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. Create a figure window with the title “Project #2 –*Your Name*”. The figure window should have the following properties:
   * Controls grouped visually for easy viewing and access
   * Either included in this same project window or instantiated as separate windows …
     + Space to simultaneously display two images, a “current” and a “preview”
     + Two sets of image axes
2. Four controls must appear as pushbuttons:
   * A pushbutton to select and open a new source image as the “current” image. Names such as “Select Image” or “Open Image” might be appropriate. The action associated with this button should open a dialog box allowing the image name (and image type if desired) to be selected.
   * A pushbutton to save the “current” image as a file. Names such as “Save Image” or “Save Result” might be appropriate. The action associated with this button should open a dialog box allowing the image name (and image type if desired) to be selected.
   * A button to apply whichever filter is currently selected to the “current” image to create the “preview” image. A name such as “Preview” would be appropriate.
   * A pushbutton to make the “preview” image into the new “current” image. A name such as “Apply Changes” would be appropriate.
3. The program is to provide at least the following spatial-domain filter options via whatever UI controls seem appropriate to you:
   * A spatial-domain smoothing/low-pass filter (i.e. neighborhood average) with sub-selection of neighborhood size. Available neighborhoods must include at least 3x3, 5x5, 7x7, and 9x9.
   * A spatial-domain edge-detect/high-pass filter.
   * A spatial-domain highboost filter with selection of the boost scaling coefficient.
   * Increase/decrease brightness with sub-selection of how much brightness shift.
   * Increase/decrease contrast with sub-selection of contrast scaling factor.
   * Global Histogram-Equalization (using MATLAB’s *histeq* function or equivalent)
   * Adaptive Histogram-Equalization (using MATLAB’s *adapthisteq* function or equivalent)
4. The program should provide the following frequency-domain filter options for both grayscale and color images (note that a change of color format from RGB to YCbCr and back may be necessary):
   * Frequency domain filters
     1. Specify low-pass, high-pass, high-boost, band-pass, or band-stop
     2. Specify cutoff frequency radius or radii
     3. Select ideal, Gaussian, or Butterworth
     4. Select any additional information needed such as Butterworth order or high-boost factor
   * Homomorphic filter