Introduction:

This project consists of three main portions. Skin segmentation, gesture recognition, and tracking of hand movements. This all culminates in a program that will store fingertip locations and transfers them to an external monitor as an image.

Skin Segmentation:
By applying the proper threshold to a frame it is possible to extract only the necessary portions of that frame, like the hand.

Gesture Recognition:
First a bounding box is created around the hand. Then, specific properties are extracted from the three different hand gestures as shown in the images. The main idea in this algorithm is to count the number of pixels comprising the pivot finger/s in use over a specified line. Before the user can properly use different gestures, the system must first be calibrated to their hands, this takes place over the first 30 frames. There are no restrictions for camera height or hand size of a person.

Interface:

This is the interface for drawing, erasing, and pausing. When the user begins to draw a crayon image appears on the upper right corner and there is a red dot indicating the location of the fingertip as it draws. When the user decides to erase an eraser will appear and they can start erasing. If the user decides to move to a different portion of the image without drawing or erasing they can pause and still track the location of their fingertip, a pause symbol will also appear.

The System Layout:

Future Goals:
Adding additional gestures controls that will allow the user greater control over the system. Such as resetting the system or the ability to change colors spontaneously. Also improving the skin detection algorithm, which will allow us to point the camera directly at the user instead of a solid background.