

นายพิษณุ รังนิจรัส 62070502215 Homework 05 :

Bring up Source Image and Gray scaled it

Attempt 1 : picture with 5*5 pixel

```
%Attempt 1
clear
clc
% input image from source
I = imread('forhough.png');
imshow(I)
title("Source Image")
```

Source Image

```
% Convert rgb image to grayscale image
r = I(:,:,1);
g = I(:,:,2);
b = I(:,:,3);
I2 = (0.3*r) + (0.6*g) + (0.1*b)
```

```
I2 = 5x5 uint8 matrix
    0     0     0     0     0
    0     0     0     0  255
    0     0     0  255     0
    0     0  255     0     0
    0  255     0     0     0
```

```
% Grayscale Image Result
imshow(I2)
title("Grayscale Image")
```

Grayscale Image

```
% Get image's resolution
[x y] = size(I2)
```

```
x = 5
y = 5
```

```
% Binary Image transform
level = graythresh(I2)
```

```
level = 0.4980
```

```
I3 = imbinarize(I2,level)
```

```
I3 = 5x5 logical array
 0  0  0  0  0
 0  0  0  0  1
 0  0  0  1  0
 0  0  1  0  0
 0  1  0  0  0
```

```
imshow(I3)
title("Binary Image")
```

Binary Image

Write a program for Hough transform.

```
% Get the coordinate of the white pixel
forhoughx = [] ;
forhoughy = [] ;
num = 0 ;
for i = 1:x
    for j = 1:y
        if I3(x+1-i,j) == 1
            forhoughy(num+1) = i ;
            forhoughx(num+1) = j ;
            num = num + 1 ;
        end
    end
end
forhoughx
```

```
forhoughx = 1x4
          2    3    4    5
```

```
forhoughy
```

```
forhoughy = 1x4
           1    2    3    4
```

```
% Get size of array
[a b] = size(forhoughx) ;
% find c for hough transform
```

```

c = [] ;
c = forhoughy ;
% find m for hought transform
m = [] ;
for i = 1:b
    m(i) = forhoughy(i)/forhoughx(i) ;
end
c

```

```

c = 1×4
    1    2    3    4

```

```

m

```

```

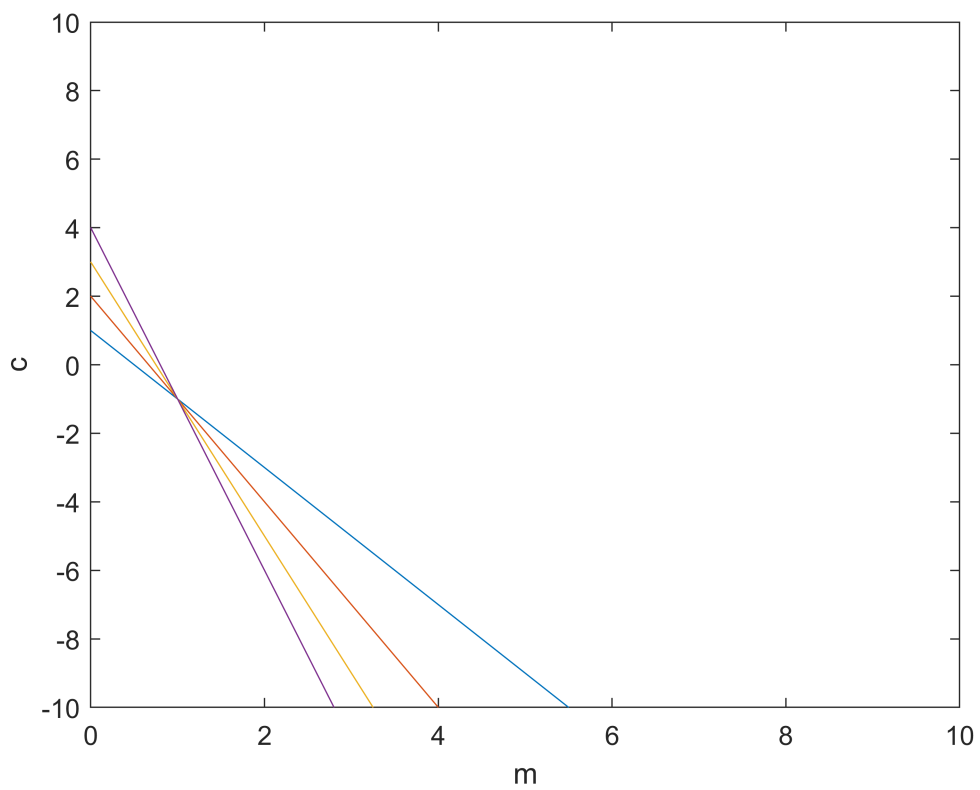
m = 1×4
    0.5000    0.6667    0.7500    0.8000

```

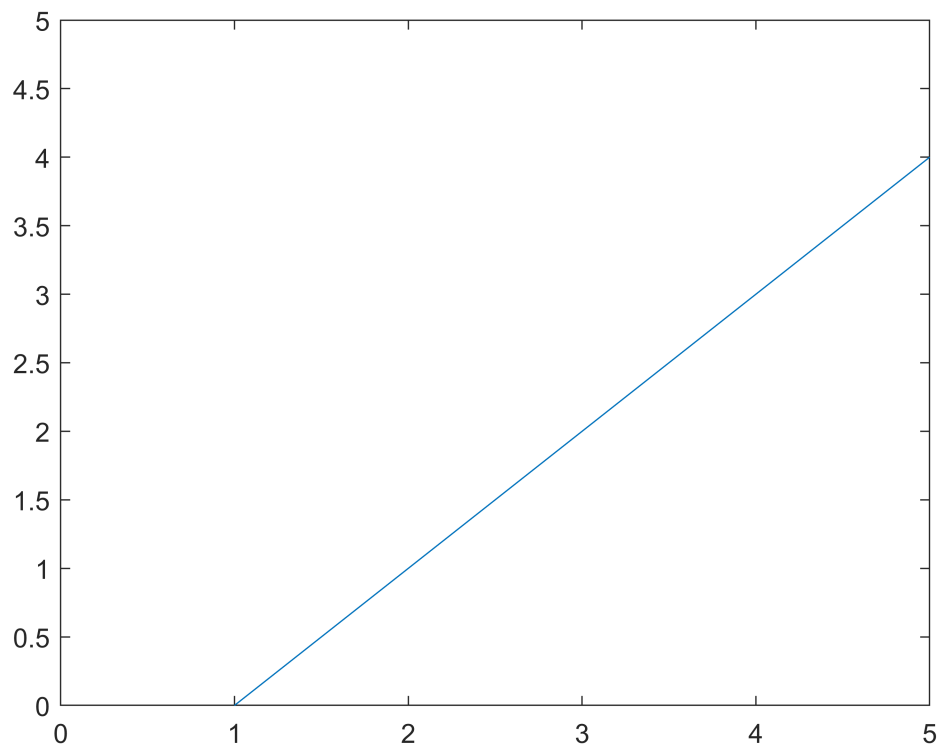
```

% plot the graph
figure
m = -10:0.01:10;
for i = 1:b
    c = -(forhoughx(i))*m + forhoughy(i);
    plot(m,c);
    hold on
end
xlim([0 10])
ylim([-10 10])
xlabel('m')
ylabel('c')
hold off

```



```
% Generate line from the point we get  
% as the most intercept point is (1,-1)  
% which mean m = 1 , c = - 1  
m = 1 ;  
c = -1 ;  
x = -100:1:100 ;  
y = m*x+c ;  
plot(x,y) ;  
xlim([0 5])  
ylim([0 5])
```



Attempt 2 : picture with 25*25 pixel

```
%Attempt 2
clear
clc
% input image from source
I = imread('forhough2.png');
imshow(I)
title("Source Image")
```

Source Image



```
% Convert rgb image to grayscale image
r = I(:,:,1);
g = I(:,:,2);
b = I(:,:,3);
I2 = (0.3*r) + (0.6*g) + (0.1*b)
```

I2 = 25x25 uint8 matrix

```

0 0 0 0 0 0 0 0 0 0 0 0 0 ...
0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0
:

```

```

% Grayscale Image Result
imshow(I2)
title("Grayscale Image")

```

Grayscale Image



```

% Get image's resolution
[x y] = size(I2)

```

```

x = 25
y = 25

```

```

% Binary Image transform
level = graythresh(I2)

```

```

level = 0.4980

```

```

I3 = imbinarize(I2,level)

```

```

I3 = 25x25 logical array
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ...
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0
:

```

```

imshow(I3)
title("Binary Image")

