DIP Assignment № 3

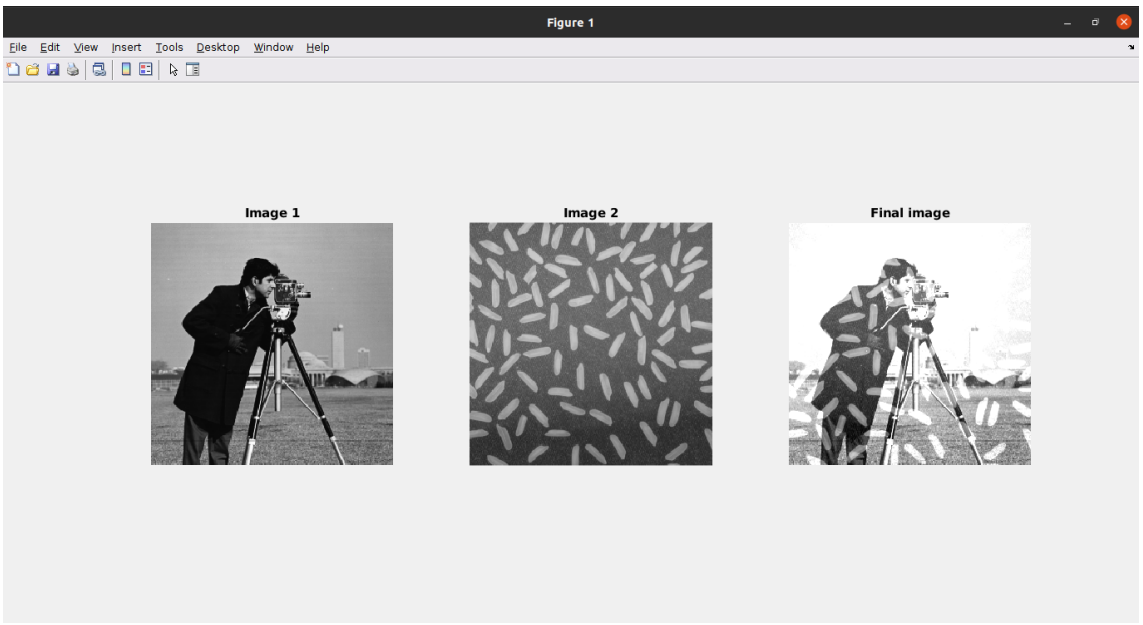
PRAMIT BISWAS, Sem V December 9, 2022

Problem 1

Addition of two images

```
img1 = imread("cameraman.tif");
img2 = imread("rice.png");
A = imadd(img1,img2);
subplot(1, 3, 1), imshow(img1), title("Image 1");
subplot(1, 3, 2), imshow(img2), title("Image 2");
subplot(1, 3, 3), imshow(A , []), title("Final image");
```

