ECE 472 Robotics and Vision
Prof. K. Dana
Fall 2021
Homework 4 -- Feature Processing (SIFT)

1. Write a python notebook to explore SIFT (Scale Invariant Feature Transform) as following instructions, and answer questions.
   Please choose an image as a sample, and find the local extrema for the image, which is to find local minima and maxima looking at the neighbors in scale space. And plot locations on the image of these maxima.
   Next, construct and plot the orientation histogram for several of these key points.
   Also, please make comments on why this is a reasonable feature descriptor, and what type of points become key points in this approach.

   And please answer following questions:
   (a) please write a difference of Gaussian filter at multiple scales.
   (b) What is the difference between features in this approach and features in deep learning networks?
   (c) What are the advantages and disadvantages of hand-crafted features vs. learned features?