```

Binary Image



Write a program for Hough transform.

```
% Get the coordinate of the white pixel
```

```
forhoughx = [] ;
```

```
forhoughy = [] ;
```

```
num = 0 ;
```

```
for i = 1:x
```

```
    for j = 1:y
```

```
        if I3(x+1-i,j) == 1
```

```
            forhoughy(num+1) = i ;
```

```
            forhoughx(num+1) = j ;
```

```
            num = num + 1 ;
```

```
        end
```

```
    end
```

```
end
```

```
forhoughx
```

```
forhoughx = 1×17
```

```
    4     5     6     7     8     9    10    14    15    16    17    18    19 ...
```

```
forhoughy
```

```
forhoughy = 1×17
```

```
    4     5     6     7     8     9    10    14    15    16    17    18    19 ...
```

```
% Get size of array
```

```
[a b] = size(forhoughx) ;
```

```
% find c for hough transform
```

```
c = [] ;
```

```
c = forhoughy ;
```

```
% find m for hought transform
```

```
m = [] ;
```

```
for i = 1:b
```

```
    m(i) = forhoughy(i)/forhoughx(i) ;
```

```
end
```

```
c
```

```
c = 1×17
```

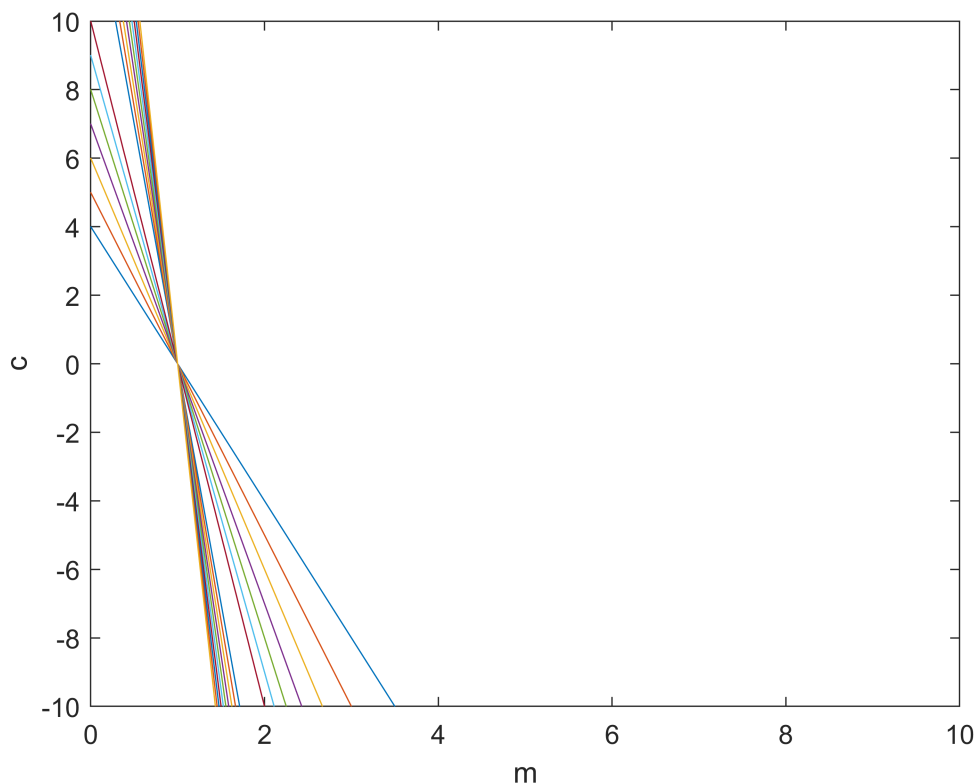
```
    4     5     6     7     8     9    10    14    15    16    17    18    19 ...
```

```
m
```

```
m = 1×17
```

1 1 1 1 1 1 1 1 1 1 1 1 ...

