Image Processing with MATLAB

Lecture 2: Working with Images in MATLAB

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Lecture Contents:

1. How to use the imshow display function

2. How to use the Image Tool integrated display and exploration environment

3. Image Tool pixel information tools, including the Pixel Region tool and the Pixel Information tool

4. Image Tool's Adjust Contrast tool

5. Using imshow and imtool to view multiple images

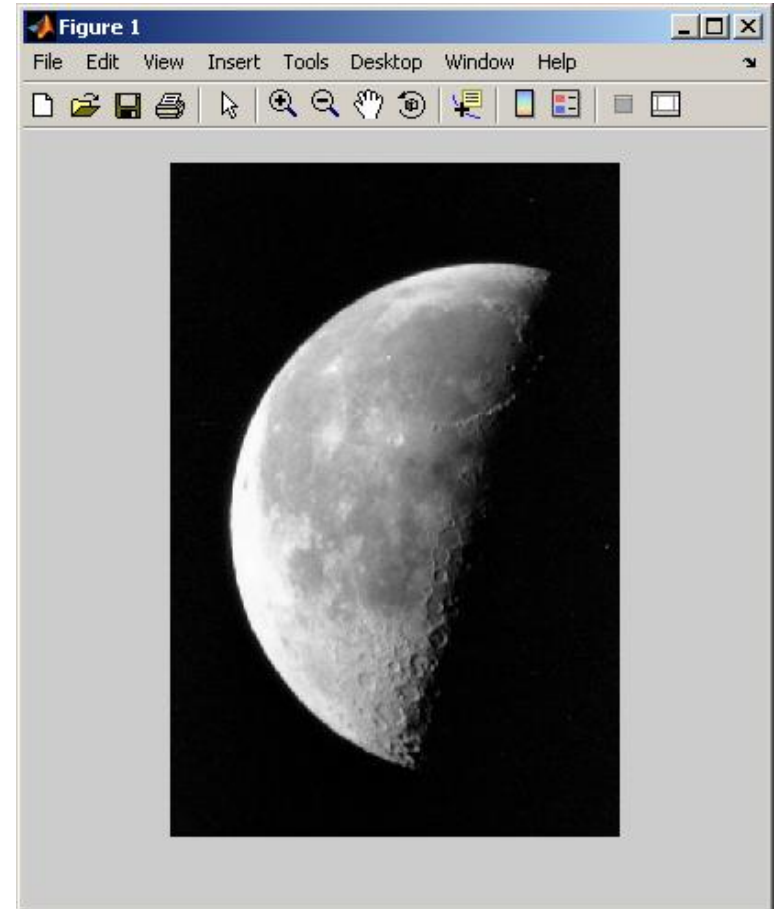6. Print images from imshow and the Image Tool

Using imshow to Display Images:

- moon = imread('moon.tif');

- imshow(moon);

- The imshow function displays the image in a MATLAB figure window, as shown in the following figure.
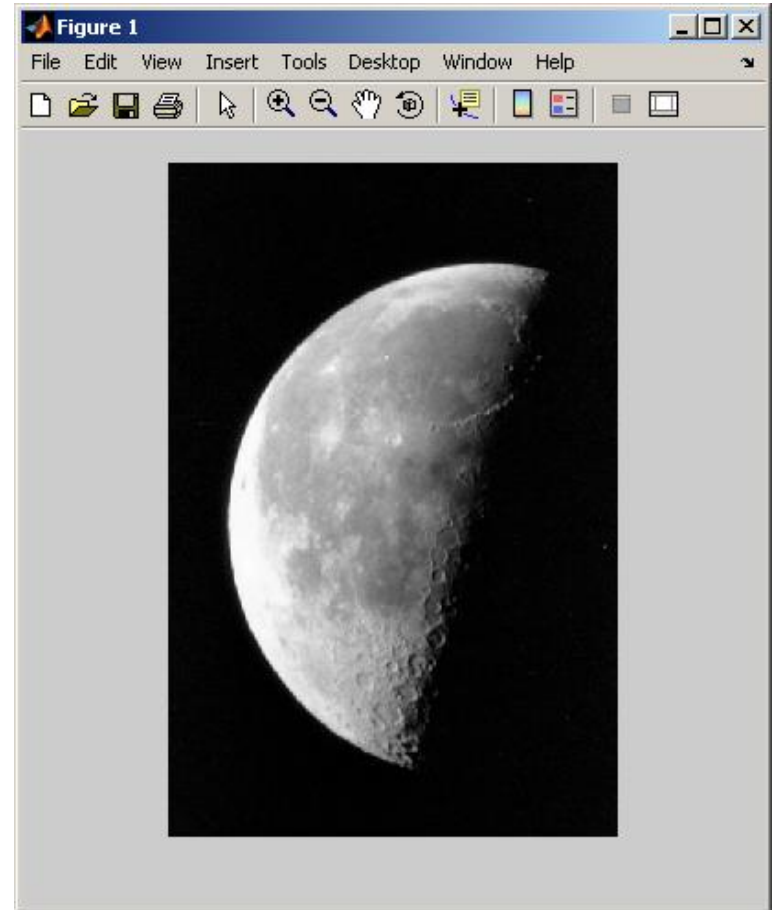
Specifying the Initial Image Magnification:

