CSE461 Assignment 2

1. Suppose in an obstacle avoiding robot, there are 3 ultrasonic sensors at the front, left and right side and additionally, there is a lidar sensor at the top.
    a. If an obstacle is situated X cm from the front sensor, then calculate the propagation delay in milliseconds. Here X is the 7^{th} and 8^{th} digit of your BRACU id. *For example, if your ID is 12345678 then the distance would be 78cm.* ***[2 Marks]***
    b. How the LIDAR sensor can help in obstacle avoidance and mapping? Explain.**[3 Marks]**
2. Suppose you are developing a small quadcopter that will be used for remote exploring an uncharted area of the Sundarbans. It will also be used for taking photos of the animals living in that area (*some of the animals can camouflage well to avoid detection and some are even nocturnal*). For taking photos of the animals living in that area what kind of imaging sensors and cameras (mention appropriate imaging sensor type, focusing technique etc.) should be used? Explain your reasons. **[3 Marks]**
3. Draw the ray diagram of a concave lens if the object is situated at focal length.**[2 Marks]**