MATLAB Image Processing Toolbox
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- **imread, imshow**
- **Image representation as a matrix**
  - Image types: grayscale, RGB
  - Numeric types: uint8, double, logical
- **Use of contrast stretching ("[ ]") in imshow**
  - Example of pout.tif
- **Use of imtool, impixelinfo**
- **Creating a simple synthetic image using “for” statements**
- **See list of functions in help browser**
- **Examples of some simple image processing functions**
  - thresholding
  - addition, subtraction
Matlab Example

- `imread('pout.tif')`
- `imshow(I,[]), impixelinfo`
  - Or use `imtool(I, [])`
- Find a bright point in the image
- `line([x0 x1], [y0 y1], 'Color', 'w')`
- Is the x axis horizontal or vertical?
- In a Matlab program do you access `I(x,y)` or `I(y,x)`?
Working with Images in Matlab

• Images are usually read in as type “uint8”
  – Range of values: 0..255
  – However, you can exceed range with some operations

• Solution: convert to double
  – Very large range, but takes 8 bytes per pixel
  – \( D = \text{double}(I); \) % straight conversion
  – \( D = \text{im2double}(I); \) % scales 0..255 to 0..1

• Many Matlab functions (such as \texttt{imshow}) treat a double image as having range 0..1 by default

• Remember to use “[ ]” with \texttt{imshow}
• \texttt{figure} – opens a new figure window