- For example, to view an image at 150% magnification

- pout = imread('pout.tif');

- imshow(pout, 'InitialMagnification', 150)

Controlling the Appearance of the Figure:

- For example, to display an image without a border, set the Imshow Border preference to 'tight'. By default, this preference is set to 'loose', which causes the border to be included. This code sets the preference to suppress the border and then displays an image.

- # iptsetpref('ImshowBor der','tight')

- # imshow('moon.tif')
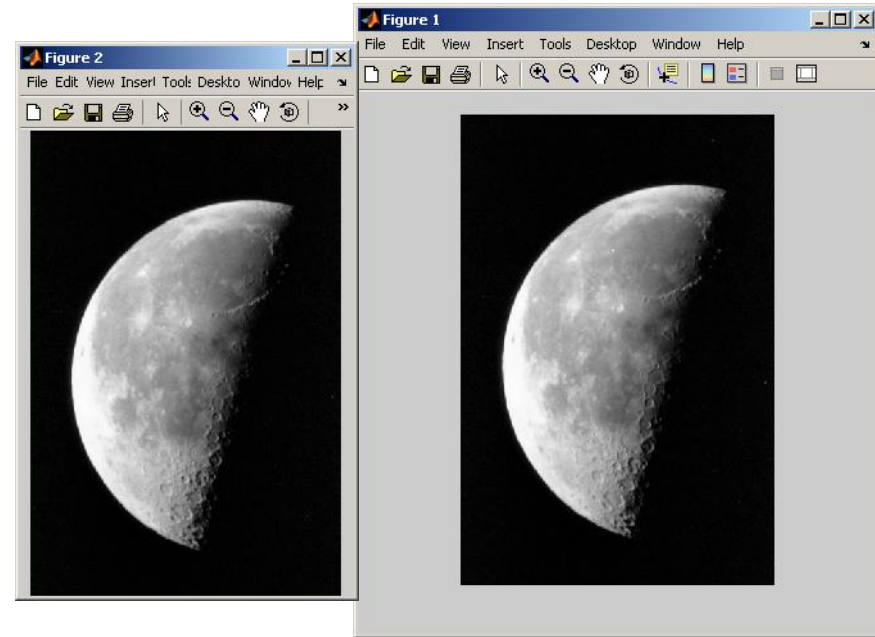
Using the Image Tool to Explore Images

- For example, this code reads an image into the MATLAB workspace and then displays it in the Image Tool.

- moon = imread('moon.tif');

- imtool(moon);

