Fall 2021

California State University, Northridge

Department of Electrical and Computer Engineering

Computer Assignment 1
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ECE 551
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1.

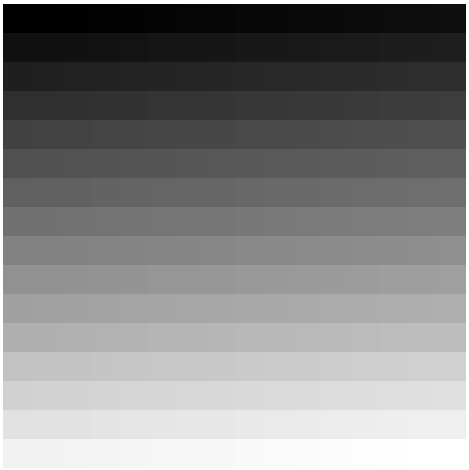
```
>> panda = imread('panda.jpg');
>> size (panda)
ans =
  183   275     3
>> panda_grey = rgb2gray(panda);
>> size (panda_grey)
ans =
  183   275
>> imwrite(panda_grey,'panda_grey.jpg')
>> imfinfo panda.jpg
FileSize: 5842
>> imfinfo panda_grey.jpg
FileSize: 6815
```

2.

mat2gray(A, [min max]) converts a matrix into a grayscale image with values ranging from 0 to 1. Min is set to 0 and max is set to 1.

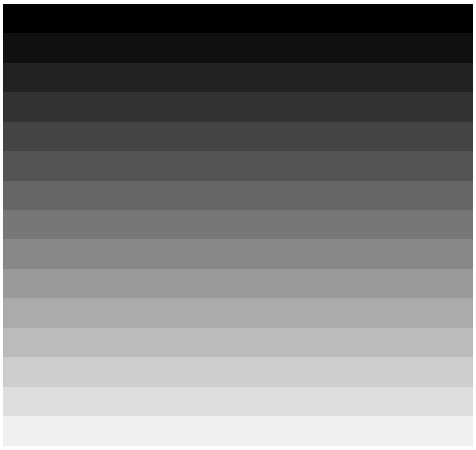
3.

```
K = 1
for I = 1:16
   for J = 1:16
      A(I,J) = K;
      K=K+1;
   end
end
imwrite(A,'intensity_matrix.jpeg')
B = mat2gray(A)
imwrite(B,'intensity_matrix.jpeg')
```



4.

```
for I = 1:16
   for J = 1:16
      A(I,J) = (I-1)*16;
   end
end
imwrite(A,'intensity_box.jpeg')
B = mat2gray(A)
imwrite(B,'intensity_box.jpeg')
```



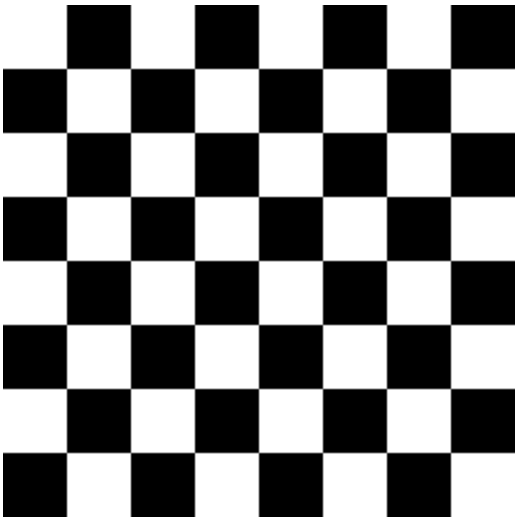
5.

```
%A threshold of 0.25 produces an image that closely resembles the original image.
panda = imread("panda.jpg");
panda_grey = mat2gray(rgb2gray(panda));
imfinfo("panda.jpg")
```

```
for I = 1:183
   for J = 1:275
      if (panda_grey(I,J) > .25)
        panda_grey(I,J) = 1;
      else
         panda_grey(I,J) = 0;
      end
   end
end
imwrite(panda_grey,"panda_thresh.jpg")
```

6.

```
white = ones(32,32);
black = zeros(32,32);
chessboard = [ white black white black white black white black;
               black white black white black white black white;
               white black white black white black white black;
               black white black white black white black white;
               white black white black white black white black;
               black white black white black white black white;
               white black white black white black white black;
               black white black white black white black white];
imwrite(chessboard,"chessboard.jpg");
```