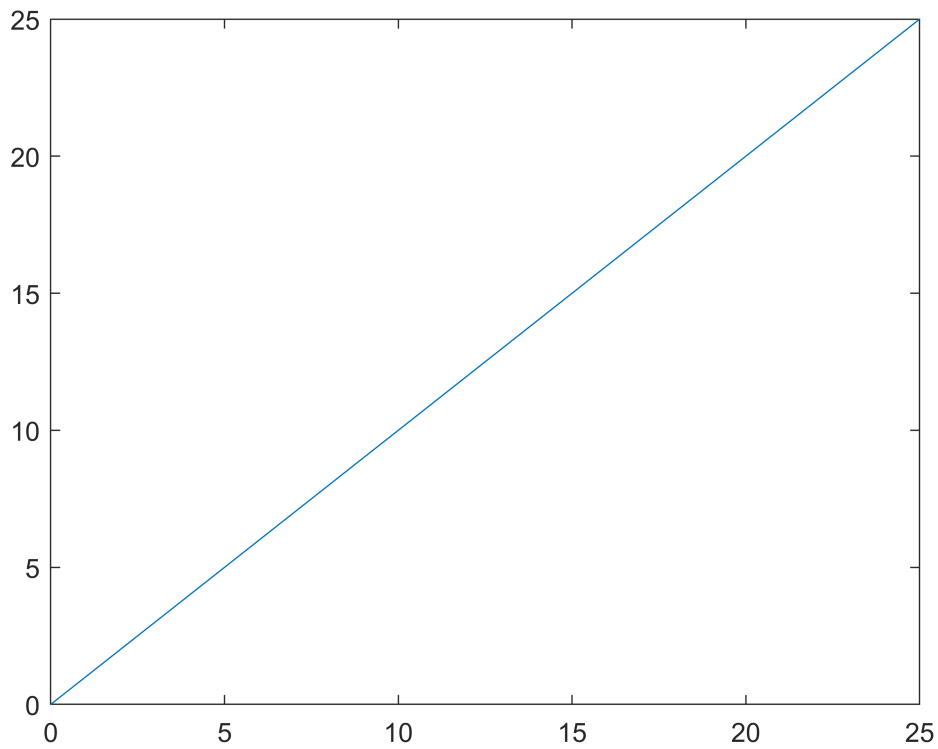
```
% plot the graph
figure
m = -10:0.01:10;
for i = 1:b
    c = -(forhoughx(i))*m + forhoughy(i);
    plot(m,c);
    hold on
end
xlim([0 10])
ylim([-10 10])
xlabel('m')
ylabel('c')
hold off
```



```
% Generate line from the point we get
% as the most intercept point is (1,0)
% which mean m = 1 , c = 0
m = 1 ;
c = 0 ;
x = -100:1:100 ;
y = m*x+c ;
plot(x,y) ;
```

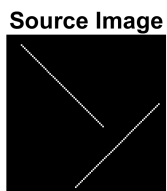


```
xlim([0 25])  
ylim([0 25])
```



Attempt 3 : picture with 100*100 pixel

```
%Attempt 3  
clear  
clc  
% input image from source  
I = imread('forhough3.png');  
imshow(I)  
title("Source Image")
```



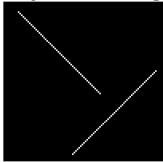
```
% Convert rgb image to grayscale image  
r = I(:,:,1);
```

```
g = I(:,:,2);
b = I(:,:,3);
I2 = (0.3*r) + (0.6*g) + (0.1*b)
```

```
I2 = 100x100 uint8 matrix
    0    0    0    0    0    0    0    0    0    0    0    0    0 ...
    0    0    0    0    0    0    0    0    0    0    0    0    0
    0    0    0    0    0    0    0    0    0    0    0    0    0
    0    0    0    0    0    0    0    0    0    0    0    0    0
    0    0    0    0    0    0    0    0    0    0    0    0    0
    0    0    0    0    0    0    0    0    0    0    0    0    0
    0    0    0    0    0    0    0    0    0    255    0    0    0
    0    0    0    0    0    0    0    0    0    0    255    0    0
    0    0    0    0    0    0    0    0    0    0    0    255    0
    0    0    0    0    0    0    0    0    0    0    0    0    255
    ⋮
```

```
% Grayscale Image Result
imshow(I2)
title("Grayscale Image")
```

Grayscale Image



```
% Get image's resolution
[x y] = size(I2)
```

```
x = 100
y = 100
```

```
% Binary Image transform
level = graythresh(I2)
```

```
level = 0.4980
```

```
I3 = imbinarize(I2,level)
```

```
I3 = 100x100 logical array
    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0 ...
    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
    0    0    0    0    0    0    0    0    0    1    0    0    0    0    0    0    0
    0    0    0    0    0    0    0    0    0    0    1    0    0    0    0    0    0
```

```

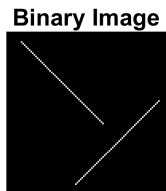
0  0  0  0  0  0  0  0  0  0  0  1  0  0  0  0  0  0  0
0  0  0  0  0  0  0  0  0  0  0  0  1  0  0  0  0  0
⋮

```

```

imshow(I3)
title("Binary Image")

```



Write a program for Hough transform.

```

% Get the coordinate of the white pixel
forhoughx = [] ;
forhoughy = [] ;
num = 0 ;
for i = 1:x
    for j = 1:y
        if I3(x+1-i,j) == 1
            forhoughy(num+1) = i ;
            forhoughx(num+1) = j ;
            num = num + 1 ;
        end
    end
end
forhoughx

```

```

forhoughx = 1×105
    44    45    46    47    48    49    50    51    52    53    54    55    56 ...