Getting Information about the Pixels in an Image

- Pixel Information tool.
- Display Range tool
- Pixel Region tool
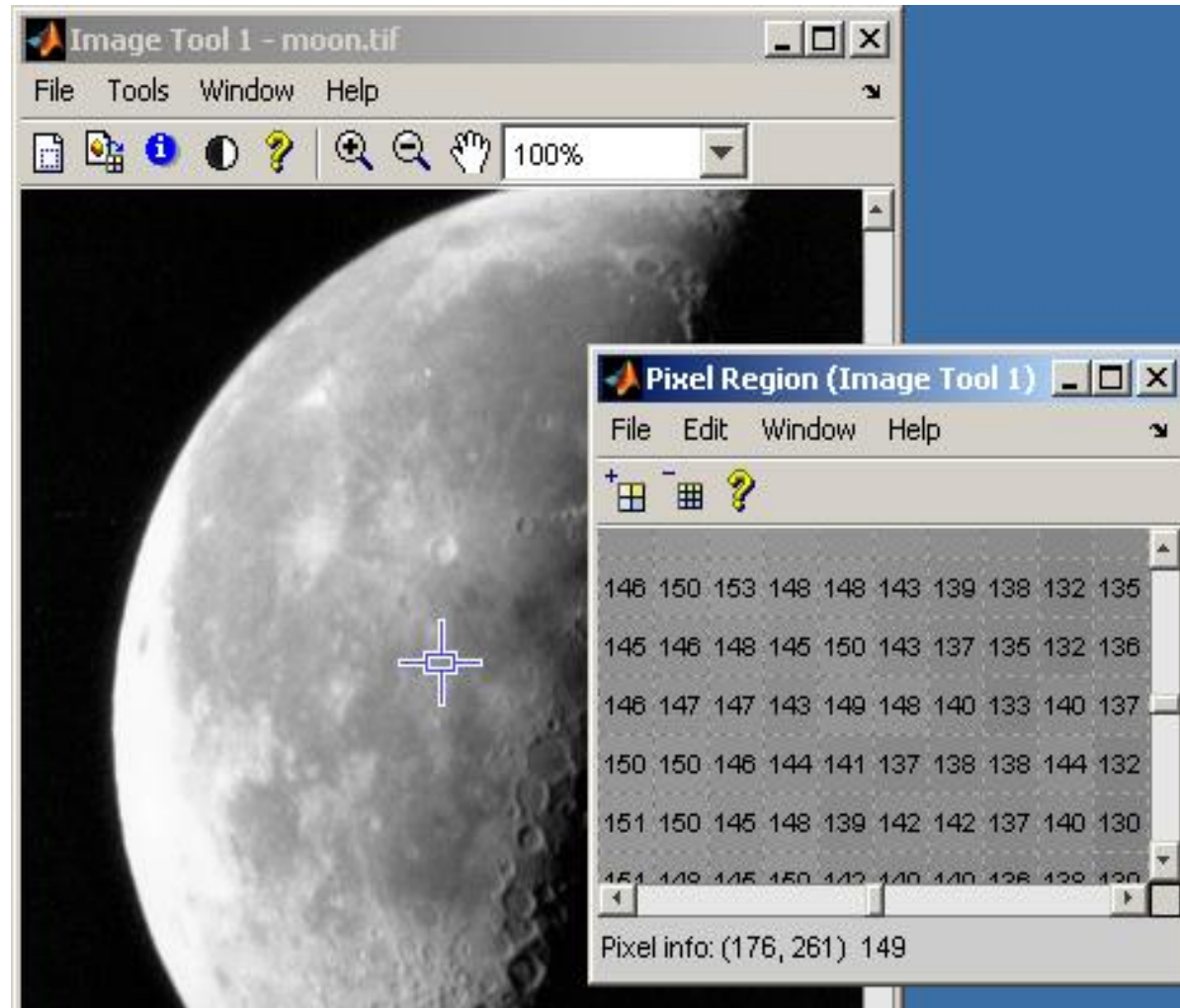
Getting Information about an Image

