Image Files

- https://bidal.sfsu.edu/~kazokada/csc872/DATA/9.jpg
- https://bidal.sfsu.edu/~kazokada/csc872/DATA/Baboon.bmp

Please download these images & place them in your MATLAB folder!

K.O.

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MATLAB Exercise 3

Exercise 4

CSC872

Pattern Analysis and Machine Intelligence

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Fast Prototyping

- Computer Vision Applications
- Implementing three classic algorithms!
- Read PD1 available at the course web.
- First exercise:
  - Principal Component Analysis PCA
  - Eigenface Face Recognition
  - https://bidal.sfsu.edu/~kazokada/csc872/PD1.pdf

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Platforms

- MATLAB
  - MathWorks: http://www.mathworks.com/
  - http://en.wikipedia.org/wiki/MATLAB
- MATLAB @ SFSU
  - https://athelp.sfsu.edu/hc/en-us/articles/360011475074-Getting-MATLAB-for-students
- MATLAB clones
  - Octave: http://www.gnu.org/software/octave/
  - SciLab: http://www.scilab.org/
- Various tutorials available online
  - https://matlabacademy.mathworks.com/?s_tid=acb_tut

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Tutorial (Neal Lewis)

- https://bidal.sfsu.edu/~kazokada/csc872/DATA/tutorial.zip
- Go_laplacian
- data_viewing

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Plotting

- Plot
- Hist
- Mesh
- Surf

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Figure

- >> figure
- >> hold
- >> grid
- >> title
- >> xlabel, ylabel
- >> legend
- >> axis
- >> subplot
- >> print/savefig

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Image

- >> IM = imread(filename)
- >> imagesc(IM)
- >> imshow(IM)
- >> colormap('gray')
- >> axis ij, xy, axis equal
- >> imresize(IM, factor)
- >> imwrite(IM, filename, type)
- >> subplot
- Data types

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String

- >> disp
- >> sprintf

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File I/O

- >> dir
- >> fopen, fclose
- >> fprintf, fscanf, fwrite, fread
- >> doc fopen

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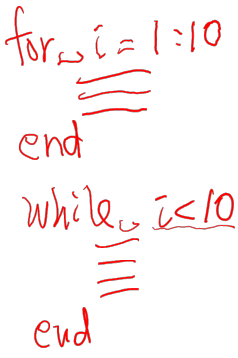
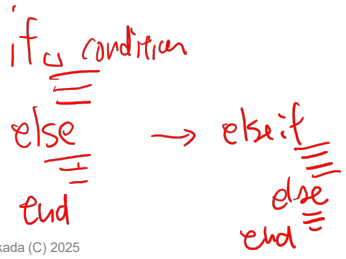
Loops/Conditions

- Relationship: > < >= <= == ~=
- For loop
- While loop
- break
- If … elseif … else … end





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Script & Function

.m

- M-flies
- Pathtool! ← to open a tool to set path
- Script
- Comments
- Function
- >> input

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Exercise (Your Homework)

- Make a random matrix
- Modify the matrix arithmetically
- Create a vector from the matrix
- Sort the vector & plot it in a figure
- Make a plot of tangent curve.
- Make a histogram and display it in a figure
- Save the figure into a file and view it in an imaging software

Exercise

- Write a reusable function to
  - Load a color image with specific format from the current directory
  - Create a grayscale version of the image and display both versions of the same image in a single figure (use subplot)
  - Binarize the image using a user specified threshold
  - Display the result
  - Compute some image statistics (mean, std, etc)
  - Make a plot of the statistics and display it in a figure
  - Save figures in a bitmap image and an eps file.

IM = imread(filename);
size(IM);

Color to gray $(R_i, G_i, B_i) \rightarrow \frac{R_i + G_i + B_i}{3} = P_i$

Gray to Binary For each pixel i threshold $1 < th < 256$

if $P_i \geq th$ then $q_i = 256$

else $q_i = 1$

then $\{q_i\}$ is a binarized version of $\{P_i\}$.

Useful MATLAB Codes

- For I/O
- dir('string')
- Imread('filename')
- Imresize(img,0.25) make it a quarter size
- size(img), returns the size of a matrix
- vector = Matrix(:) colon operator to vectorize a matrix
- dimg = double(img): casting the type to double!!!
  - This is important because image data is Int type but MATLAB built-in functions expects data to be double type.