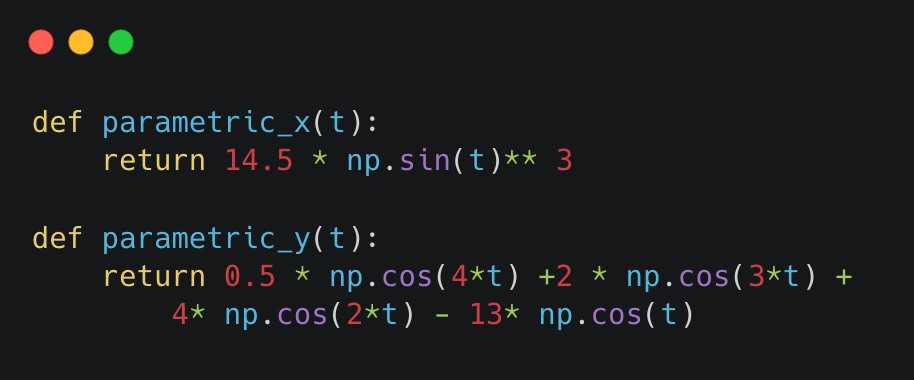
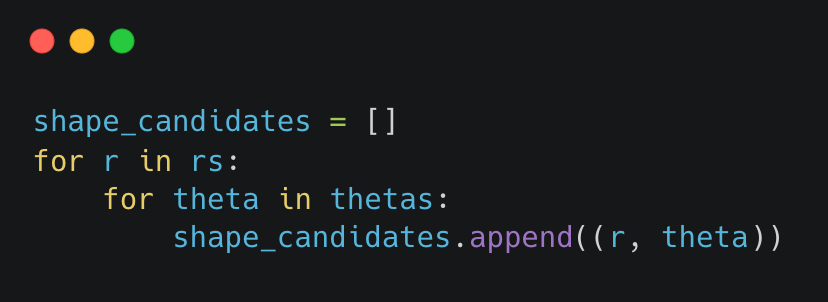
**Problem 3 - Hough transform**

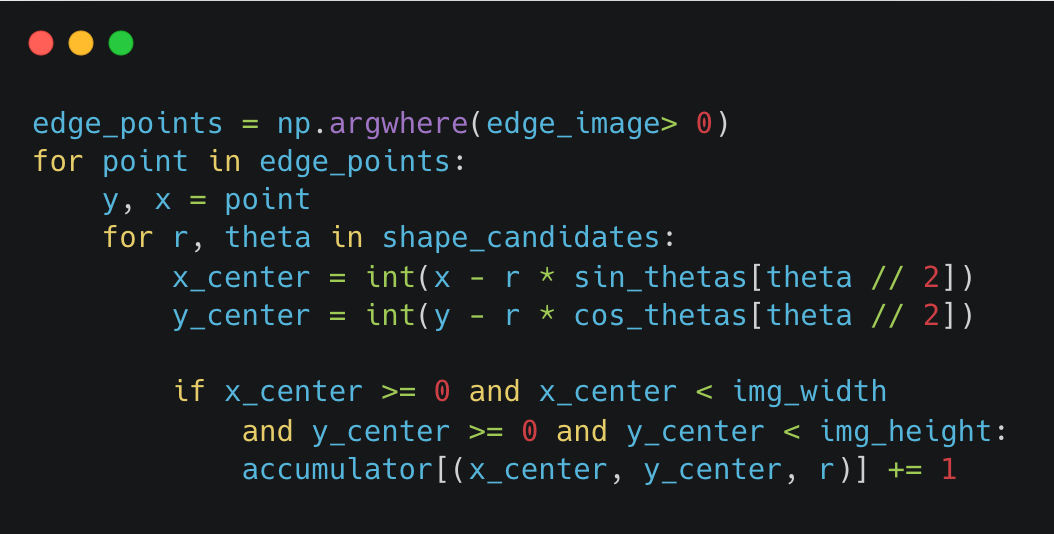
The two functions 'parametric\_x' and 'parametric\_y' were implemented based on the heart's parametric equation mentioned in the instructions document:



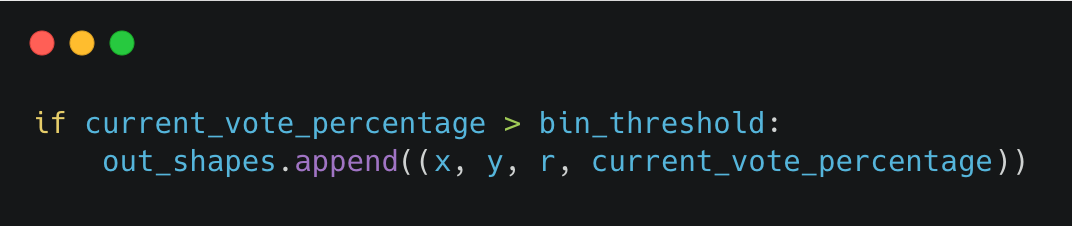
The following code was modified so it now generates all possible heart shape candidates using different values of r and θ:



The implementation of the following piece of code which iterate over all edge points and candidate hearts computing the center of each possible heart was completed. The code in addition ensures that the detected centers are within the image boundaries:



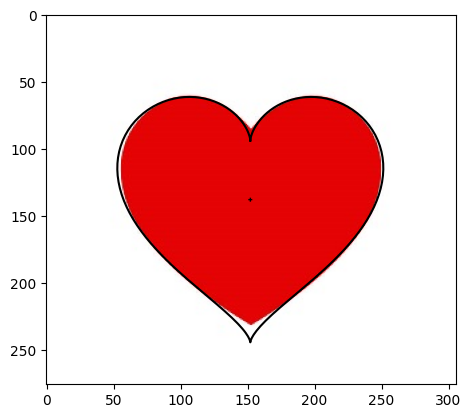
The following code filters weak detection was implemented:



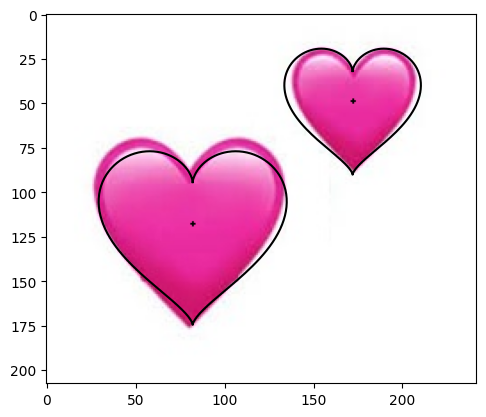
Below are the detection output for each image along with the parameter values which provided the best results:

Note: the bin threshold is given as a range of values that all produce the same result. If a single value had to be chosen, we would the midpoint of the range, which balances between avoiding false detections and succussing in detecting hearts when edges are weak.

* Simple:



* Med:



* Hard:

תמונה שמכילה טקסט, צילום מסך, לב, אדום

התיאור נוצר באופן אוטומטי