- Pixel Information tool.
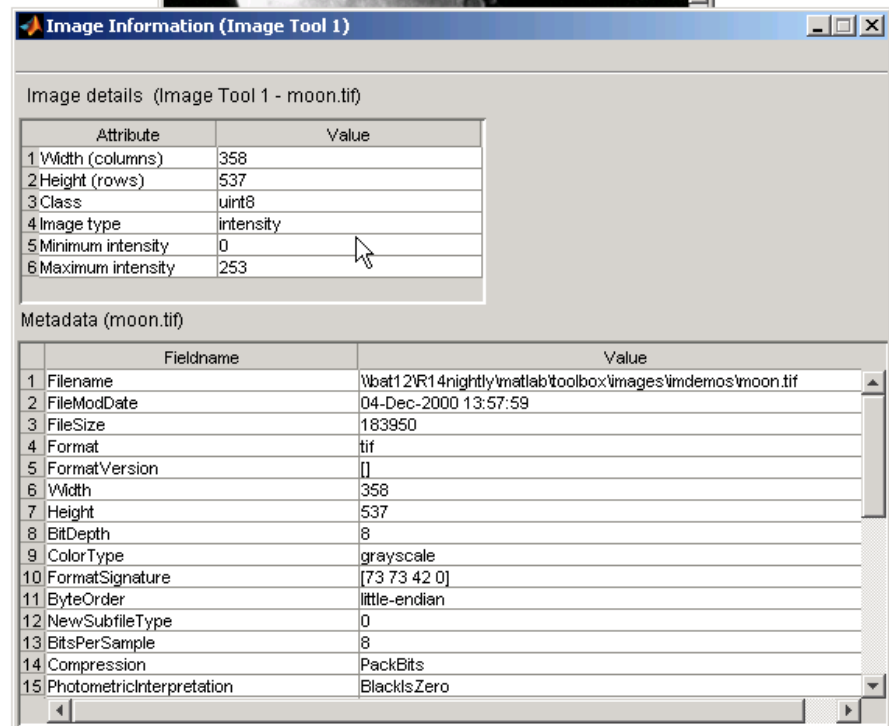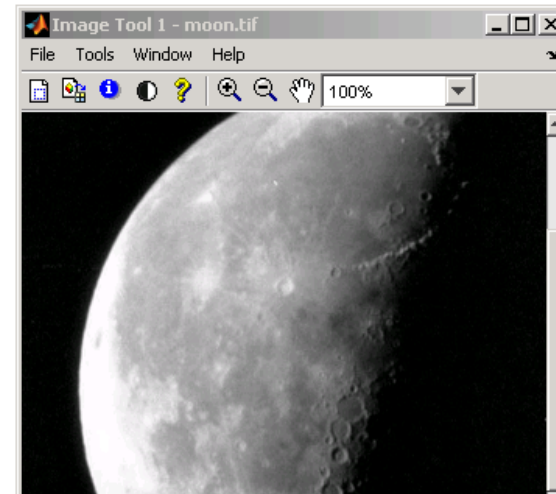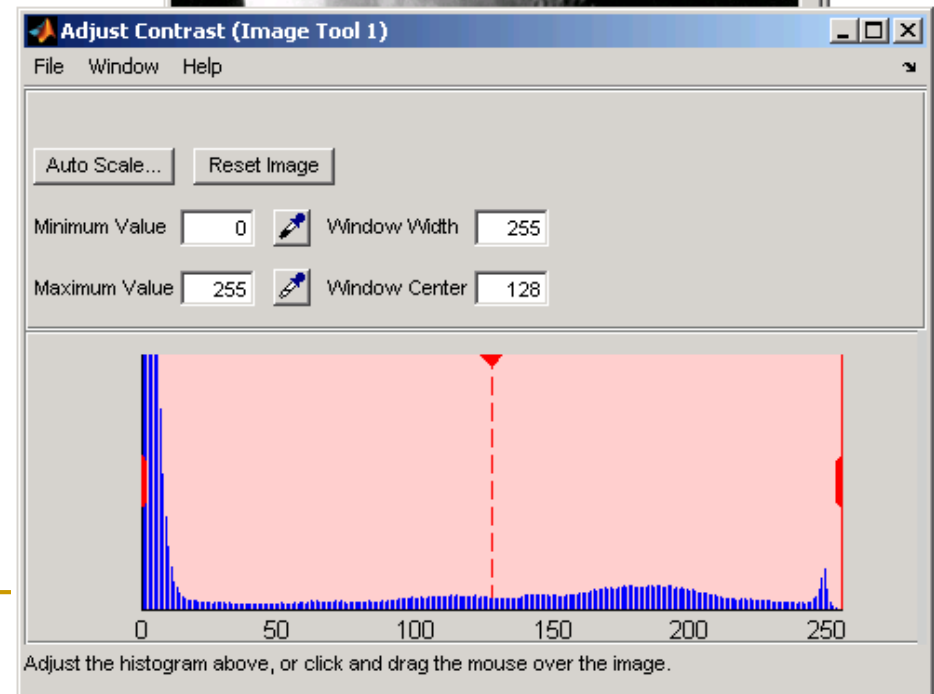- Display Range tool
- Pixel Region tool

