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NMD 430

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**System Design:**

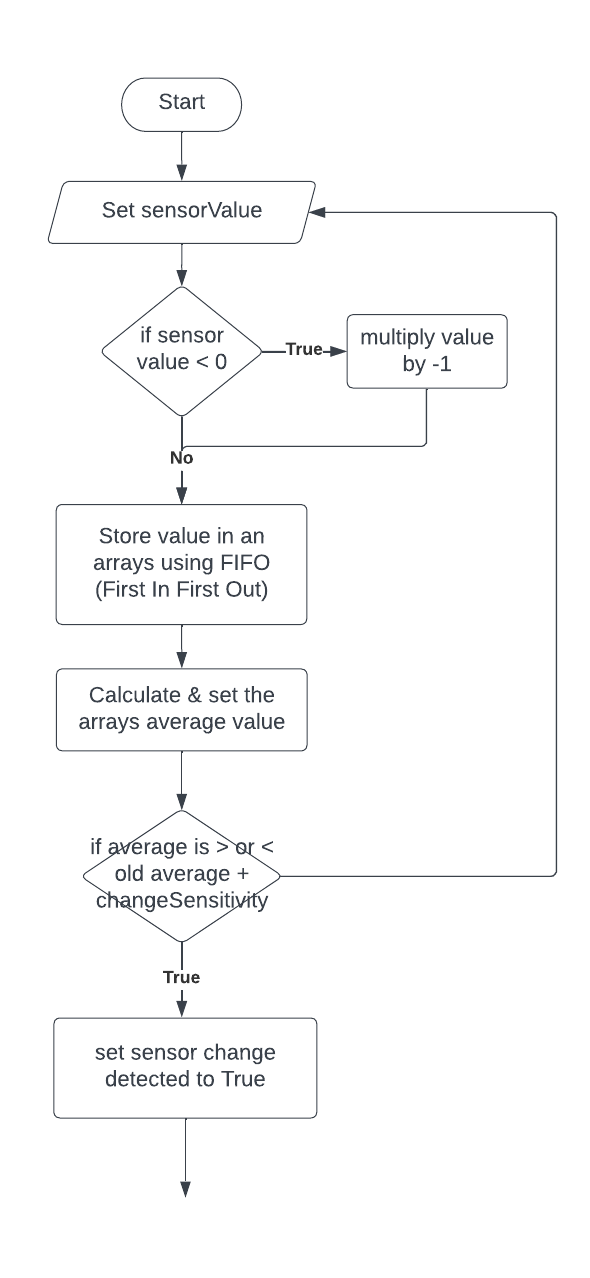
Product name:The Second Alarm

The purpose of this tool is not only to get an individual out of bed but to avoid the recurring problem of turning off one's alarm. This is a common issue around the world as it can be very easy to turn off your alarm when it’s in reach.

When first going through the design process we were set on creating a tool that can be used as an addition to an object or device. This device “The Second Alarm” is an addition or backup to your normal everyday alarm system whether it be an alarm clock or the alarm on your cellular device. To clarify though this tool is a separate object and is not attached to an alarm system. The Second Alarm is a sound detection system that will be used to detect when the alarm will be going off and once the alarm is detected it will begin to sense light differences in the room. If there are no changes in the room then the device will begin to go off on its own. The user will have to get up and manually turn the device off, therefore, getting them up out of bed.

When considering the physical design of the Second Alarm the goal is to provide it with enough protection so that if it were to fall it won't break, but something that won't cover the light sensor. So implementing a rubber back to the device will provide the necessary protection without interfering with the light sensing. On the back of the device, we will also implement a built-in command strip. This will ensure the device can be installed on multiple places and surfaces. Such as on the roof of someone's room or on the side of the wall.

**System description**:

The system when turned on executes a series of functions which continue as a loop until the system is turned off. By the user manually, or by the system itself when it detects that the user has affected the environment, i.e., a sudden change in the average light level of the room. The chart below depicts how the sensor system will:

1. Set the value for the respective sensor.
2. Format the value to ensure it is a non-negative number
3. Store it in the respective array
4. Iterate over the array & calculate average value
5. Compare the average value with the previous value
6. If value is outside the sensitivity range of the old value:

set boolean for sensor level change to True

1. Else: Loop again

The chart above depicts the sensor system, for both the light and sound sensors. It shows how they will record their respective value, format it, and then determine if a significant change has been detected.

The first detection recorded by the system will be for the sound sensor. If an alarm has been detected, the system will then watch for any significant changes in the average light level of the environment. If no changes are detected after a set amount of minutes later, the system will then loop an alarm noise. The alarm noise will continue until either a significant light change has been detected or the user has manually gotten up and disabled the system. The chart below depicts the general operation of the main system: