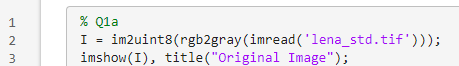
Homework 1 for **Kun**

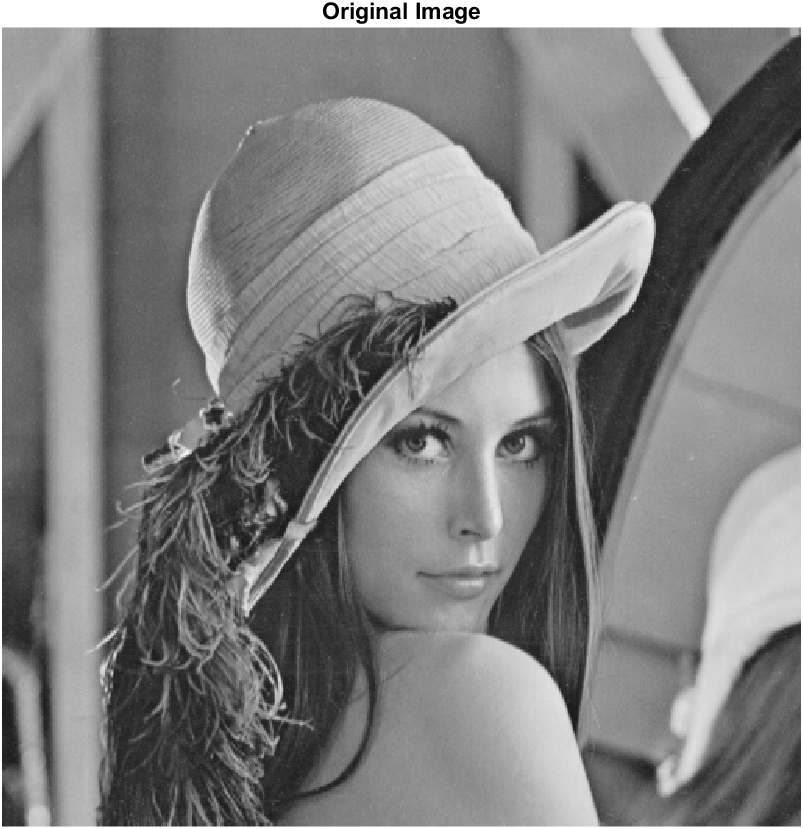
Introduce to image process

All codes are attached on the last page.

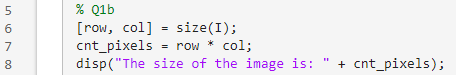
Q1a:



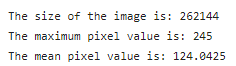
Res:



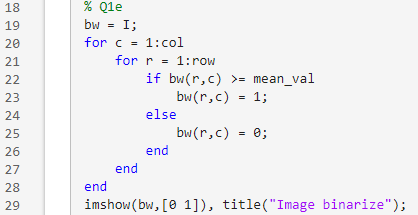
Q1b & Q1c & Q1d:



Res:



­Q1e:

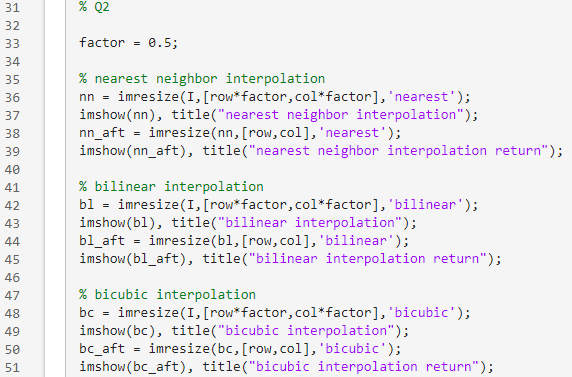


Res:



It is image binarize.

