^{0}(0.586)^{4} = 0.1179$

→ $P(1) = {}^{4}C_{1}(0.414)^{1}(0.586)^{3} = 0.332$

→ $P(2) = {}^{4}C_{2}(0.414)^{2}(0.586)^{2} = 0.3531$

→ $P(3) = {}^{4}C_{3}(0.414)^{3}(0.586)^{1} = 0.0689$

→ $P(4) = {}^{4}C_{4}(0.414)^{4}(0.586)^{0} = 3.4641$

Date 29.2.24

Expt. No. 5.

Page No.

PRACTICAL - 5

AIM : To fit a Binomial distribution on a set of observation when P is given.

SOFTWARE USED : SciLab

SOURCE CODE :

```
clc
clear all
n=4
disp("no of observations", n)
x=input("enter values of x")
disp(x)

y=input("enter observed frequencies")
disp(y)
p=0.4140625
EF=sum(y)*binomial(p,n)
disp("expected frequencies",EF)
disp("sum of expected frequencies", sum(EF))
```

Teacher's Signature

BINOMIAL DISTRIBUTION :

x	$P(x)$	$N.P(x)$	E_i (Expected Freq.)	O_i (Observed Freq.)
0	0.1179	7.5439	7	15
1	0.3332	21.3235	21	22
2	0.3531	22.6039	22	6
3	0.0689	10.6435	10	12
4	3.4641	1.8812	1	9

Date

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OUTPUT :

```
"no of observations"

  4.
enter values of x[0,1,2,3,4]


  0.   1.   2.   3.   4.
enter observed frequencies[15,22,6,12,9]


  15.   22.   6.   12.   9.

"expected frequencies"

  7.5437129   21.323562   22.602975   10.648513   1.8812373

"sum of expected frequencies"

  64.
```

14/05/24

Teacher's Signature

Date 14.3.24

Expt. No. 6. Page No.

PRACTICAL -6

AIM: Fitting of possion distribution after given value of λ.

SOFTWARE USED: SciLab

SOURCE CODE:

```
clc
n=input("Enter Value of n:");
l=input("Enter Value of l:");
X=[0,1,2,3,4];
for idx = 1:5
    frequency(idx) = input("enter frequency:");
end
N = 200;
disp("Expected Frequencies are:");
for idx = 1:5
    ans(idx)=(exp(-l)*(l**X(idx)))/factorial(X(idx));
    ans(idx) = N*ans(idx);
end
disp(ans);
sef = sum(ans);
disp("sum of expected frequencies are:");
disp(sef);
sof = sum(frequency);
disp("sum of observed frequencies are:");
disp(sof);
```

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Page No. _____

OUTPUT :

```
Enter Value of n:4

Enter Value of l:  0.5

enter frequency:122

enter frequency:60

enter frequency:15

enter frequency:2

enter frequency:1


  "Expected Frequencies are:"

   73.575888
   73.575888
   36.787944
   12.262648
   3.0656620

  "sum of expected frequencies are:"

   199.26803

  "sum of observed frequencies are:"

   200.
```

Date 14-3-23

Expt. No. 7.

Page No.

PRACTICAL - 7

AIM: Fitting of Possion Distribution after computing mean.

SOFTWARE USED: SciLab

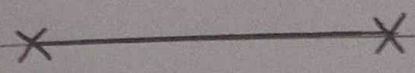
SOURCE CODE:

```
clc
n=input("Enter Value of n:");
disp("values of x:");
for i=1:5
    x(i) = input("");
end
disp("values of f");
for i=1:5
    f(i)=input("");
end
for i=1:5
    fx(i)=f(i)*x(i);
end
sf = 0;
sfx = 0;
for i=1:5
    sf = sf+f(i);
    sfx = sfx+fx(i);
end
mean = sfx/sf;
I = mean/n
N = 200;
disp("Expected Frequencies are:");
for idx = 1:5
    ans(idx)=(exp(-1)*(1**X(idx)))/factorial(X(idx));
    ans(idx) = N*ans(idx);
end
disp(ans);
sef = sum(ans);
disp("sum of expected frequencies are:");
disp(sef);
sof = sum(frequency);
disp("sum of observed frequencies are:");
disp(sof);
```

Teacher's Signature

OUTPUT :

```
Enter Value of n:4

 "values of x:"
-> 0

-> 1

-> 2

-> 3

-> 4

 "values of f"
-> 122

-> 60

-> 15

-> 2

-> 1

"Expected Frequencies are:"

73.575888
73.575888
36.787944
12.262648
3.0656620

"sum of expected frequencies are:"

199.26803

"sum of observed frequencies are:"

200.
```



Date 21-3-24

Expt. No. 8. Page No.

