Sierra Obi
CSC 412
Fall 2020
Program 3

Report: Pattern Matching

Implementation

For this assignment, I designed my program to have modularity. Each one of my source files serves a very specific purpose. In total, I created 6 files: **prog03.sh**, **main.c**, **image.h**, **image.c**, **pattern_matching.h**, and **pattern_matching.c**. The purpose of the main fuction is to take in arguments from the command line and to use those arguments to run certain tasks. The **image** files handle all of the functions that manipulate the image data. The functions include reading an image from a file into memory. The **pattern matching** files handles all of the operations that match the patterns in two images.

I used 2-d arrays for the implementation of my images. The most expensive task in the program was to match a pattern to an image. In order to traverse through two 2D arrays to find matches, the program should take about $O(n^4)$ time to complete this operation.

Discussion

Though I was able to use assertions as well as basic error handling, there are errors that are not accounted for. I was able to check if the files were images based off of their extensions, however this becomes more nuanced when the image file has multiple file extensions in the file name. Since my program does not check for this, I can see this being a problem with directories that include these types of files.

Limitations

Though the program works well with smaller images, very large images will take a while to process because of the algorithm used to find the matches. Also, as aforementioned, passing in directories that contain files with multiple file extensions will be a limitation as well.