Adjusting the Contrast and Brightness of an Image

- Adjust Contrast tool with Window Resized
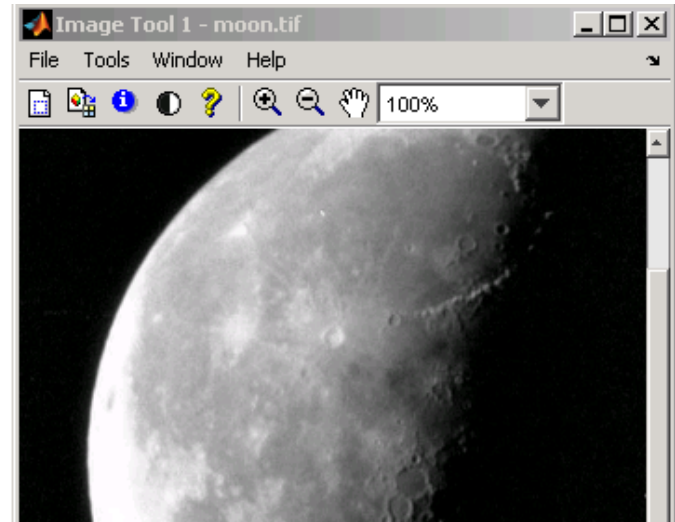
Understanding Contrast Adjustment
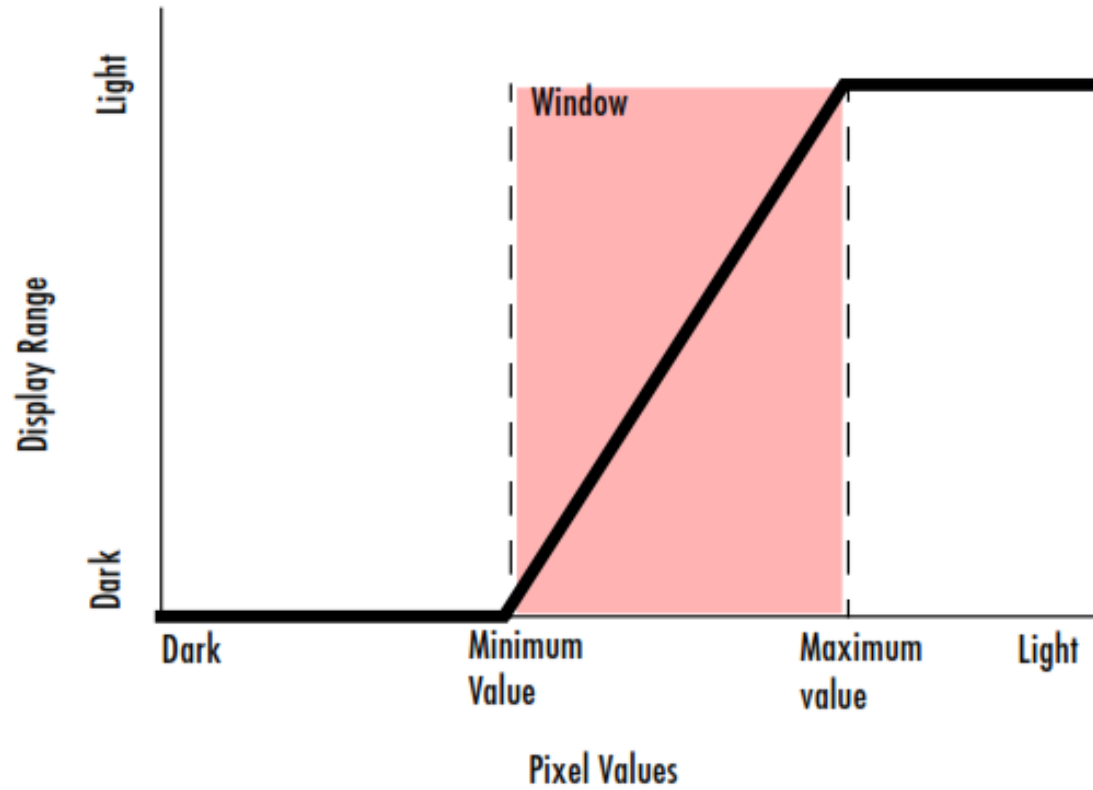
