

Agent-based/Robotics Programming Lab I

In this lab, you will use a robot made by LEGO and a programming environment called RoboLab. Make sure you have the LEGO robot kit and USB communications tower before you start the lab.

1 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 programming in **RoboLab**!

2 find the icons

- Locate the **functions palette**. See if you can find each of the following **icons**. Make a note of which sub-palette each icon belongs to. As you learn what each icon does, write down its function in the boxes below.

3 create your first program


- Use the mouse to select, drag and drop RoboLab **icons** onto your canvas and **wire** them together, creating the following program:



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

4 download your program



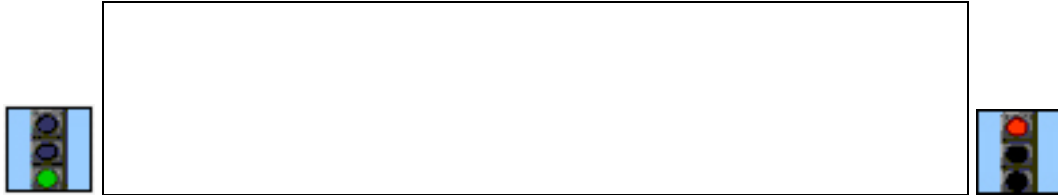
- Find the **communication tower**, which looks like this:
- Connect it to your computer's USB port (ask if you need help finding it).
- Place your robot next to the tower.
- Find the **download arrow** in your RoboLab window that looks like this:  It's up near the top, just under "File Edit" menu options. Click on it, and your program will **download** onto your robot!
- If the download works, then the RCX will sing a happy tune :-)
- If you have trouble, check these things:
 1. The RCX must be turned on during the download.
 2. The black part of the RCX should be turned towards your tower.
 3. If there is a lot of light in the room, try covering your RCX and the tower with a piece of paper.
 4. If your download arrow is broken, then you have an error in your program. Make sure that you copied all the icons correctly and that the wires all start and end in the right places.
 5. Make sure the **touch sensor** is connected to **port 1**.

5 run the program

- After the program downloads successfully, put your robot on the floor and turn it on.
- Then press **RUN**.
- What did your robot do? Is that what you expected? Write your answer below.

6 modify the program

- Now change the program to make your robot go in a straight line for 6 seconds and then stop. **Edit** the program in RoboLab, **download** it again and **test** it. Repeat this process until it works!
- Then in the box below, draw your code:



7 programming challenges

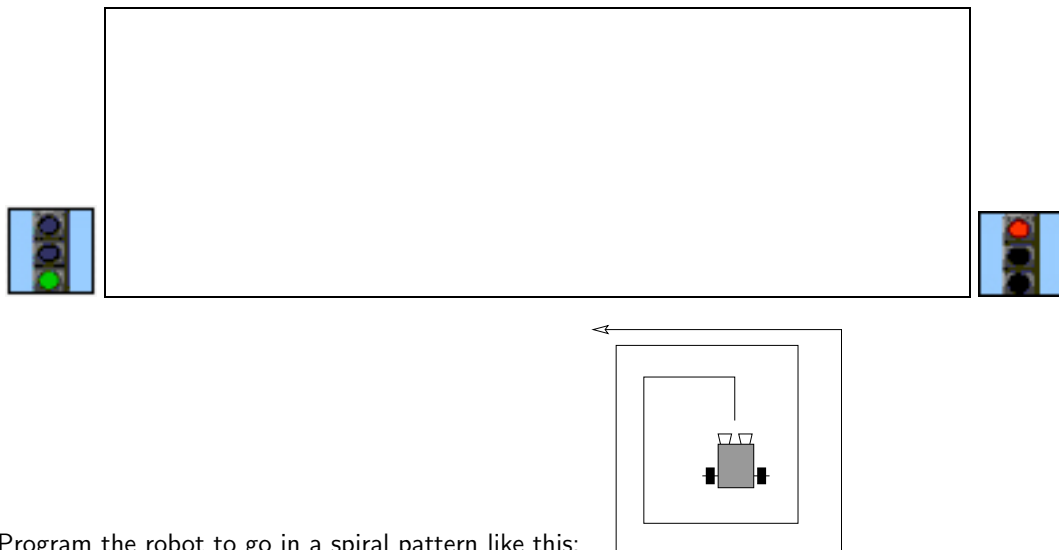
- Complete as many of the following programs as you can.
 - After you get each program to work, draw the code in the boxes provided on the next page.
1. Program the robot to go forward for 2 seconds and then go backward for 2 seconds and then stop. Is it back where it started from?



2. Program the robot to go in a square.



3. Program the robot to go forward until its touch sensor is pushed, and then stop.



4. Program the robot to go in a spiral pattern like this:



5. Program the robot to perform “wall-following” and navigate around an obstacle like this:

