



Computer Engineering Department &
Information Technology Engineering Department

Academic Year: 2021-2022

Class: S.Y.B.Tech Sem.: 4 Course: Linear Algebra

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AIM:	To complete the following problems
THEORY:	<p>If else Braching</p> <pre>x = input("Enter a number: ") if x>0 then disp("The number is positive") else disp("The number is negative") end</pre> <p>For Loop</p> <p>Identity Matrix of user size</p> <pre>size=input("Enter the matrix size:") for i = 1:size for j = 1:size if i==j then a(i,j)=1 else a(i,j)=0; end end end disp(a)</pre>



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Display matrix elements until a zero appears

```
A=[1,2,7;-4,5,12;-6,0,8]

flag=0

for i=1:3
    for j=1:3
        if A(i,j)==0 then
            flag=1
            break;
        else
            disp(A(i,j))
        end
    end
end
if flag==1 then
    break;
end
end
```

While Loop

```
//While Loop
x=1
while x<4
    printf("Hello World ")
    x=x+1
end
end
```



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Functions

```
//Functions

function s=distance(u,a,t)
    s=u*t+0.5*a*t^2;
endfunction

u=1
a=2
t=1

//printf("The distance is %d",distance(u,a,t))

//Code for distance at t=1:5

for t=1:5
    printf("\nThe distance at time :%d ts %d",t,distance(u,a,t))
    t=t+1
end

//Function Defination for single lines

deff('s=distance(t)','s=u*t+0.5*a*t^2')
```

Even Odd Function

```
//even or odd
number =input("Enter a number: ")

if modulo(2,number)==0 then
    printf("%d is even number",number)
else
    printf("%d is odd number",number)
end
```



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Prime Number Function

```
x=input("Enter any number: ")
flag=0
for i=2:sqrt(x)
    if(modulo(x,i)==0) then
        flag=1
        break
    end
end
if(flag==1) then
    disp("Not prime number")
else
    disp("Prime number")
end
```

Fahrenheit to Celsius and vice versa

```
//Fahrenheit to Celsius
Far = input("Enter the value of fahrenheit in degrees: ");
Cel=(Far-32)/1.8;
printf("Value of celsius degrees: %g\n", Cel);

//Celsius to Fahrenheit
Cel = input("Enter the value of celius in degrees: ");
Far=1.8*Cel+32
printf("Value of Farenheit in degrees: %g\n", Far);
```

Topics covered:

- If else branching
- For loop
- While loop
- Functions
- Some of the important functions like evenOdd, prime number and degrees conversion



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PROBLEMS	
CODE:	<p>First Problem:</p> <p>Find the user given matrix is</p> <ul style="list-style-type: none">• Symmetrix(find the skew symmetrix equivalent)• Skew symmetrix• Singular• Non singular(find inverse too) <pre>A=input("Enter a Matrix: ") length=size(A) len=length(1,1) printf("\n-----\n") asymmetric =0 for i=1:len for j=1:len if A(i,j)~=A(j,i) then asymmetric=1 end end end if asymmetric==1 then printf("\nGiven Matrix is not symmetric\n") else printf("\nGiven Matrix is symmetric\n") for i=1:len for j=1:len if i~=j A(i,j) = -A(j,i) else A(i,j)=0 end end end end</pre>



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```
printf("\n*****\n")
printf("The skew symmetric matrix is:\n")
disp(A)
end

printf("\n-----\n")

skew =0
for i=1:len
    for j=1:len
        if A(i,j)~-A(j,i) then
            skew=1
        end
    end
end

if skew==1 then
    printf("Given Matrix is not skew symmetric\n")
else
    printf("Given Matrix is skew symmetric\n")
end

printf("\n-----\n")

determinant = det(A)

if determinant==0 then
    printf("Matrix is singular\n")
else
    printf("Matrix is non-singular\n")
    printf("\n*****\n")
    disp("The inverse of the given matrix is:")
    disp(inv(A))
end
printf("\n-----\n")
```



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OUTPUT:

When Matrix is neither symmetric nor skew symmetric

Enter a Matrix: [1,2,6; 5,7,3; 0,2,6]

Given Matrix is not symmetric

Given Matrix is not skew symmetric

Matrix is non-singular

"The inverse of the given matrix is:"

```
1.      0.      -1.
-0.8333333  0.1666667  0.75
0.2777778 -0.0555556 -0.0833333
```

Matrix is symmetric and skew symmetric

Enter a Matrix: [1,1,-1; 1,2,0; -1,0,5]

Given Matrix is symmetric

The skew symmetric matrix is:

```
0.  -1.  1.
1.   0.  0.
-1.  0.  0.
```

Given Matrix is skew symmetric

Matrix is singular



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Second Problem

Define a function that finds the sum of given matrix and $2i \cdot I$ and display the matrix

```
function matrix=sumMatrix(A)

    //finding the length of the matrix a
    length = size(A)

    //Getting the 1row and 1column
    len = length(1,1)

    //Constructing a identity matrix of len x len
    B=eye(len,len)
    B = 2*%i*B

    //returning the matrix with the sum
    matrix = A+B;

endfunction;
printf("\n-----\n")
A=input("Enter a Matrix: ")
printf("\n-----\n")
disp(sumMatrix(A))
printf("\n-----\n")
```

Output:

```
-----
Enter a Matrix: [1,5,8; 2,4,7; 9,0,3]
-----

1. + 2.i    5. + 0.i    8. + 0.i
2. + 0.i    4. + 2.i    7. + 0.i
9. + 0.i    0. + 0.i    3. + 2.i
-----
```




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	<div>----- Enter a Matrix: [5,8,1; 2,3,6; 4,9,0] ----- 5. + 2.i 8. + 0.i 1. + 0.i 2. + 0.i 3. + 2.i 6. + 0.i 4. + 0.i 9. + 0.i 0. + 2.i -----</div>
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CONCLUSION: I learnt about the if-else branching, for loop, while loop and function. Learnt about the size function which returns the no of rows and column. I have learnt about prebuilt function like inv and det which finds the inverse and determinant of the matrix