Group Team 9 Mini Project Documentation

**Computer Vision**

* The camera initializes and turns on, setting the resolution, iso, shutter speed, and then turns off the auto exposure mode since all of the above parameters were set
* The camera takes 4 calibration pictures, recording the red and blue awb gains in each pictures, then averages those gains, and sets the camera to have those gains for the awb mode, then turns off the awb mode
* The python script enters an infinite loop where it will take a picture, find the marker (a neon green pencil in our case), and report the quadrant of the image that the pencil was in
  + It takes a new picture every iteration of the loop, and converts the picture to HSV
  + Bounds are set for masking to isolate just the neon green pencil to create a mask
  + The original image is anded with the mask to output an image that contains only black pixels except for where the pencil is
  + The image is then filtered to get rid of excess noise that was picked up
    - It does a blur, an opening, then a closing
  + The center of the marker is found by finding where the image has non-zero(non-black) pixels, and averages the array that is returned
  + A combined image is displayed on screen of the machine running the python script showing the original picture taken and the filtered picture so that users can see what the camera is seeing

**Model Development**

**Arduino Code and Simulink Block Development**

**Github Repository**