Output

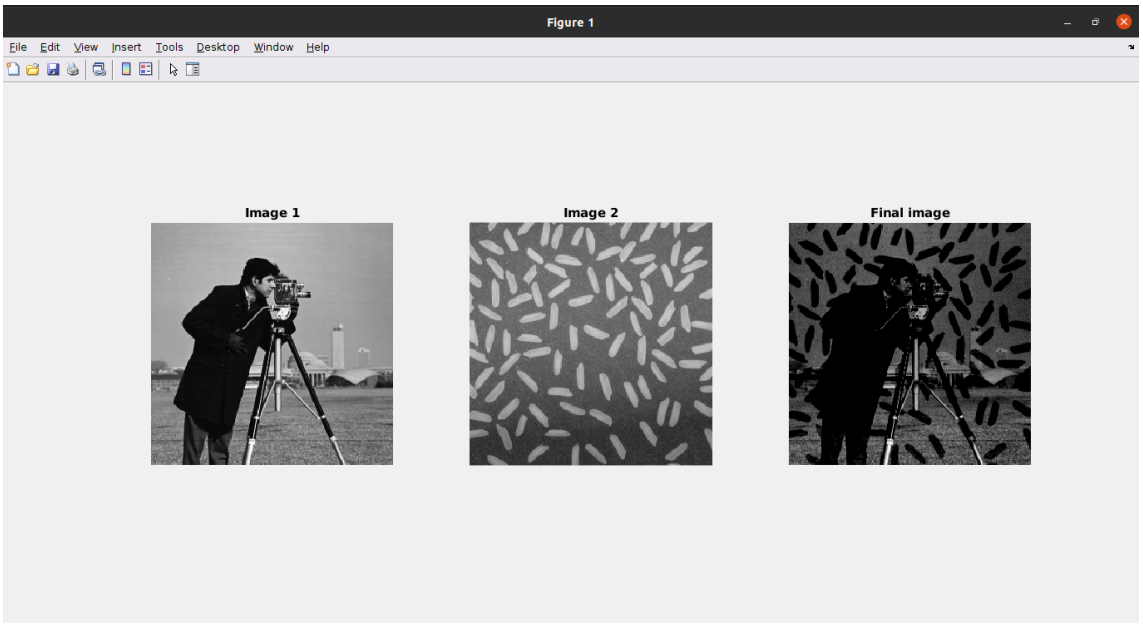


Problem 2

Subtract one image from other image

```
1  img1 = imread("cameraman.tif");
2  img2 = imread("rice.png");
3  S = imsubtract(img1, img2);
4  subplot(1, 3, 1), imshow(img1), title("Image 1");
5  subplot(1, 3, 2), imshow(img2), title("Image 2");
6  subplot(1, 3, 3), imshow(S , []), title("Final image");
```

Output

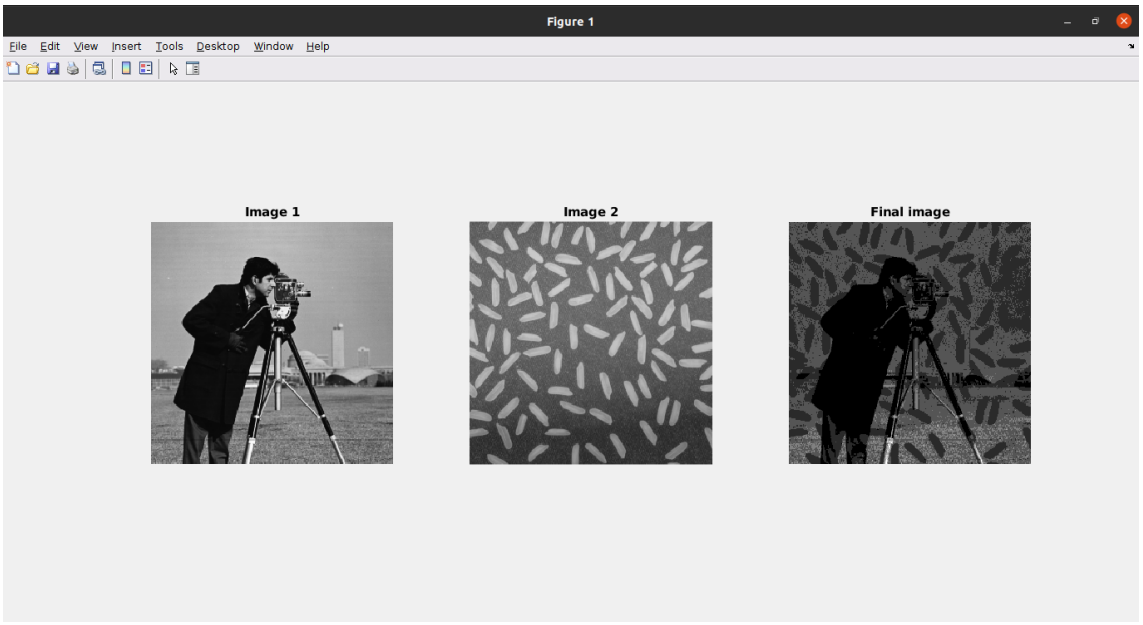


Problem 3

Perform division of images

```
1 img1 = imread("cameraman.tif");
2 img2 = imread("rice.png");
3 D = imdivide(img1, img2);
4 subplot(1, 3, 1), imshow(img1), title("Image 1");
5 subplot(1, 3, 2), imshow(img2), title("Image 2");
6 subplot(1, 3, 3), imshow(D , []), title("Final image");
```

