

Mentor Sheet
3rd meeting

Agenda for October 25, 2007

- Finish bumper car activity
- More on light sensors














Equipment required:

- Completed taskbot
- Computer with ROBOTLAB 2.9 and Robotics Engineering vol. 1
- Light and touch sensors
- Worksheets for your students
- Poster with black line for line following

Concepts introduced:

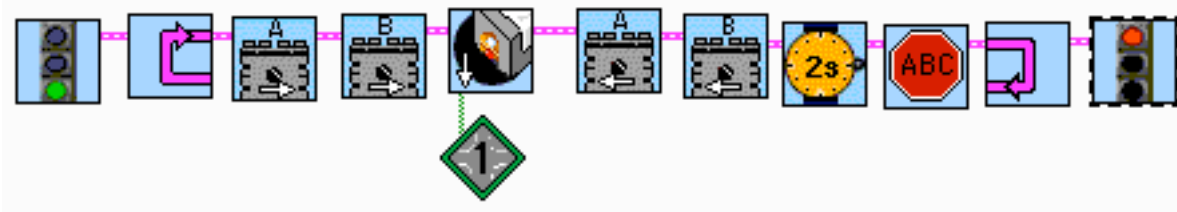
- Uses of light sensors
- More on forks and loops
- Design planning

New/Important icons:

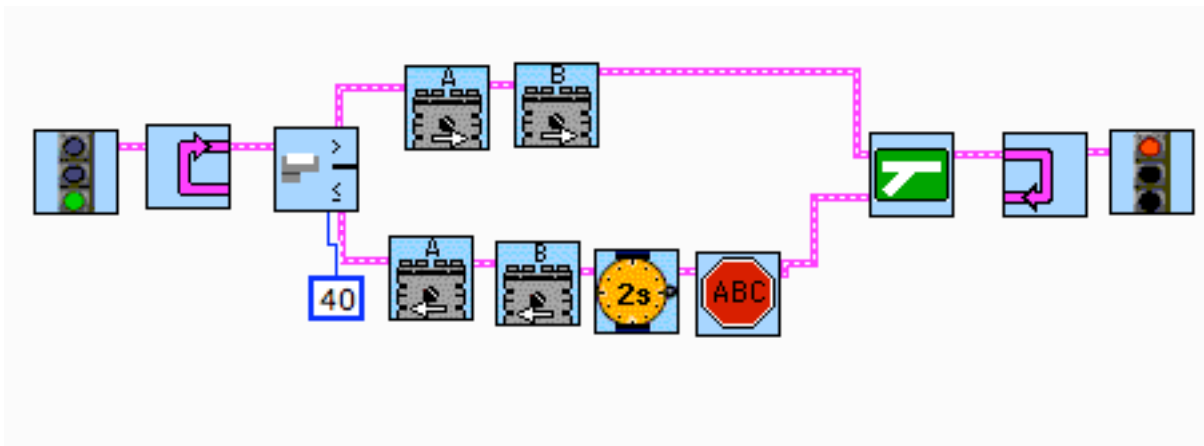
<p>NXT Wait for Darker</p> 	<p>NXT Wait for Brighter</p> 	<p>NXT Wait for Light</p> 	<p>NXT Wait for Dark</p> 	<p>NXT Light Sensor Fork</p> 
<p>Fork Merge</p> 	<p>Start of Loop</p> 	<p>End of Loop</p> 	<p>Jump</p> 	<p>Land</p> 
<p>"Structures" menu</p> 	<p>"Forks" Submenu</p> 	<p>"Loops" Submenu</p> 		

- Finish up bumper car activity (5 minutes)
 - Wrap up whatever programming and construction things can be fit into these five minutes. Each room will then have the opportunity to have a bumper car demonstration (essentially just having all of the robots run around and bump into each other/different things for a few minutes)
- Introducing programming with light sensors
 - You want your robot to go forward (on a white surface) until the light sensor detects a change in the color of the table (or floor) at which point the robot will back up for 3 seconds then stop. Using the "wait for darker" icon, what do you do?

You may find it helpful to change the power level, and if the code does not work, make sure to check the view menu on the NXT for light sensor readings. Default wait for Darker value is 5, but if you need to change it, add a numeric modifier, found under the modifiers menu.



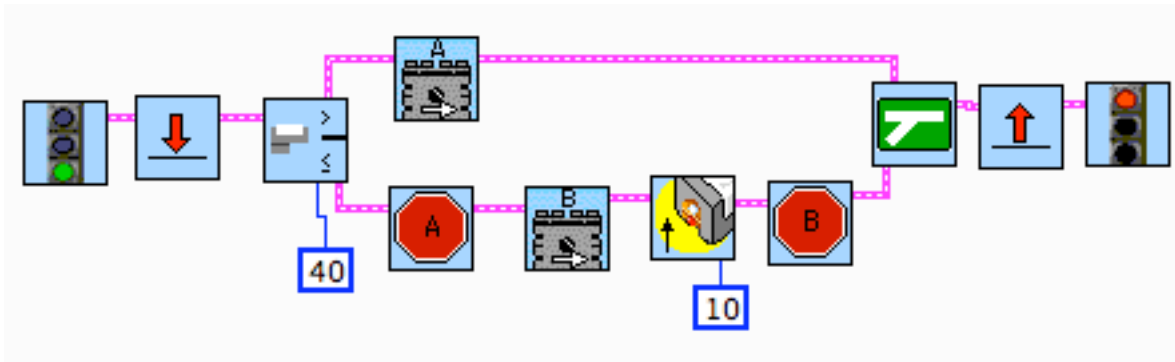
- Now, the robot needs to differentiate between light or dark by using a light sensor fork. If the robot is on white, it should go forward, and if it is on black, it should back up for three seconds, then stop (notice, this is the same task as in part a). It will be important for students to understand the view menu in selecting a threshold value for the fork. If students did not experiment with the light sensor fork during the last meeting, they should first explore the context help.



- Line following
 - Show students the Robotics Engineering Vol. 1 (RE v1) application. Navigate to Projects and select Follow Guidelines. Using the provided resources is a particularly important skill for students. Note that while the programs that the CD describes may use NXT-G, the concepts remain the same
 - Suppose you want the robot to navigate terrain that is unknown at the time of programming. However, you do know that there will be a black line on a white surface (such as electric tape on a poster board). Students should first brainstorm and write pseudocode for how the robot would follow a line. Use the table provided on the student worksheet (Don't forget to have students measure light sensor readings on the view menu)
 - Go through the very simple algorithm from Wang, *Engineering LEGO Bricks and ROBO LAB* to make the robot follow a line.


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          Loop
            Turn left motor on
            Wait for bright
            Turn left motor off
            Turn right motor on
            Wait for dark
            Turn right motor off
          
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 - Now, using a light sensor fork, as well as jumps and lands, have students implement the pseudocode (multiple correct answers, depending on which side of the line students are following).



- If there is time available, discuss how you could track the line faster. The Faster Line Tracking project shows how to change the position of the light sensor, so you can follow the line fast
- Advanced groups can add the Clap On Clap Off behavior (RE v1: Projects) to stop the robot or the Emergency Stop button (RE v1: Anytime Activities)

REMEMBER TO SAVE YOUR CODE!!!