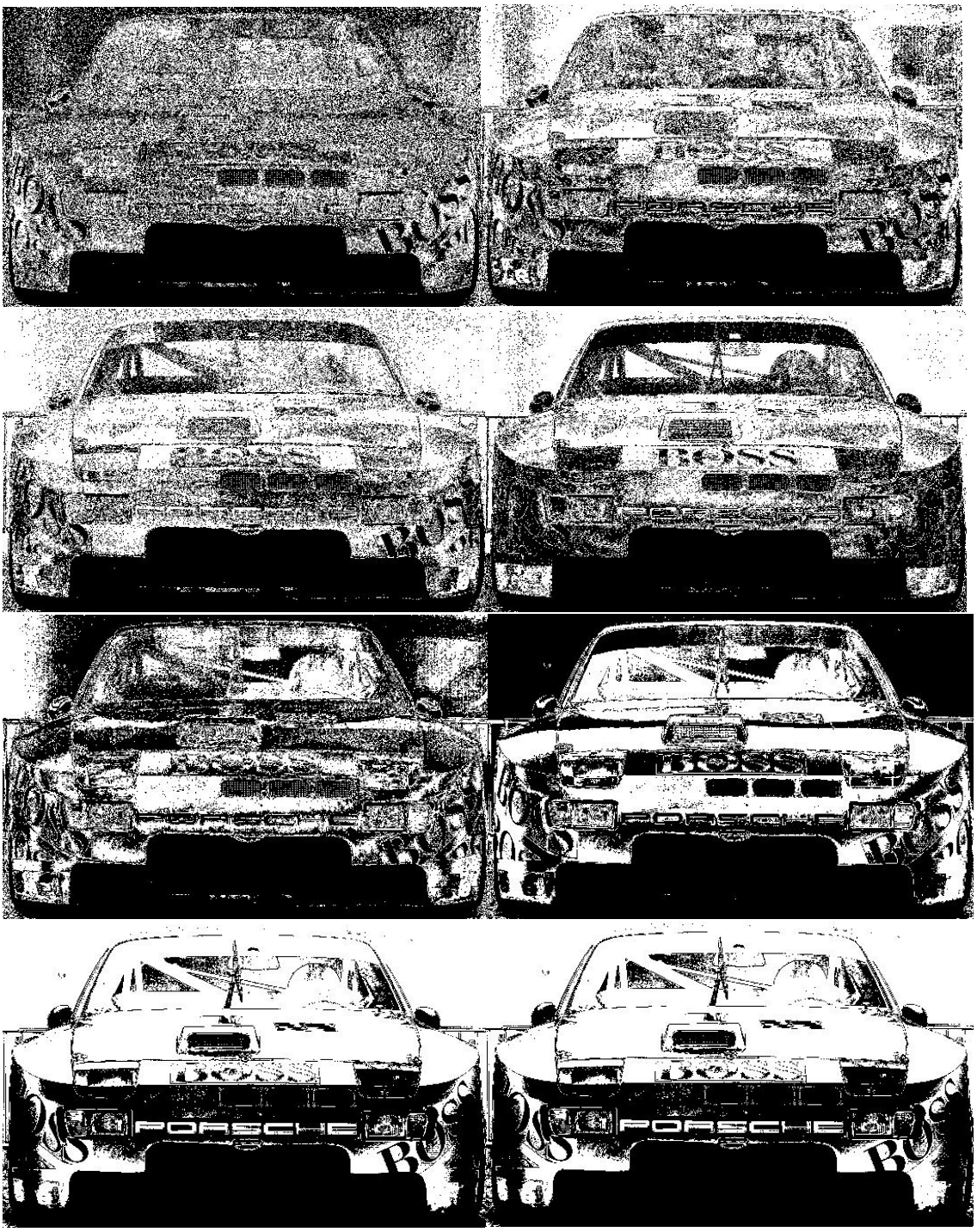


7.

```
porsche = imread("porsche.tif");
porsche_d = double(porsche);
p0 = mod(porsche,2);
imwrite(p0,"p0.jpeg");
p1 = mod(floor(porsche_d/2),2);
imwrite(p1,"p1.jpeg");
p2 = mod(floor(porsche_d/4),2);
imwrite(p2,"p2.jpeg");
p3 = mod(floor(porsche_d/8),2);
imwrite(p3,"p3.jpeg");
p4 = mod(floor(porsche_d/16),2);
imwrite(p4,"p4.jpeg");
p5 = mod(floor(porsche_d/32),2);
imwrite(p5,"p5.jpeg");
p6 = mod(floor(porsche_d/64),2);
imwrite(p6,"p6.jpeg");
p7 = mod(floor(porsche_d/128),2);
imwrite(p6,"p7.jpeg");
```

% The floor function rounds a number down to an integer. The purpose of using it in this program is to
% remove the remainder from the division because it is not needed for finding the targeted bit
% information.

% The following pictures are in order from least significant bit to most significant bit. The most significant
% bits provide the most important information in the image, particularly the structure of the image. Less
% significant bits provide more information about the detail in the image.


PORSCHE
PORSCHE