

【Experiment name】

Lab 1 Basic operations on images

【Purpose】

Master the basic operation method of digital image processing based on matlab

【Experimental content】

Use the given image to complete operations such as creating, inverting, scaling, and changing image resolution.

PROJECT 02-01

task

Image Creating

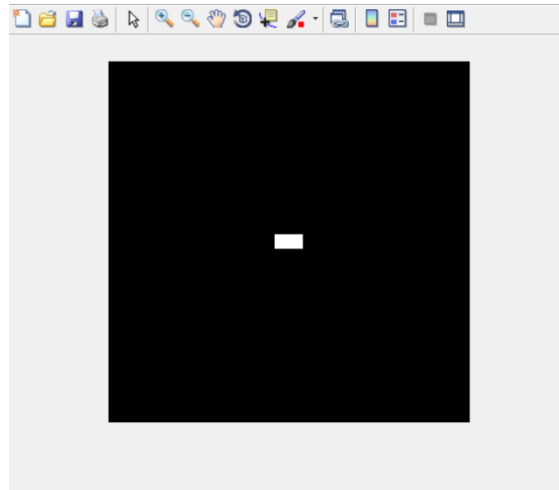
- In Matlab workspace, generate an image with the size of 512×512 pixels, 8-bit grayscale, black background, the center having a 40 pixels width and 20 pixels height white rectangle. As shown in the following figure:
- Save this image as a file "test.bmp"
- Read out the image from the file test.bmp to the variable I
- Display the image represented by the variable I in Matlab graphical interface
- Convert the obtained image format into ".tif", ".jpg" format, check the data size of the volume of the documents with different formats.
- Save or copy the image to the root directory of MATLAB program "work" folder for later experimental use.

code

```
%% PROJECT 02-01
A = zeros(512,512);
for row=246:266
for col=236:276
A(row,col)=255;
end
end
%% Image display
imshow(A);
% step b
imwrite(A,'test.bmp');
```

```
% step c
I=imread('test.bmp');
% step d
imshow(I);
% imwrite(A,'test.tif');
imwrite(A,'test.jpg');
```

result



PROJECT 02-02

task

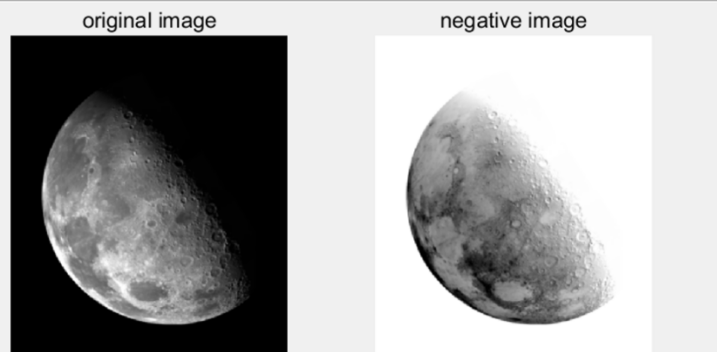
Image negative

Write a computer program capable of producing the negative images (logic operation NOT) on "Fig_blurry_moon.tif" as well as the images used in the previous sections.

code

```
%% PROJECT 02-02
I=imread('Fig_blurry_moon.tif');
%imshow(I)
for row=1:540
for col=1:466
A(row,col)=255-I(row,col);
end
end
%% Image display
subplot(1,2,1);imshow(I);title('original image');
subplot(1,2,2);imshow(A);title('negative image');
```

result



PROJECT 02-03

task

Zooming and Shrinking Images by Pixel Replication

- (a) Write a computer program capable of zooming and shrinking an image by pixel replication.
- Assume that the desired zoom/shrink factors are integers.
- (b) Use your program to shrink the image "Fig_rose.tif" by a factor of 16.
- (c) Use your program to zoom the image in (b) back to the resolution of the original. Explain the reasons for their differences.

code

```
%% PROJECT 02-03
close all;
clear all;
%% read file
I=imread('Fig_rose.tif');
[m,n]=size(I);
%% shrink function method
% lshrink = imresize(I,1/16);
% lshrink = imresize(I,1/16,'nearest');
% lshrink = imresize(I,1/16,'bilinear');
lshrink = imresize(I,1/16,'bicubic');
%% zoom function method
% lzoom = imresize(lshrink,16);
% lzoom = imresize(lshrink,16/1,'nearest');
% lzoom = imresize(lshrink,16/1,'bilinear');
lzoom = imresize(lshrink,16/1,'bicubic');
```