Output



Problem 4

Calculate mean value of image

```
1  img = imread("cameraman.tif");
2
3  meanVal = mean2(img);
4  disp(meanVal);
```

Output

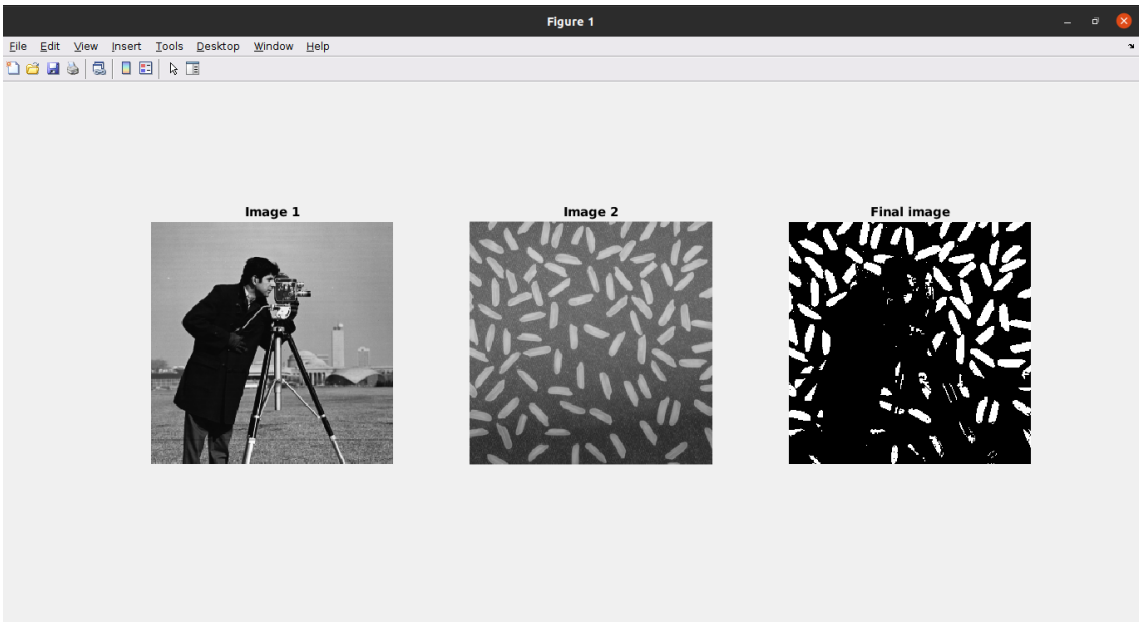
```
        Trial License -- for use to evaluate programs for possible purchase as an end-user only.

>> meanval_img
   118.7245

fx >>
```

Problem 5

AND operation between two images

```
img1 = imread("cameraman.tif");
img2 = imread("rice.png");
b1 = imbinarize(img1);
b2 = imbinarize(img2);
A = bitand(b1, b2);
subplot(1, 3, 1), imshow(img1), title("Image 1");
subplot(1, 3, 2), imshow(img2), title("Image 2");
subplot(1, 3, 3), imshow(A), title("Final image");
```