PRACTICAL - 8

AIM: WAP to plot Normal and Exponential Distribution.

SOFTWARE USED - SciLab

SOFTWAR

SOURCE CODE:

```
clc
mean=input("Enter mean:")
sigma=input("Enter sigma:")
lambda=input("Ener the lambda:")
x=linspace(-10,10,100)
normal=(1/(sigma*sqrt(2*%pi)))*exp(-0.5*((x-mean)/sigma).^2)
exponential=lambda*exp(-lambda*x)
clf();
subplot(2,1,1)
plot(x,normal,'-b')
xlabel('x')
ylabel('Probability Density')
title('Normal Distribution')
x=linspace(0,10,100)
subplot(2,1,2)
plot(x,exponential,"-g")
xlabel('x')
ylabel('Probability Density')
title('exponential Distribution');
```

Teacher's Signature

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OUTPUT :

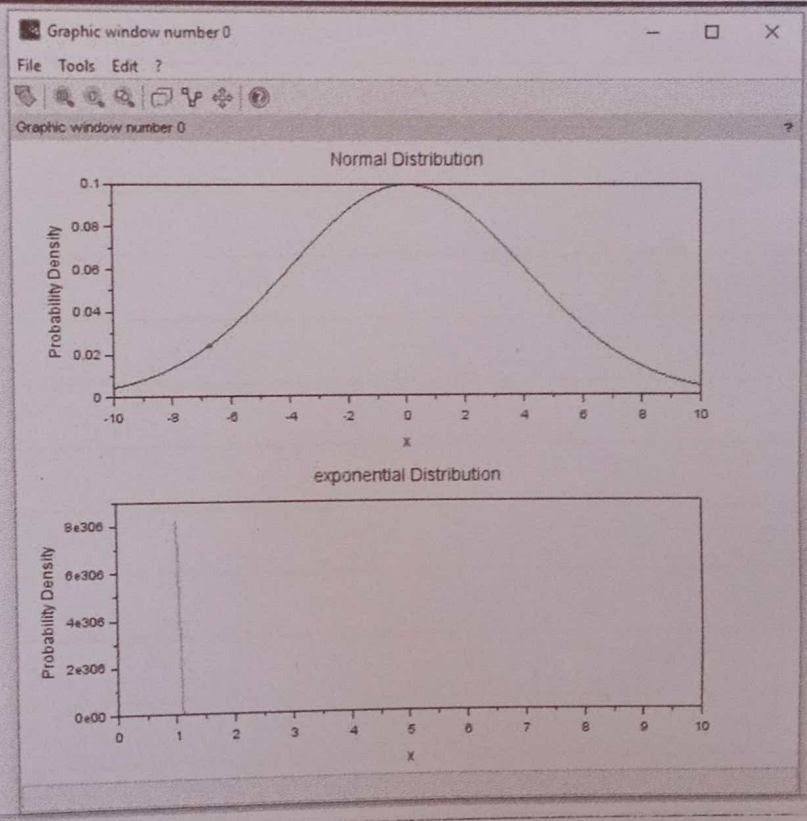
```
Enter mean:0

Enter sigma:4

Ener the lambda:88

exec: Wrong number of output argument(s): 0 expected.

-->
```



Date 25.4.24

Expt. No. 9.

Page No.

PRACTICAL - 9

AIM : Fitting of Linear regression line to the data set given in theory.

