NAME: Shreeya Chatterji
ROLL NO: 102103447
CLASS: CO16

OT LAB ASSIGNMENT 1

Problem 1. Input an array containing natural numbers with use of increment.

Code:

```
%% QUESTION 1
clc
clear all
n = 10; % Define the number of elements in the array
natural_numbers = 1:n; % Creates an array of natural numbers from 1 to n
% Display the generated array
disp(natural_numbers);
```

Output:

```
Command Window
     1     2     3     4     5     6     7     8     9    10
```

Problem 2. Consider a matrix $\begin{pmatrix} 4 & 1 & 3 \\ 2 & 6 & 7 \\ 3 & 1 & 8 \end{pmatrix}$. Find location of least element in matrix and update this with a value 10.

Code:

```
%% QUESTION 2
clc
clear all
format short
% #1: input parameter
A=[4 1 3; 2 6 7; 3 1 8];
x=min(min(A))
[i,j]=find(A==min(min(A)))
A(i,j)=10
```

Output:

```
x =

     1


i =

     1
     3


j =

     2
     2


A =

     4    10     3
     2     6     7
     3    10     8
```

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Problem 3. Consider a matrix $\begin{pmatrix} 4 & 1 & 3 \\ 2 & 6 & 7 \\ 3 & 1 & 8 \end{pmatrix}$. Sort the elements in matrix and update each row/column in ascending order.

Code:

```
%% QUESTION 3
clc
clear all
format short
% #1: input parameter
A=[4 1 3; 2 6 7; 3 1 8];
% Sort each row in ascending order
sorted_rows = sort(A, 2);
% Sort each column in ascending order
sorted_columns = sort(A, 1);

A= sort(A,2);
A= sort(A,1);

disp("Sorted Rows:");
disp(sorted_rows);

disp("Sorted Columns:");
disp(sorted_columns);

disp("Final sorted matrix");
disp(A);
```

Output:

```
Sorted Rows:
     1     3     4
     2     6     7
     1     3     8

Sorted Columns:
     2     1     3
     3     1     7
     4     6     8

Final sorted matrix
     1     3     4
     1     3     7
     2     6     8
```

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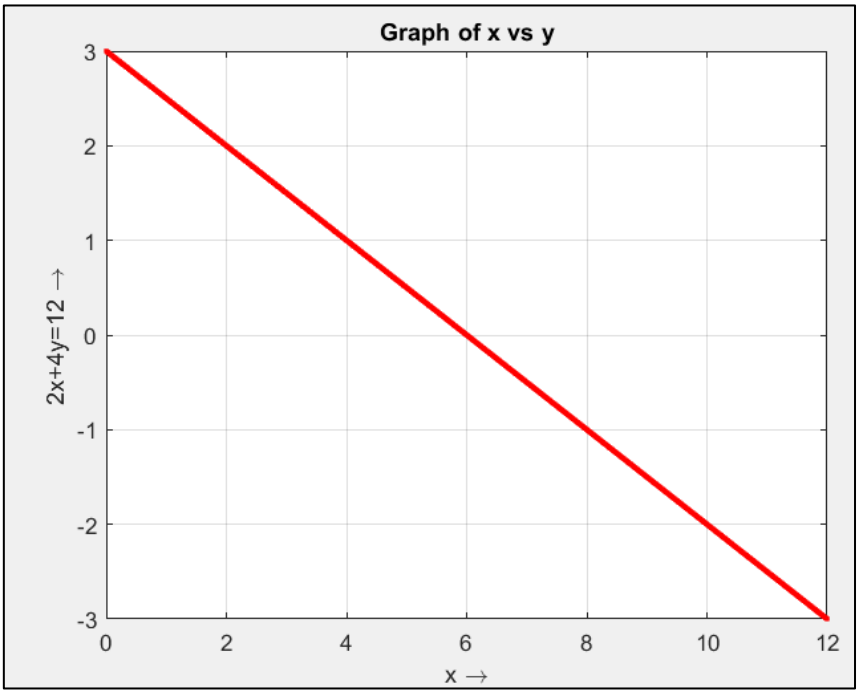
Problem 4. Find all points that lie on line $2x + 4y = 12$, when $x \in [0, 12]$. Plot line.

Code:

```
%% QUESTION 4
clc
clear all
x=0:0.01:12; % values for x for the plot
% the function
y = (12 - 2*x)/4;
% Plotting
plot(x,y,'r.')
xlabel('x \rightarrow')
ylabel('2x+4y=12 \rightarrow')
title('Graph of x vs y')
grid on
```

Output:



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Problem 5. Find intersection point of the two given lines: $2x + 4y = 12$ and $3x + 2y = 12$

Code:

```
%% QUESTION 5
clc
clear all
% The equations of the lines
% eq1 => 2*x + 4*y == 12;
% eq2 => 3*x + 2*y == 12;

% Define the coefficient matrix and the constant vector
A = [2 4; 3 2];
B = [12; 12];
% Solve the system of equations using matrix operations
solution = inv(A)*B;
% Display the intersection point
disp('Intersection Point:');
disp (solution);
```

Output:

```
Intersection Point:
    3.0000
    1.5000
```