Output

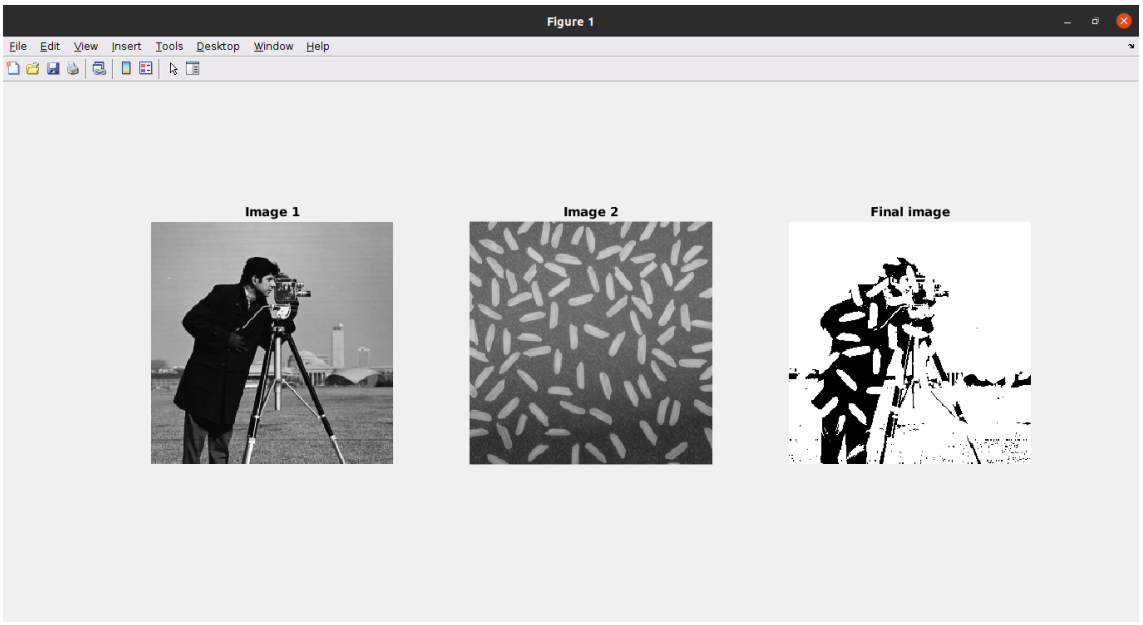


Problem 6

OR operation between two images

```
img1 = imread("cameraman.tif");
img2 = imread("rice.png");
b1 = imbinarize(img1);
b2 = imbinarize(img2);
O = bitor(b1, b2);
subplot(1, 3, 1), imshow(img1), title("Image 1");
subplot(1, 3, 2), imshow(img2), title("Image 2");
subplot(1, 3, 3), imshow(O), title("Final image");
```

Output

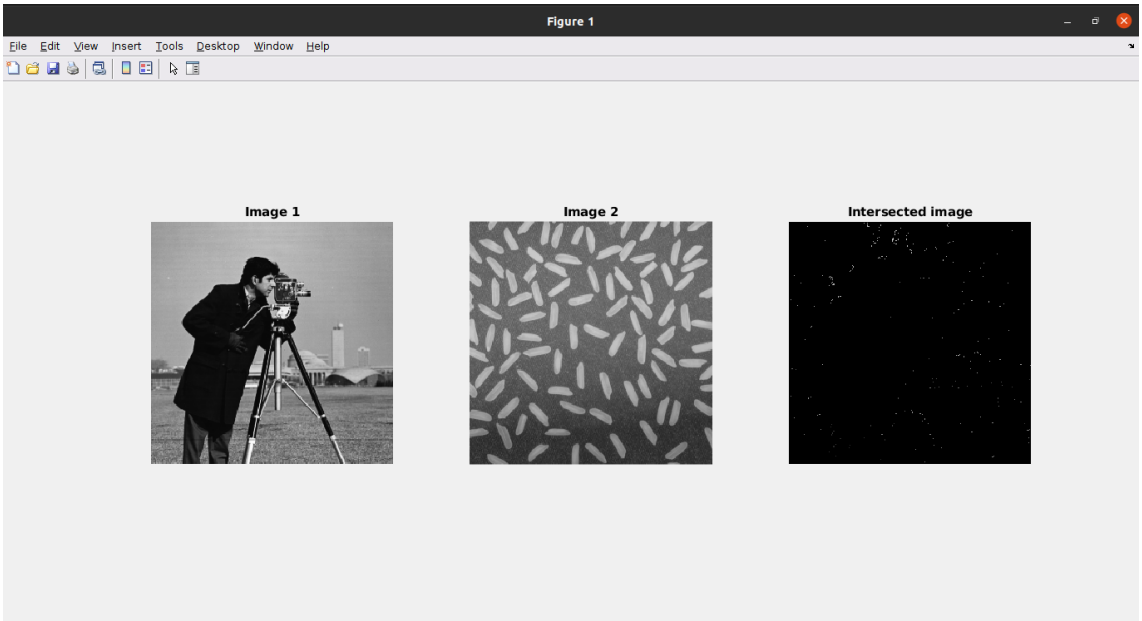


Problem 7

Calculate intersection of two images and display the intersection image

```
img1 = imread("cameraman.tif");
img2 = imread("rice.png");
[x, y ,z] = size(img1);

img = uint8(zeros(x, y, z));

for k = 1:z
    for i = 1:x
        for j = 1:y
            if img1(i , j , k) == img2(i, j, k)
                img(i, j, k) = img1(i, j, k);
            end
        end
    end
end
subplot(1, 3, 1), imshow(img1), title("Image 1");
subplot(1, 3, 2), imshow(img2), title("Image 2");
subplot(1, 3, 3), imshow(img), title("Intersected image");
```

Output

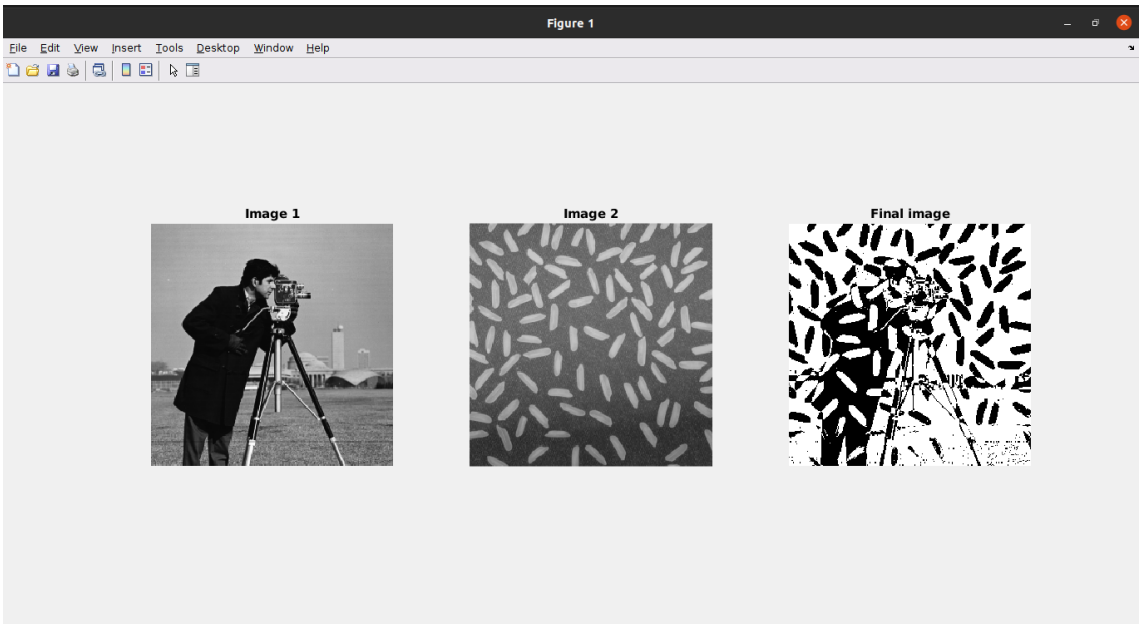


Problem 8

Water Marking using EX-OR operation

```
img1 = imread("cameraman.tif");
img2 = imread("rice.png");
b1 = imbinarize(img1);
b2 = imbinarize(img2);
W = bitxor(b1, b2);
subplot(1, 3, 1), imshow(img1), title("Image 1");
subplot(1, 3, 2), imshow(img2), title("Image 2");
subplot(1, 3, 3), imshow(W), title("Final image");
```