SOFTWARE USED : SCILAB

SOURCE CODE :

```
clc
x=[1 2 3 4 5 6 7];
disp("data points")
disp(x)
y=[1.5 3.8 6.7 9.0 11.2 13.6 16]
disp("data values")
disp(y)
n=length(x);
sum_x=0;
sum_y=0;
sum_xy=0;
sum_xx=0;
for i=1:n
    sum_x=sum_x+x(i);
    sum_y=sum_y+y(i);
    sum_xy=sum_xy+x(i)*y(i);
    sum_xx=sum_xx+x(i)*x(i);

end
slope=(n*sum_xy-sum_x*sum_y)/(n*sum_xx-sum_x*sum_x)
intercept = (sum_y-slope*sum_x)/n;
disp("slope")
disp(slope)
disp("intercept")
disp(intercept)
y_pred=slope*x+intercept;
clf;
plot(x,y,'bo','MarkerSize',8,'LineWidth',1.5);
plot(x,y_pred,'r-','LineWidth',1.5);
xlabel('x');
ylabel('y');
title('Linear Regression');
legend('data points','linear regression line');
```

Teacher's Signature

THEORY :

x	1	2	3	4	5	6	7
y	1.5	3.8	6.7	9.0	11.2	13	16

x	y	xy	x^2
1	1.5	1.5	1
2	3.8	7.6	4
3	6.7	20.1	9
4	9.0	36	16
5	11.2	56	25
6	13.6	81.6	36
7	16	11.2	49

$y = mx + k$

where, m = slope of line

$\hat{m}$ = y-intercept

i) Calculating m, i.e, slope

$$m = \frac{n\Sigma xy - \Sigma x \Sigma y}{n\Sigma x^2 - (\Sigma x)^2} = \underline{2.41486}$$

ii) Calculate :

$$\theta = \frac{\Sigma y - m.\Sigma x}{n} = \frac{81.8 - (2.414)(28)}{7} = \underline{0.82857}$$

iii) Final regression line w.r.t m & θ $\Rightarrow$ $y = mx + c$

$y = 2.4m + (-0.83)$

$\therefore$ $\underline{y = 2.91x - 0.83}$

Date _____

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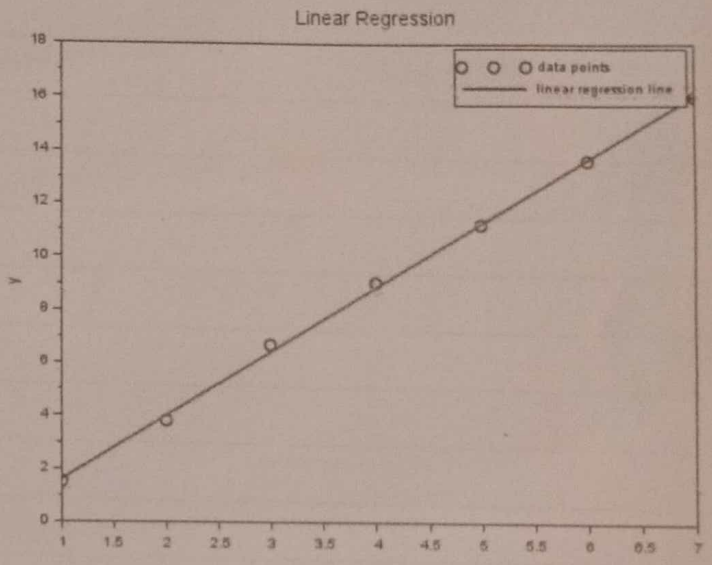
OUTPUT :

```
"data points"

 1.   2.   3.   4.   5.   6.   7.

"data values"

 1.5   3.8   6.7   9.   11.2   13.6   16.

"slope"

 2.4142857

"intercept"

-0.8285714
```



Expt. No. 10.

Date 2.5.24

Page No.

PRACTICAL - 10

AIM : WAP in Scilab to solve assignment problem in Linear Program

SOFTWARE USED : Scilab

SOURCE CODE :

```
clc
clear
n=input("how many workers and job do you have  :");

for i=1:n
        for j=1:n
        printf("worker %d  job%d :",i,j);
        T(i,j)=input("");
        end
end

printf("\n\nDATA YOU ENTERED IS      :\n ");
for i=1:n
  printf("\t\tjob%d ",i);
end

for i=1:n
  printf("\nworker%d  ",i);
  for j=1:n
    printf("\t\t%d ",T(i,j));
  end
end

minim=[1000,1000,1000,1000,1000,1000,1000,1000,1000,1000];

for i=1:n
  for j=1:n
    if(T(i,j)<=minim(i)) then
      minim(i)=T(i,j);
```

