Introductory Laser Sensors

Introduction

Today will serve as an introduction to the laser sensors that the robot uses.

Step 1: Reading the laser sensor

Activity Checklist

- [ ] You may have already noticed some of the blocks talking about the laser sensor in the more blocks section.
- [ ] The first block we'll look at the Fron laser distance block.

  Front Laser Distance

- [ ] This is a variable, like the ones we were making last time, however we can't change this variable, it will be automatically updated by Scratch.
- [ ] It uses the xbox Kinent sensor, which has many different laser readings, it uses the one right in the middle, pointing straight forwards.
- [ ] We can use this to measure the distance to an object in front of us! It tells us this in meters.
- [ ] There are two things worth noting. Below about 1.5 metres it will function incorrectly, and there's a maximum limit, for which the sensor value will return 99 metres.
- [ ] Firstly we'll just see what the information is. Drag the Front laser Distance block on to the Scratch workspace.

  Front Laser Distance

Test the laser sensor

Activity Checklist

- [ ] If you double click any block in scratch it will run that block. So, we can double click this block and it will tell us the current value.
- [ ] We can also click the checkbox next to the block for it to show on the Scratch screen at all times.
- [ ] Move the robot around a bit, closer and further away from walls and see how this reacts.

Step 2: Using the laser sensor data

Activity Checklist

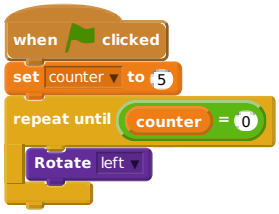
- [ ] Let's start using this in code! I'll start by introducing you to a new block.

- [ ] Remember the "If then" block from the previous exercise? This is similar to that. We provide with something that answers Yes or No. and it will repeat anything inside of the block until it receives Yes.

- [ ] Before we use the sensor let's get familiar with it! We're going to use variables again to practice. Start by making a variable named counter.

- [ ] Set the counter to 5 (Or any number if you want to use your own numbers for understanding).

- [ ] So now we can use this number. Make a reapeat until block, and check for the counter equalling 0. Make it rotate left inside the loop.



Test the loop

Activity Checklist

- [ ] The best way to understand code is to make it, and then observe the results.

- [ ] If you click the flag and run your project does it do what you expected?

- [ ] You can show the counter on the Scratch screen and watch it as it goes around.

- [ ] You probably didn't expect it to go quite so fast!

Step 3: Let's slow it down

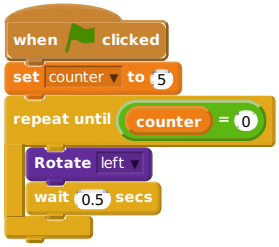
Activity Checklist

- [ ] The way that the rotate block works is by sending a single message to the robot to move.

- [ ] Because of this, it is almost instantly complete and ready for the next step, so a loop will complete very quickly!

- [ ] We don't need to send movements this quickly, as they take longer to actually happen than the code thinks.
- [ ] Scratch already has a block to help us with this! It's called a delay normally and Scratch simply calls it wait.

- [ ] Sometimes 1 second is too long, we can use decimals. If you want it to wait half of a second you can type 0.5 instead.



Test the new loop

Activity Checklist

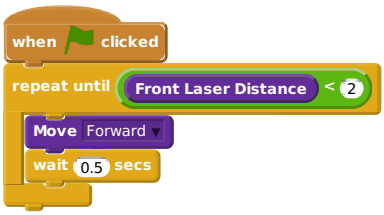
- [ ] Let's try the same test as above again!
- [ ] Doesn't that work much nicer.
- [ ] Play around with some of these values and test substituting values.

Step 4: Back to the lasers

Activity Checklist

- [ ] We had a short intermission to understand these new loops, now we should be ready to use them with the laser sensor.
- [ ] We'll start off by making it just move forwards and stop before it hits an object.
- [ ] We can use the Front Laser Distance block like a variable, and put it inside an operator block like before.
- [ ] The first step is to make something that will reply Yes or No, regarding how close a wall is.
- [ ] Make an operator block that will say Yes if a wall is less than 2m away, using the Front Laser Distance block.

- [ ] That's what we need, then we can incorporate this with a structure similar to above, reapting moving forward until the above is the case.
- [ ] Also make note that the Move Forward block is similar to the rotate in that it will instantly say it's done, so we should definitely use a delay again!



Test the sensor!

Activity Checklist

- [ ] Make sure nobody is in the way, and that you're not already too close to a wall, and hit the green flag!
- [ ] The robot should stop once it approaches the wall.
- [ ] Don't be afraid to change some of these values, get comfortable with this stuff.

Save your project