Midterm 200 points:

For all problems below: Show the code, intermediate results, and final outcome.

1. (50) Examine the image named B6_DAPI_1.tif. This is a 16bit per pixel image of nuclei.
    a. You are asked to use LoG filter to detect and count the number of nuclei. How would you do this? Think about this as a problem for detecting blobs.
    b. How would you segment each blob? Show segmentation results followed by the output of the connected component.
    c. Repeat part (a) on clutter.png
2. (25) Examine the image named "nuclei.png."
    a. Read and display color image,
    b. Extract the Blue channel, save as a monochrome image, and segment and count the number of nuclei in this monochrome image.
    c. Extract the green channel and count the number of "spots" per nucleus in the corresponding blue image. Have your program display each spot with a cursor.
3. (25) You are asked to build a robot to navigate a hallway (Hallway). How would you do this?
4. (100) You are tasked to compute the bases of a face library and represent one of the faces in the library as a linear combination of computed basis.
    a. The face library is called pain_crops
    b. You can reduce the size by a factor of 2.
    c. Decide on the number of bases and report how much error is incurred by selecting the number of bases.
    d. Show all bases
    e. Show reconstruction of f1a2.jpg as a linear combination of select bases.