Teacher's Signature

Date _____

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```
for i=1:n
  printf("\nworker%d ",i);
  for j=1:n
     printf("\t\t%d ",T(i,j));
  end
end

zerr=[1000,1000,1000,1000,1000,1000];
zerc=[1000,1000,1000,1000,1000,1000];

for i=1:n
  for j=1:n
     if(T(i,j)==0) then
        zerr(i)=0;
        zerc(j)=0;
     end
  end
end

f=0; y=0;

for i=1:n
  if(zerr(i)) then
     f=1;
        end
end

for i=1:n
  if(zerc(i)) then
     y=1;
        end
end
```

```
if f y then

        mn=[1000,1000,1000,1000,1000,1000,1000,1000,1000,1000];

        for j=1:n
        for i=1:n
        if(T(i,j)<=mn(j)) then
        mn(j)=T(i,j);
       end
                end
        end

  for j=1:n
        for i=1:n
                T(i,j)=T(i,j)-mn(j);
        end
  end

        printf("\n\n**********data after column minimum decrement is**********\n\n")

        for i=1:n
                printf("\t\tjob%d ",i);
        end

for i=1:n
  printf("\nworker%d ",i);
  for j=1:n
```

Signature _____

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Page No. _____

OUTPUT

```
How many workers and job do you have

DATA YOU ENTERED IS :
        job1        job2        job3
worker1
worker2
worker3
**************data after row minimum decrement is**************
        job1        job2        job3
worker1
worker2
worker3
**************data after column minimum decrement is**************
        job1        job2        job3
worker1
worker2
worker3
**************final job assignment is**************
assign job    to worker
assign job    to worker
assign job    to worker
```

```
      printf("\t%d ",T(i,j));
    end
  end

  printf("\n\n\n**************Final job assignment is**************\n\n");

  for j=1:n
    for i=1:n
      if(T(i,j)==0) then
        printf("\n assign job %d to worker %d",j,i);
        for z=1:n
          if (z==i) then
            continue;
          end

          if(T(z,j)==0) then
            T(z,j)=1000;
          end
          end

          for l=1:n
            if(l==j) then
              continue;
            end

            if(T(i,l)==0) then
              T(i,l)=1000;
            end
          end
        end
      end
    end
  end
  end
  printf("\n");
```

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CONTENT BEYOND SYLLABUS

PRACTICAL - II

AIM : To find the Eigen values and Eigen vectors in Scilab

SOFTWARE USED : Scilab

OUTPUT :

```
 "enter the Matrix"
\5

\4

\1

\2


 "The characteristic equation is:"

 " e^2 + "  "-7"  "*e + "  "6"  " = 0"

 "First Eigen value is:"

  6.

 "First Eigen vector is:"

  4.
  1.

 "Second Eigen value is:"

  1.

 "Second Eigen vector is:"

  4.
 -4.
```

Teacher's Signature

SOURCE CODE :

File Edit Format Options Window Execute ?

eigenval.sci | eigenvector.sci

```
clc
disp('enter the Matrix')
for i=1:2
 for j=1:2
 A(i,j)=input('\');
 end
end
b=A(1,1)+A(2,2);
c=A(1,1)*A(2,2)-A(1,2)*A(2,1);
disp('The characteristic equation is:')
disp([' e^2 + ' string(-b) '*e + ' string(c) ' = 0'])
e1=(b+sqrt(b^2-4*c))/2;
e2=(b-sqrt(b^2-4*c))/2;
if A(1,2) ~= 0
 v1 = [A(1,2); e1-A(1,1)];
 v2 = [A(1,2); e2-A(1,1)];
elseif A(2,1) ~= 0
 v1 = [e1-A(2,2); A(2,1)];
 v2 = [e2-A(2,2); A(2,1)];
else
 v1 = [1; 0];
 v2 = [0; 1];
end
 disp('First Eigen value is:');
 disp(e1)
 disp('First Eigen vector is:');
 disp (v1)
 disp('Second Eigen value is:');
 disp(e2)
 disp('Second Eigen vector is:');
 disp(v2)
```