Brooklyn College The City University of New York

Exploring Robotics (CORC 3303)

UNIT C Lab, part 1 : Touch Sensors and Looping

vocabulary

- sensor
- touch sensor
- connecting lead
- modifier
- numeric constant
- loop
- multi-tasking

materials

Make sure you have all of the following materials before you start the lab:

- lego go-bot kit
- lego touch sensor and connecting lead

instructions

1. **add a bumper and touch sensor to the go-bot**
   - Follow the **bumper sensor add-on instructions**, and work with your partner to add the bumper and touch sensor to your go-bot (as in the instructions).
   - Add the **bumper sensor** to **port 1** of the RCX using the **connecting lead** :

connecting lead

touch sensor

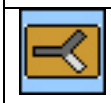
2. start up RoboLab

- Find the **RoboLab** icon on your computer and double-click on it to start it up.
  Click on **PROGRAMMER**.
  Double-click on **INVENTOR 4**.
  Your screen will look like this:

- Now you are ready to start programing in **RoboLab**!

3. find the icons

- Locate the **functions palette**. See if you can find each of the following **icons**. What do you think each icon does? In the boxes below, next to each icon, write down your ideas.

4. loops

- Loops are structures that allow your program to repeat specific tasks again and again.
- All loops have the same basic structure. This includes a set of commands that you want the program to repeat and something that tells the program when to stop repeating. Some loops run for a specific number of times. These are the loops that we will discuss today. Other types of loops run until a certain **condition** occurs, for example, go forward until you hit a wall. We will discuss these types of loops another time.
- In RoboLab, loops begin with a **start of loop** icon  and end with an **end of loop** icon  .

- There is also a **loop counter** which tells the loop how many times to repeat. This is specified using the **numeric constant** icon 

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- Note that if you do not assign a loop counter, the default is to loop (i.e., repeat the set of commands inside the loop) only twice.
- Inside the loop is the section of your program that you want to repeat.

5. programming challenges

- Complete as many of the following programs as you can.
- After you get each program to work, draw the code in the boxes provided on the next page.

(a) Consider the following example program:

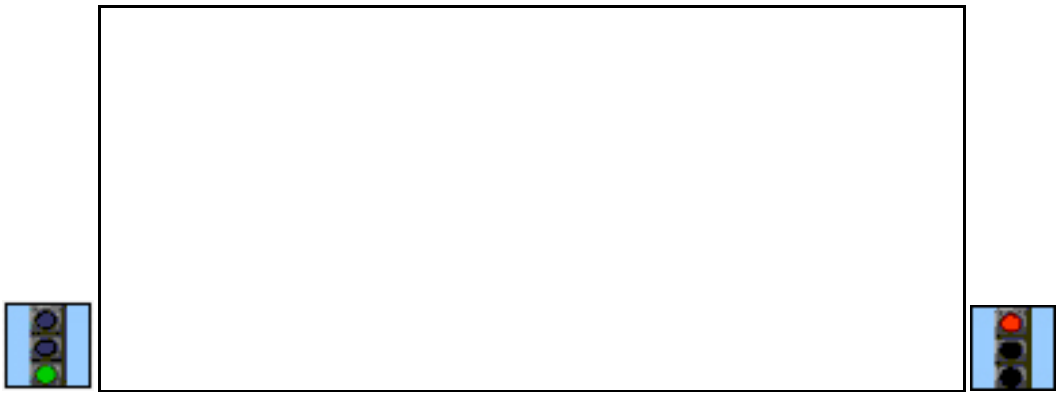
- What do you think it does? Write down your ideas below:

- Create the program in RoboLab. Test it and run it. What did it do? Did you predict right (above)?

(b) Modify the program using a loop structure:

- Does it behave the same as the program above or differently?
Why or why not?

