**Assignment 1**

**Yangqi Su 800957989**

The approach I took for this assignment was to scan across the bigger image 1 pixel at a time to search for the point of highest similarity to the target image. The similarity was calculated using cross correlation, and the point of highest correlation was as an indicator of highest similarity. To achieve efficiency, I used the **normxcorr2** function included with MATLAB digital image processing package. The norxcorr2 function performs Fast Fourier Transform to transform the images into the frequency domain, thus cross correlation operation becomes an multiplication operation, so instead of operating at O(N2), the time complexity becomes O(NlogN).

Another simpler approach I took was as follows:

1. For each target, find the position (x,y) of the pixel value of the Target image that appears the least frequent in the Big image.
2. When scanning across the big image, compare only (x,y), only when (x,y) match do I compare the entire portion of the Big image with the target.

The problem with this approach was that It was still an O(N2) operation, and it could only find exact matches.