```

```

forhoughy

```

```

forhoughy = 1×105
     5     6     7     8     9    10    11    12    13    14    15    16    17 ...

```

```

% Get size of array
[a b] = size(forhoughx) ;
% find c for hough transform
c = [] ;
c = forhoughy ;
% find m for hough transform
m = [] ;

```

```

for i = 1:b
    m(i) = forhoughy(i)/forhoughx(i) ;
end
c

```

```

c = 1×105
    5    6    7    8    9   10   11   12   13   14   15   16   17 ...

```

```

m

```

```

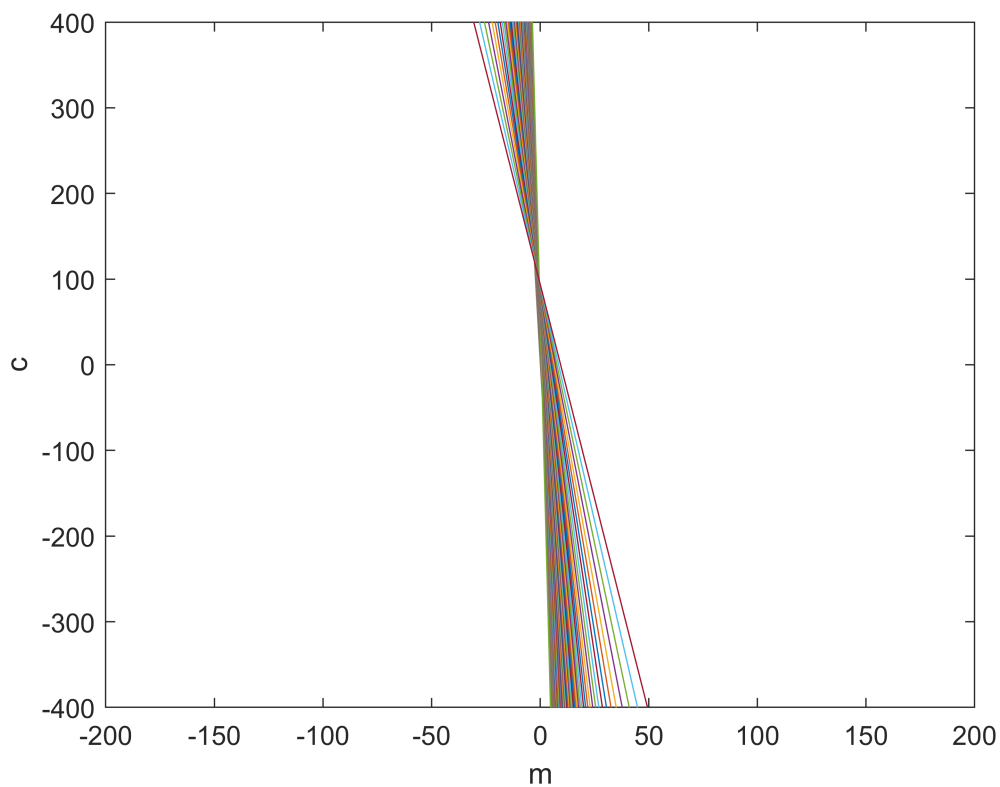
m = 1×105
    0.1136    0.1333    0.1522    0.1702    0.1875    0.2041    0.2200    0.2353 ...

