Leonardo DaGraca
CS7680
HW4
Task C

1) Explain how the light level sensor is being calculated to determine if the light level is high, medium, low, or non-existent?

The light level sensor is calculated by using a photocell resistor and capacitor to build a resistor-capacitor circuit. The capacitor begins by discharging its levels and then the circuit measures the time it takes for the capacitor to recharge. The recharge is based on the photocell resistor. If there is low light, the photocell has a higher resistance resulting in a longer recharge time and higher reading from the capacitor. With bright light, the photocell's resistance decreases which in turn results in shorter recharge time and a lower reading from the capacitor. Given this information, we can build a system where we take in these readings and set predefined thresholds for each state. The readings are then passed in (photocellParse function takes in readings) to the system and classified as either high, medium, low, or non-existent and the correct LED illuminates to show the system's current state.

2) Envision a situation in which a light sensor would make a good tool and describe how the sensor circuit and software could be modified to address the situation?

There are some parks and recreational fields around the city that have lights that turn on at a specific time each night. I believe rather than having a predefined time each night a light sensor would be a good tool to better handle this situation, especially during seasons where the sun goes down earlier. By installing a light sensor circuit, the system could measure the ambient light levels and automatically power their street lamps or flood lights when it detects low light conditions. The circuit could include an MCU where based on the levels of sunlight it is currently reading, it can determine whether it needs to switch the lights on or off. The software could also be enhanced to include thresholds for seasonal changes. This would allow it to automatically adjust the light thresholds based on the current season making it so lights active correctly throughout the year.