Adjusting Contrast and Brightness
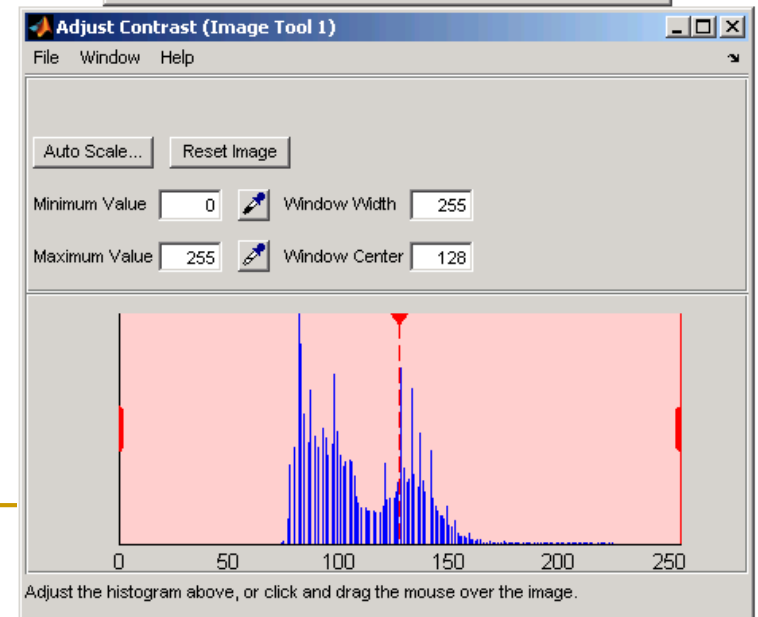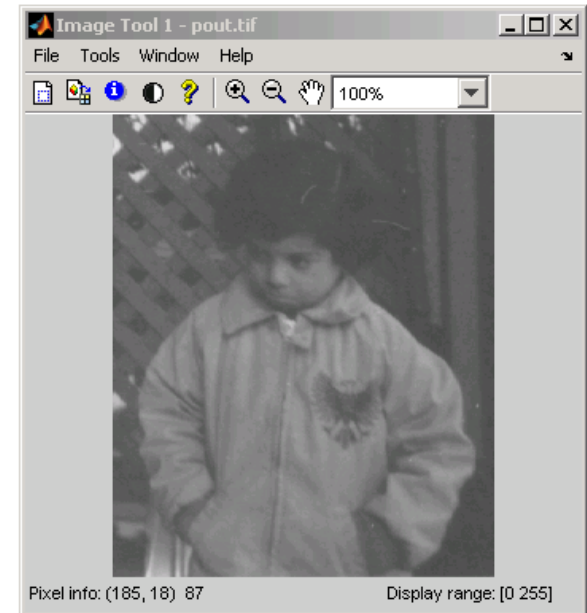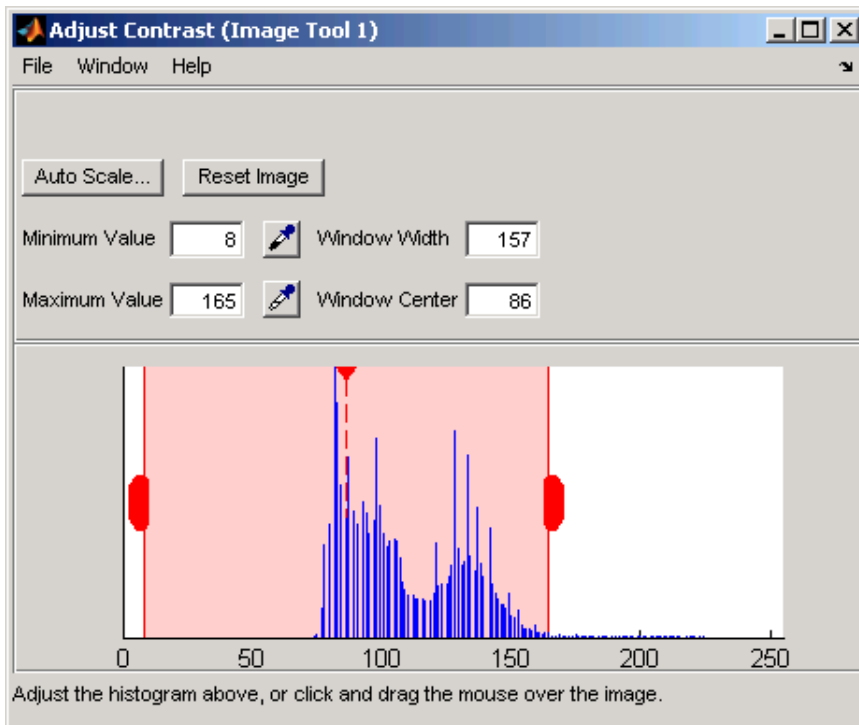
Viewing Multiple Images

