**Wiimote Problem Solving**

**LAB 1**

**SECTION A**

**SUBMITTED BY:**

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**Lab Problem**

The purpose of this lab is to get used to the Wiimotes, as well as start problem solving using them. We will figure out what each sensor in the Wiimote does, and then use them to solve problems. We will use the sensors that are built into the Wiimote to figure out distances.

**Analysis**

There are a few problems we are trying to solve:

1. Orient the Wiimote in different ways and collect data from the accelerometers and try and figure out what each column means.
2. Use the infrared sensors in the Wiimote to collect data from the two lights at the front of the room. Try and figure out what each column of data means.
3. Use the Wiimote to sense the two lights that are at the front of the room, and use this data to find the distance to a second point in the room.
   1. This problem requires the formula

d1x1 = d2x2

**Design**

For these experiments, we will need a couple different setups. For the first problem, we will just need the desk and the Wiimote. We will orient the Wiimote at the specified angles, and then collect data. Through the comparison of the data for each orientation, we should be able to accurately tell what column reacts to different motions.

For the second problem, we will need to set up the Wiimote on a table a given distance away from the two lights. We will then need to collect data. We will need to move the Wiimote around during our data collection so that we can figure out what each column in our data represents.

The final task we will need to complete involves collecting data from a Wiimote at a given distance from the lights until we have constant data coming in. Then we will move the Wiimote to an unknown distance from the lights, and then repeat the previous process. Then we will be able to use the given formula to figure out the distance to the unknown point.

**Testing**

We ran a multitude of tests to make sure that our Wiimote was working. After we knew it was working, we needed to run tests to figure out what all of the data meant. This part was vital because without it, we wouldn’t know what we were doing. We knew how to do it, but not the meaning of it.

When we needed to work on the second and third part (anything using the infrared lights), we used this diagram to help. The two black dots are the infrared lights, and the middle box is our calibration point, and the further box is our measurement point (we needed to find this distance.

X1

D1 = 4.115 meters

D2 Cal. Pt.

X2

Meas. Pt.

The relationship between our two x values and our two d values can be solved using the given formula d1x1 = d2x2.

**Comments**

In this lab, I learned a lot about the Wiimotes, as well as solving problems using the resources given. This also taught me that while the solution may not be easy to see, it is usually possible. We were having troubles early on trying to get the Wiimote to sense the lights. This is probably because the lights were dim, and they weren’t actually infrared lights. Although by just moving the Wiimote around a little, we were able to find the light.

**Implementation**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Xa | Ya | Xb | Yb |
| Calibration | 728 | 640 | 336 | 632 |
| Measurement | 712 | 456 | 573 | 447 |

X1 = Xa - Xb (We use Calibration data for X1)

X1 = 728 – 336

X1 = 392

X2 = Xa - Xb (We use Measurement data for X2)

X2 = 712 - 573

X2 = 139

d1x1 = d2x2

(4.115)(392) = d2(139)

d2 = 11.605 meters