Output



Problem 9

Histogram Equalization Without Built-in Function

```
img = imread("AT3_1m4_03.tif");

I = img;
[r, c] = size(I);
n = r * c;
newImg = uint8(zeros(r, c));


f = zeros(256, 1);
pdf = zeros(256, 1);
cdf = zeros(256, 1);
out = zeros(256, 1);
cum = zeros(256, 1);

for i = 1:r
    for j = 1:c
        value = I(i, j);
        f(value + 1) = f(value +1) + 1;
        pdf(value + 1) = f(value + 1)./n;
    end
end

sum = 0;
L = 255;

for i = 1:size(pdf)
    sum = sum + f(i);
    cum(i) = sum;
    cdf(i) = cum(i)./n;
    out(i) = round(cdf(i) .* L);
end
for i = 1:r
    for j = 1:c
        newImg(i, j) = out(I(i, j) + 1);
    end
end

subplot(2, 2, 1), imshow(img), title("Before hist-eq");
subplot(2, 2, 3), imhist(img);
subplot(2, 2, 2), imshow(newImg), title("After hist-eq");
subplot(2, 2, 4), imhist(newImg);
% histEq = histeq(I);
% imshow(histEq);‘
```

Output

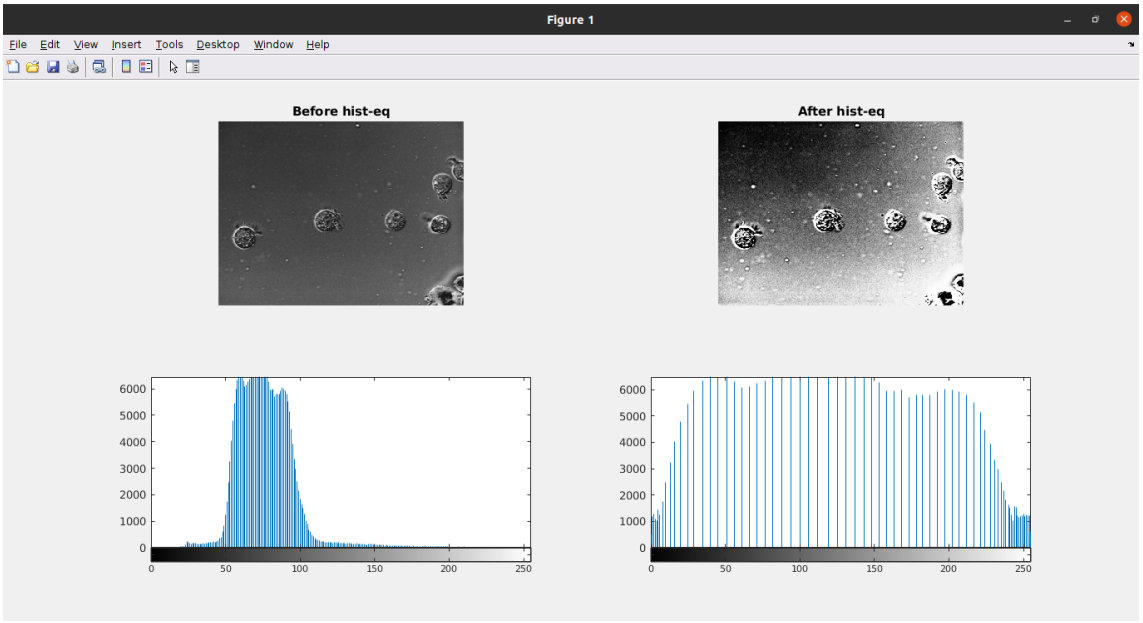


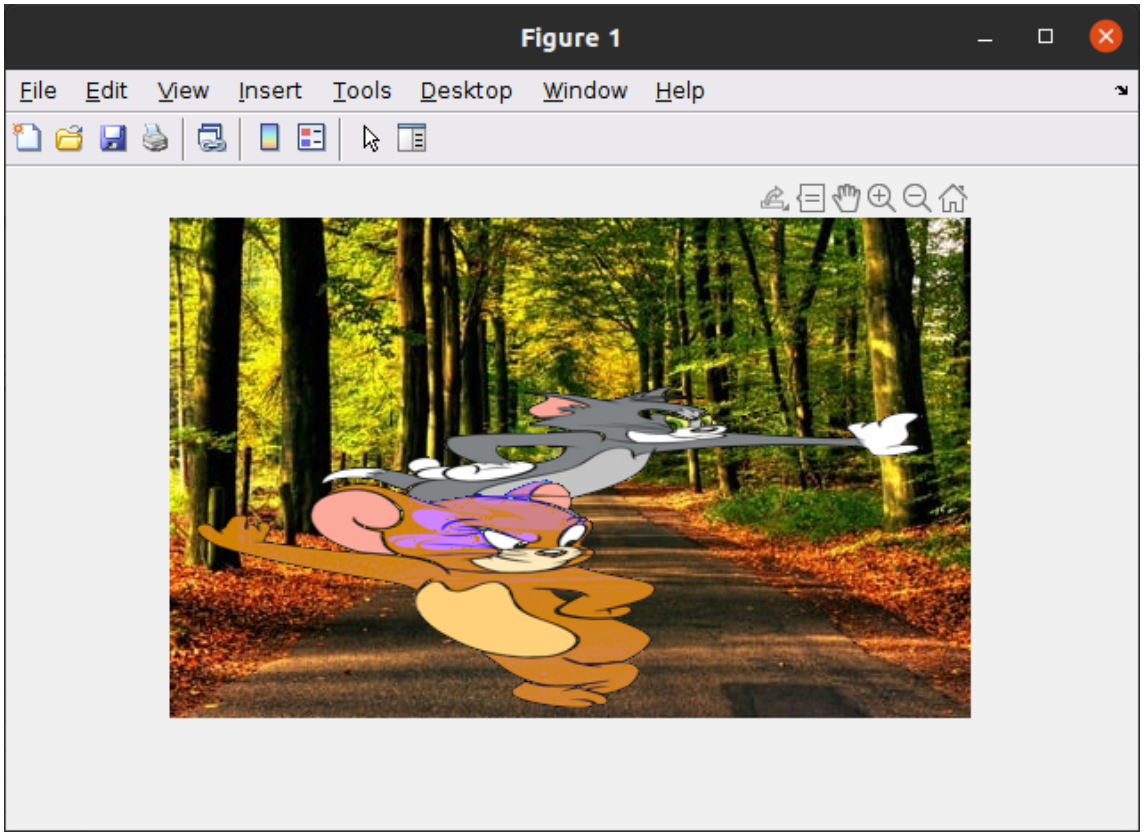
Figure 1
File Edit View Insert Tools Desktop Window Help
Before hist-eq
After hist-eq
6000
5000
4000
3000
2000
1000
0
0 50 100 150 200 250

Problem 10

Adding objects to an external scenery using the above operator(s)

```
bg = imread("../dip_imgs/bg.jpg");
tom = imread("../dip_imgs/tom.jpg");
jerry = imread("../dip_imgs/jerry.jpg");
[m,n,o] = size(bg);
tom = imresize(tom,[m,n,]);
jerry = imresize(jerry,[m,n,]);

mask1 = tom > 12;
mask2 = jerry > 12;

bg(mask1) = tom(mask1);
bg(mask2) = jerry(mask2);
imshow(bg);
```

Output



Assignment 3 Github link: https://github.com/promit-3o20/DIP/tree/main/dip/assignment3