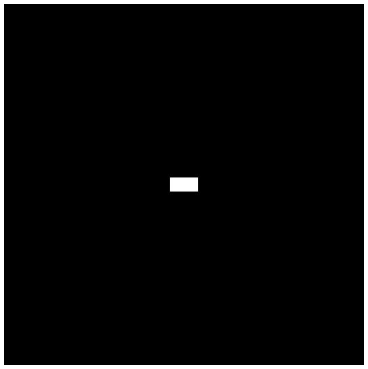
PROJECT 02-01

Image Creating

a) 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:



b) Save this image as a file "test.bmp"

c) Read out the image from the file test.bmp to the variable I

d) Display the image represented by the variable I in Matlab graphical interface

e) Convert the obtained image format into "*. tif", "*. jpg" format, check the data size of the volume of the documents with different formats.

f) Save or copy the image to the root directory of MATLAB program "work" folder for later experimental use.

PROJECT 02-02

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.

PROJECT 02-03

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.

PROJECT 02-04

Reducing the Number of Intensity Levels in an Image

(a) Write a computer program capable of reducing the number of intensity levels in an image from 256 to 2, in integer powers of 2. The desired number of intensity levels needs to be a variable input to your program.

(b) Perform the program on the following image "Fig_ctskull-256.tif" from the textbook

PROJECT 02-05

Zooming and Shrinking Images by Bilinear Interpolation

(a) Write a computer program capable of zooming and shrinking an image by bilinear interpolation. The input to your program is the desired resolution (in dpi) of the resulting image.

(b) Use your program to shrink the same image as shown in PROJECT 02-03 from 1250 dpi t0 100 dpi.

(c) Use your program to zoom the image in (b) back to 1250 dpi. Explain the reasons for their differences.