OPTI 380B
Lab 11 – Microcontrollers III : "Motion Control of a Laser Beam"

Goal: Point the laser to the 2 upper corners (left and right) of the room, using the alt/az (altitude/azimuth) stage.

Procedure:

(1) Calculate the angles (azimuth and altitude) necessary to rotate the stage, in order to point the laser to the 2 upper corners of the room. Use the room dimensions (below) to do this.

(2) Wire up a circuit to use 2 (1kohm) potentiometers to move the servo motors. By rotating each potentiometer, manually move the laser beam to each corner of the room. (Refer to the program "Knob.ino" at arduino.cc as a starting point. In particular, learn how to use the 'map' command!) For each target, store the 2 angles on the SD memory card.

---

(3) Write a program to move the laser beam automatically to each of the 2 corners of the room:
- start by pointing the laser beam "due North" (to 0° altitude, 90° azimuth) and pause:
    - blink the laser 5 times ('on' for 500 ms, 'off' for 500 ms)
    - store data on the SD card (1, alt angle, az angle, linefeed)
    - print to the serial monitor:
        "Pointing REFERENCE", alt = __ , az = __ (linefeed)

- move the laser to the upper LEFT corner of the room and pause:
    - repeat the blink sequence
    - store data on the SD card (2, alt angle, az angle, linefeed)
    - print to the serial monitor:
        "Target HIT! at location: alt = __ , az = __" (linefeed)

- move the laser to the upper RIGHT corner of the room and pause:
    - repeat the blink sequence
    - store data on the SD card (3, alt angle, az angle, linefeed)
    - print to the serial monitor:
        "Target HIT! at location: alt = __ , az = __" (linefeed)

- move the laser to the upper CENTER position, and pause:
    - repeat the blink sequence
    - store data on the SD card (4, alt angle, az angle, linefeed)
    - print to the serial monitor:
        "Target HIT! at location: alt = __ , az = __" (linefeed)

- print "Mission COMPLETED" to the serial monitor

Room Dimensions:

width of room = 274 in.
laser to wall = 195 in.
height of laser = 104 in.