Assignment:

Your assignment is to write a program (*assumed to be a MATLAB “.m” file*). Please comment your code completely and be certain to include your name as part of the comments. Your program should perform the following actions:

1. Begin with the code written for previous projects. Retitle the main figure window “Final Project –*Your Name*”.
2. For the filter types used in previous programs, if any implementations do not already work with RGB color images, add that capability.
3. The program should provide the following *additional* filter options for both grayscale and color images:
   * Generate a mask based on color threshold
     1. Result is a binary mask (0 for background, 1 for foreground) which is the same width and height as the original image
     2. Select mask threshold based on color using either:
        1. specifying minimum and maximum levels for red, green, and blue
        2. specifying minimum and maximum levels for hue and saturation in an HSV model
        3. specifying minimum and maximum levels for intensity for an HSV model (use this for gray level for grayscale images)
   * Implement Morphological filters for binary masks
     1. Select a structuring element (at least square, rectangle, and circle/disk){see *strel*}
     2. Erosion
     3. Dilation
     4. Opening
     5. Closing
     6. Boundary (β)
     7. Morphological smoothing
     8. Morphological gradient
4. The program should provide the following object recognition capabilities for images that have a solid color background and solid color objects:
   * Select an object size using the same options as the morphological structuring element
   * Select an object color using the same options as the color mask
   * Select a background color from the majority color of the outer border pixels of the image
   * Generate a result image which contains only the specified objects in a field of the background color (i.e. replaced all non-specified objects with background color