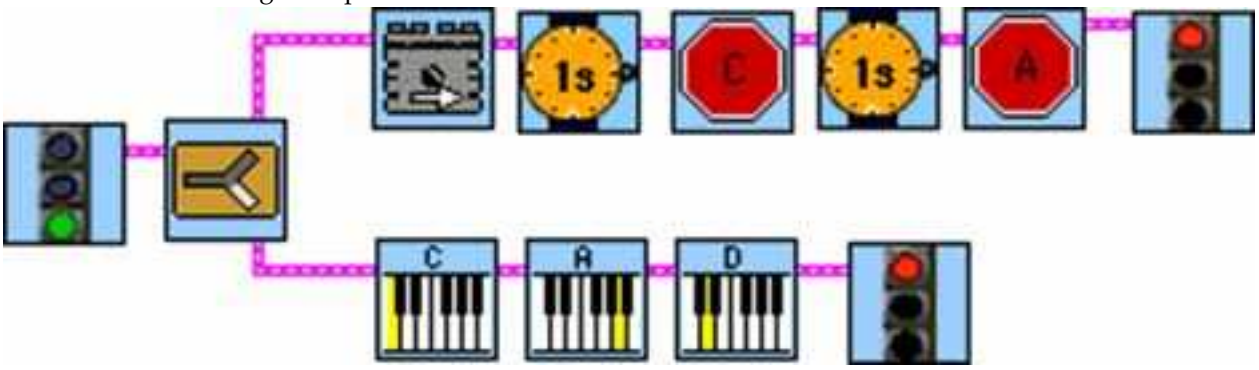
(c) Write a program to make the robot go in a square—but this time, use a loop structure.



6. **programming challenges**

- Complete as many of the following programs as you can.
- After you get each program to work, draw the code in the boxes provided on the next page.

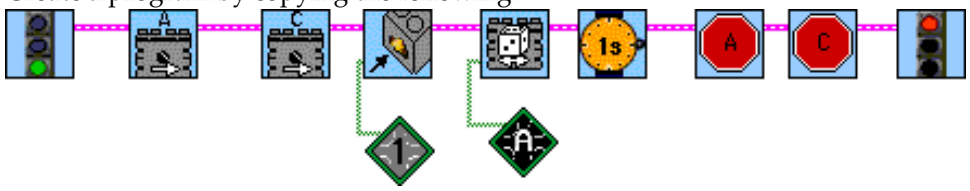
(a) Consider the following example:



- What do you think it does? Write down your ideas below:

- In RoboLab, you have been writing all your programs to have one **begin** and one **end**. When you write a multi-tasking program, you still have one **begin**; however, at some point in the program, it will divide into multiple tasks, and each task will have its own **end**.
- Create the above example in RoboLab. Download and test it. Does it behave as described above?

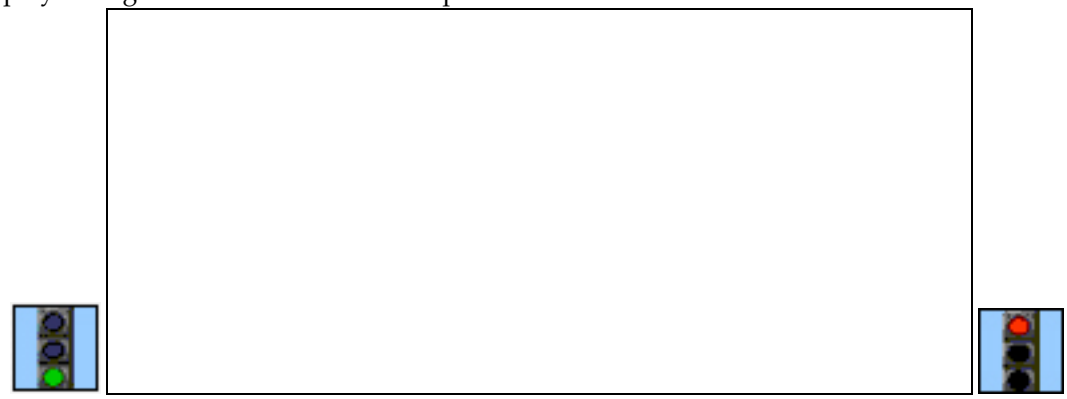
(b) Create a program by copying the following:



- What do you think it does? Write down your ideas below:

- **Download** your program and test it by running it several times.
- What did your robot do? Did it behave the same way each time you ran it? Write your answer below.

- Modify the program to keep going in a random direction until the touch sensor is pushed, play a song and then turn left and stop.



(c) Program the robot to go forward when the touch sensor is pushed, then turn in place until the touch sensor is pushed again and then stop.