Q2:



Res:

Nearest neighbor interpolation:





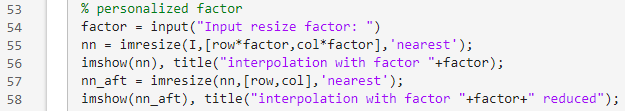
Bilinear interpolation:



Bicubic interpolation:

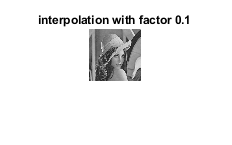


Customized factor:



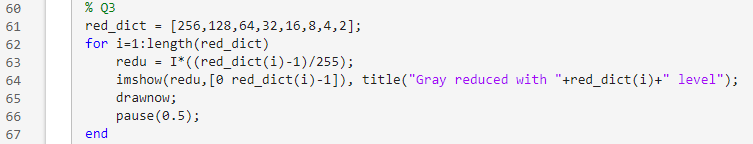
Res:



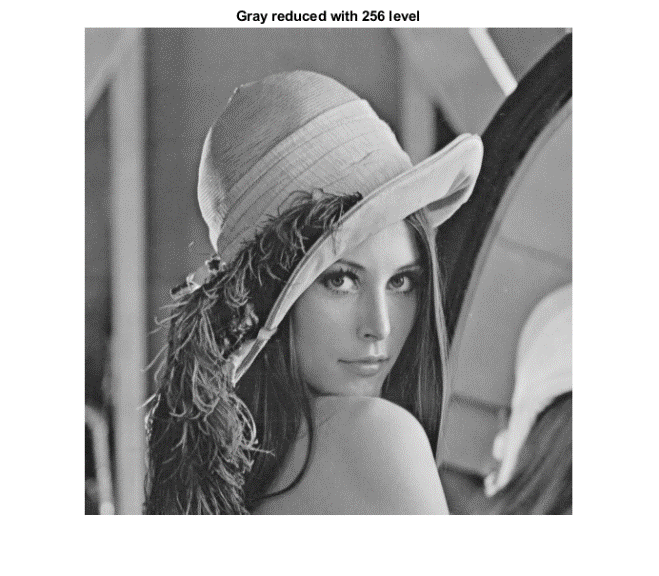


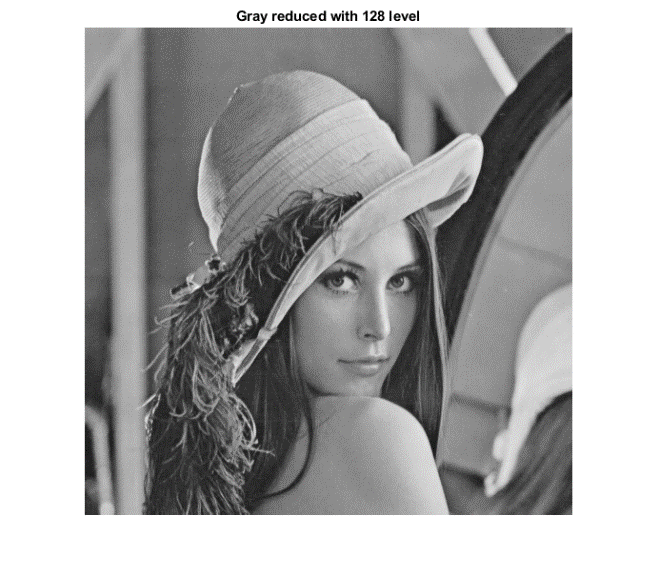


Q3:



Res:









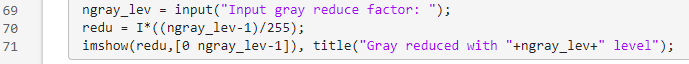




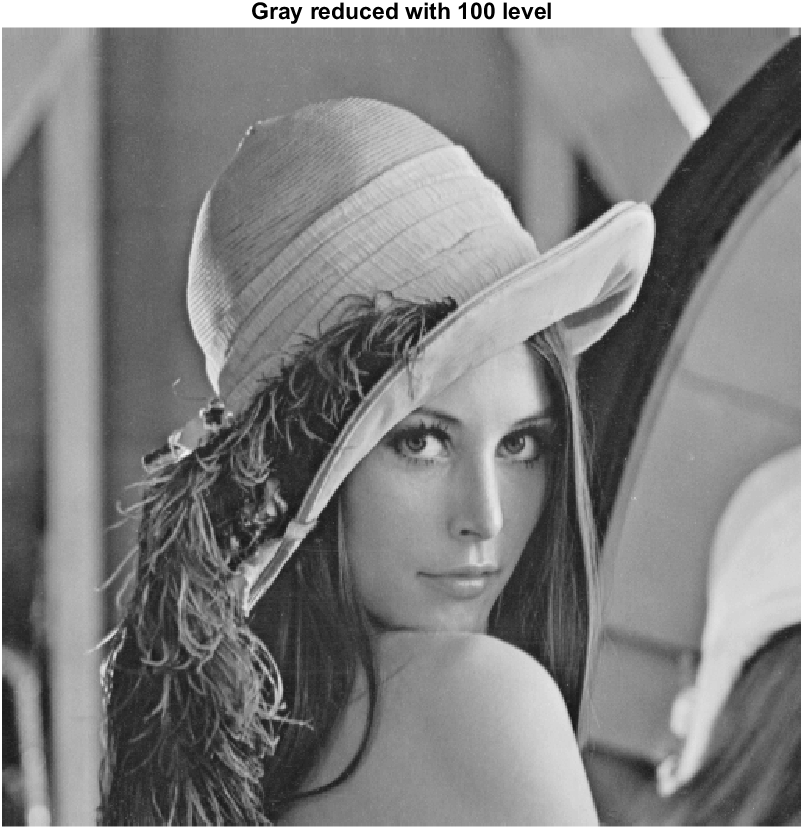




Customized Gray reduce factor:



Res:

% Q1a

I = im2uint8(rgb2gray(imread('lena\_std.tif')));

imshow(I), title("Original Image");

% Q1b

[row, col] = size(I);

cnt\_pixels = row \* col;

disp("The size of the image is: " + cnt\_pixels);

% Q1c

max\_val = max(I(:));

disp("The maximum pixel value is: " + max\_val);

% Q1d

mean\_val = mean(I(:));

disp("The mean pixel value is: " + mean\_val);

% Q1e

bw = I;

for c = 1:col

for r = 1:row

if bw(r,c) >= mean\_val

bw(r,c) = 1;

else

bw(r,c) = 0;

end

end

end

imshow(bw,[0 1]), title("Image binarize");

% Q2

factor = 0.5;

% nearest neighbor interpolation

nn = imresize(I,[row\*factor,col\*factor],'nearest');

imshow(nn), title("nearest neighbor interpolation");

nn\_aft = imresize(nn,[row,col],'nearest');

imshow(nn\_aft), title("nearest neighbor interpolation return");

% bilinear interpolation

bl = imresize(I,[row\*factor,col\*factor],'bilinear');

imshow(bl), title("bilinear interpolation");

bl\_aft = imresize(bl,[row,col],'bilinear');

imshow(bl\_aft), title("bilinear interpolation return");

% bicubic interpolation

bc = imresize(I,[row\*factor,col\*factor],'bicubic');

imshow(bc), title("bicubic interpolation");

bc\_aft = imresize(bc,[row,col],'bicubic');

imshow(bc\_aft), title("bicubic interpolation return");

% personalized factor

factor = input("Input resize factor: ");

nn = imresize(I,[row\*factor,col\*factor],'nearest');

imshow(nn), title("interpolation with factor "+factor);

nn\_aft = imresize(nn,[row,col],'nearest');

imshow(nn\_aft), title("interpolation with factor "+factor+" reduced");

% Q3

red\_dict = [256,128,64,32,16,8,4,2];

for i=1:length(red\_dict)

redu = I\*((red\_dict(i)-1)/255);

imshow(redu,[0 red\_dict(i)-1]), title("Gray reduced with "+red\_dict(i)+" level");

drawnow;

pause(0.5);

end

ngray\_lev = input("Input gray reduce factor: ");

redu = I\*((ngray\_lev-1)/255);

imshow(redu,[0 ngray\_lev-1]), title("Gray reduced with "+ngray\_lev+" level");