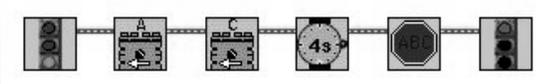


# Lesson 1: Motors and Sound Programming Solutions

## Learning to program

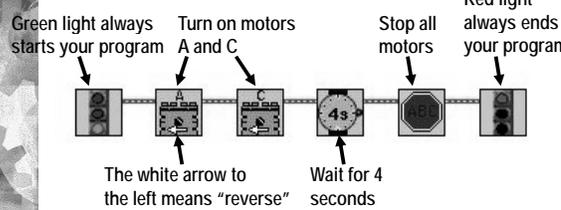
- An effective way to learn to program is to learn to “read” a program.
- Follow the steps and understand what each does. See how they fit together.
- Then you can do your first program by modifying an existing program.
- First we'll look at some programs here and understand what they do.

### Exercise 1: What does this do? See how much you can guess.



### Exercise 1: Solution

Turn on motors connected to ports A and C in the reverse direction for 4 seconds, then stop both motors.



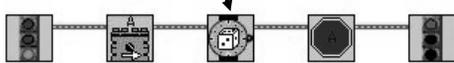
### Things to notice

- Every program has a beginning and end. (Traffic lights.)
- All icons are connected with “wires.”
- This program is linear—one step follows another from beginning to end.

### Exercise 2: Solution

Turn on motor A in the forward direction for a random amount of time, then stop the motor.

Use the watch icon with the dice, which means “random”



### Exercise 3: Solution

Turn on motor A in the forward direction for 2 seconds, stop the motor, and beep once. Then turn on motor C in the reverse direction for 2 seconds, stop the motor, and beep twice.



Remember, the white arrow to the right means "forward"

And the white arrow to the left means "reverse"

Use 2 Play Sound icons to play 2 beeps.

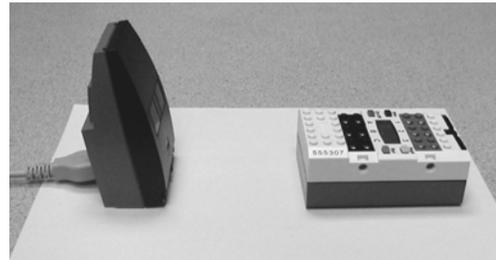
### Key Point!

- Writing down programs step by step in English makes them very easy to write in RoboLab.
- Think about how to solve the given problem, then work out the logical steps. Write down the steps before writing your program.

## Lesson 1: Motors and Sound Troubleshooting Tips

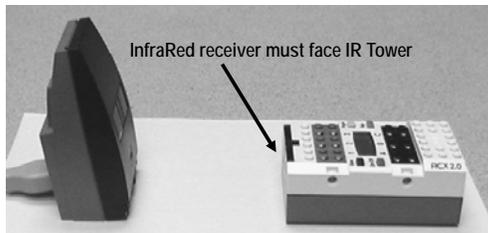
### Problem 1a

Why can't I download my program to the RCX?



### Solution 1a

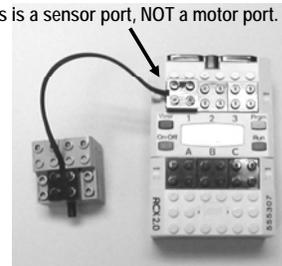
The RCX was facing the wrong direction. (Don't forget to turn it on too!)



### Problem 1b

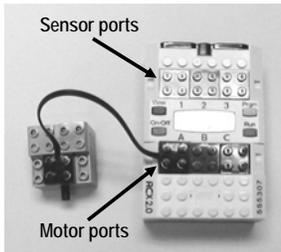
Why won't the motor work?

This is a sensor port, NOT a motor port.



### Solution 1b

It was connected to a sensor port. Motor ports are A, B, and C.



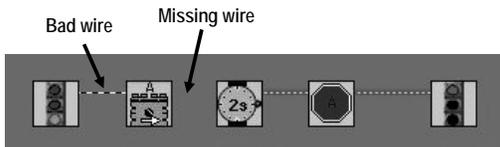
### Problem 1c

What is wrong with this program?



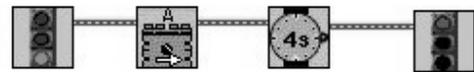
### Solution 1c

Bad wiring. Always check for bad wires.



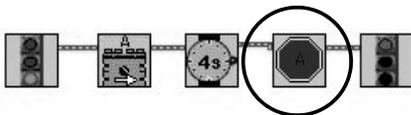
### Problem 1d

This program is supposed to turn on Motor A for 4 seconds, then turn off the motor. What's wrong?



### Solution 1d

There was no "Stop Motor" icon.



### Mentor session assignment

- You will start by writing (copying) a somewhat complicated program for a line follower robot and test it on your Tug of War vehicle. (You'll have to add a light sensor that points at the ground.)
- Then you'll delete most of the program to do our simple Tug of War program.
- For Tug of War your robot will turn on the motors when a touch sensor is pressed. This is a requirement of the assignment.
- You can't compete if your robot can't perform this simple task.



\* [http://www.education.rec.ri.cmu.edu/previews/rcx\\_products/robofab\\_video\\_train/rob\\_vid\\_train\\_preview.htm#](http://www.education.rec.ri.cmu.edu/previews/rcx_products/robofab_video_train/rob_vid_train_preview.htm#)