- imtool(multiframe_array(:,:,:,1)
- imshow(I(:,:,:,1))
- figure, imshow(I(:,:,:,2))
- figure, imshow(I(:,:,:,3))
- imtool(multiframe_array(:,:,:,1)
- subplot(m,n,p)
- [X1,map1]=imread('forest.tif');
- [X2,map2]=imread('trees.tif');
- subplot(1,2,1), imshow(X1,map1)
- subplot(1,2,2), imshow(X2,map2)

Printing Images

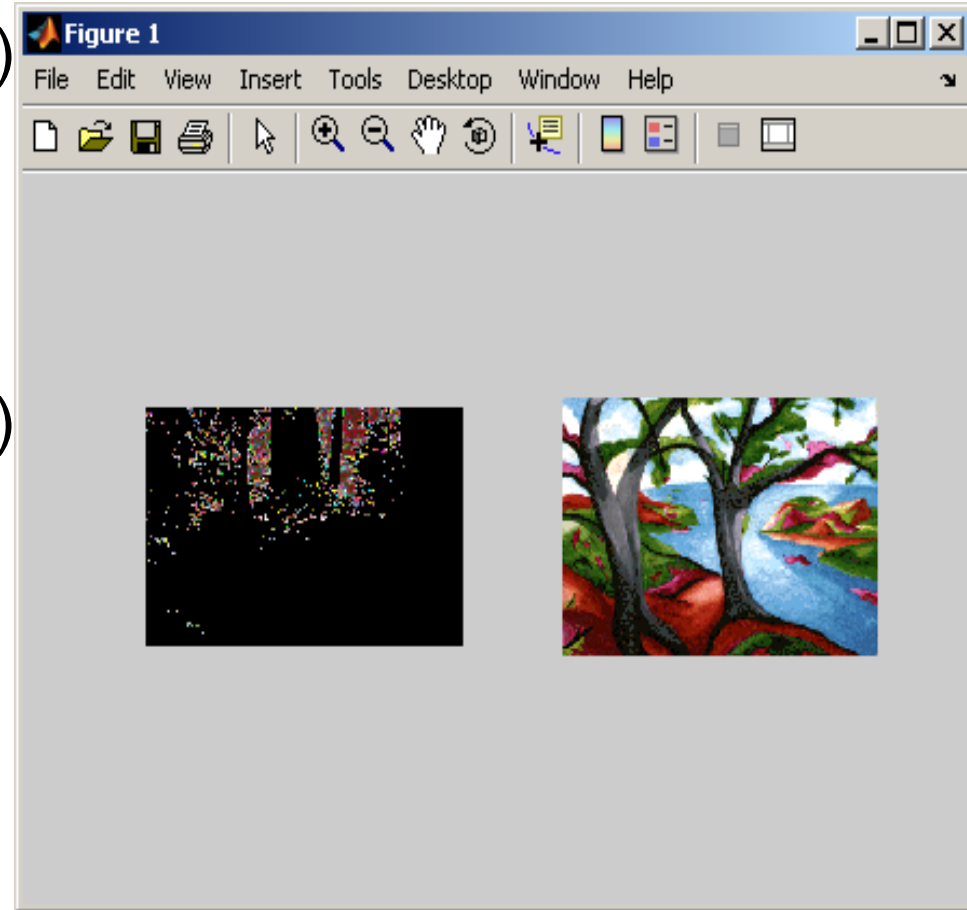- If you want to print an image, use imshow to display the image in a MATLAB figure window. If you are using the Image Tool, you must use the **Print to Figure** option on the Image Tool File menu. When you choose this option, the Image Tool opens a separate figure window and displays the image in it. You can access the standard MATLAB printing capabilities in this figure window. You can also use the **Print to Figure** option to print the image displayed in the Overview tool and the Pixel Region tool.

- Once the image is displayed in a figure window, you can use either the MATLAB print command or the **Print** option from the **File** menu of the figure window to print the image. When you print from the figure window, the output includes non image elements such as labels, titles, and other annotations.

Supplementary files:

- MATLAB Tutorial:

http://www.mathworks.com/products/matlab/matlab_tutorial.html

- MATLAB documentation:

http://www.mathworks.com/access/helpdesk/help/techdoc/matlab.shtml

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