```

```

% plot the graph
figure
m = -100:1:100;
for i = 1:b
    c = -(forhoughx(i))*m + forhoughy(i);
    plot(m,c);
    hold on
end
xlim([-200 200])
ylim([-400 400])
xlabel('m')
ylabel('c')
hold off

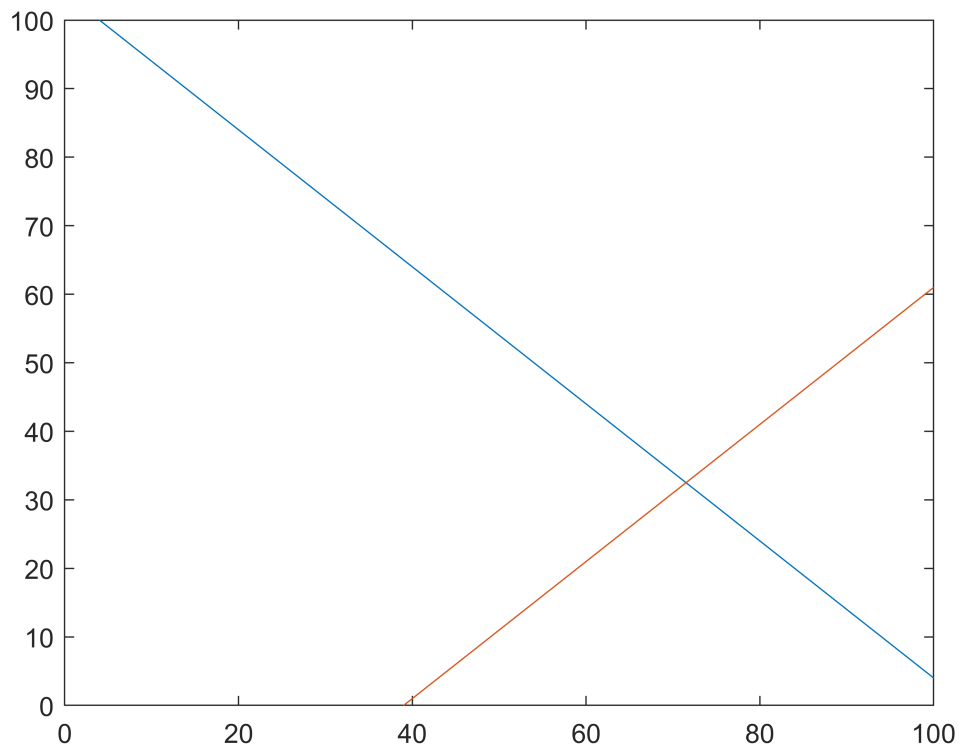
```



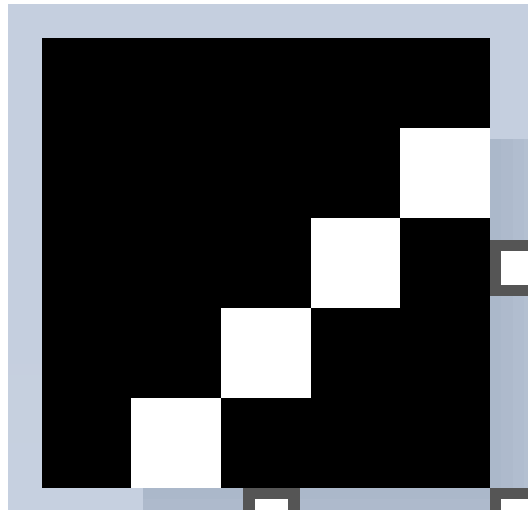
```

% Generate line from the point we get
% as the most intercept point is (-1,104) and (1,-39)
% which mean m = -1 , c = 104 and m = 1 , c = -39
m = -1 ;
c = 104 ;
x = -100:1:100 ;
y = m*x+c ;
plot(x,y) ;
hold on
m = 1 ;
c = -39 ;
x = -100:1:100 ;
y = m*x+c ;
plot(x,y) ;
xlim([0 100])
ylim([0 100])
hold off

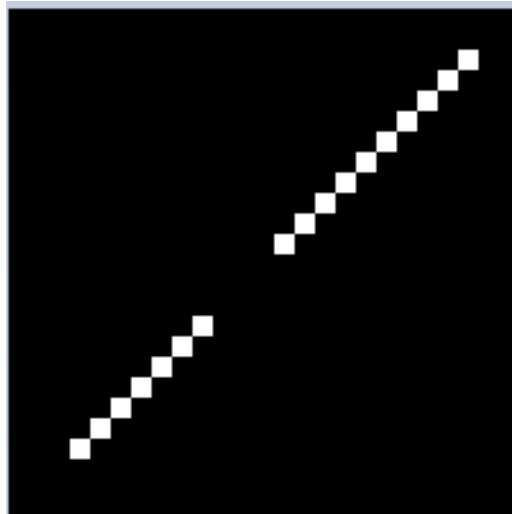
```



Attempt 1 :



Attempt 2 :



Attempt 3 :

