

COS 116
The Computational Universe
Laboratory 2: Introduction to Pseudocode

Today you'll meet Scribbler, the robot we'll be using in several labs this term. Scribbler is a very capable little machine. It has two independently driven wheels, three status lights, and a small speaker. It can detect light sources, obstacles in its path, and lines on printed on the "road." Best of all, the Scribbler can easily be programmed to perform a multitude of tasks.

For this class, we've created a way to control the Scribbler using simple "pseudocode" instructions. These statements resemble English commands, and they'll help you grasp some important concepts about computation without having to understand a complete programming language.

In this lab you will learn the building blocks of pseudocode by analyzing and testing a series of pseudocode files. Then, in two short experiments, you'll use the robot and provided pseudocode to explore the robot's capabilities. This week you won't be writing any pseudocode, but that will be the focus of the next lab.

Your TA will issue you the following items:

- The Scribbler (in box, together with a black serial cable)
- 6 AA batteries
- A blue USB-Serial adapter and software CD

These are yours to keep and experiment with until the end of the semester. *Please take good care of them!* We'll send email with instructions for installing the Scribbler software on your PC.

We will provide these additional supplies for this lab:

- Flashlight
- Ruler
- Construction paper
- Tape

Please pick them up at the beginning of the session.

General Test Procedure

In this lab you will test the robot with several pseudocode files. Keep detailed notes about each test and hand in them when you finish. Follow this procedure for each test:

1. **Use Scribbler Control Panel to open the test file.**
2. **Examine this pseudocode. Write in your notes what you think it will make the robot do.**
3. **Load the file on to the robot and observe the robot's behavior.**
 - a) **Attach your robot to the computer.**
Use the black cable to attach the robot to the blue USB adapter (don't tighten the thumb screws), then plug the USB adapter into the computer.
 - b) **Switch the robot on.**
 - c) **Download the pseudocode to the robot.**
In the Tools menu, click Download to Robot.
 - d) **Unplug the cable from the robot.**
 - e) **Place the robot where it will have enough room to run the test. (For some tests, you will need to use the floor.)**
 - f) **Press the robot's button twice (rapidly) to start it.**
 - g) **Observe the robot's behavior. Some tests will provide additional instructions.**
 - h) **If the robot is still moving when you are finished with your observations, press the button once more to stop it.**
 - i) **To conserve the batteries, you should turn off the robot if you're not going to use it for a few minutes.**
4. **Did the robot's behavior differ from what you predicted? If so, figure out why and write about it in your notes.**

Part 1: Basic Motion, Lights, and Sounds

1. Test the robot with the file “01 Forward, Back”

```
1 Move Forward for 1s
2 Pause 0.5s
3 Move Back for 1s
4 END
```

Remember, you should use the testing procedure described on the previous page for all the tests in this week’s lab.

2. Test the file “02 Spin Left, Spin Right”

```
1 Spin Left for 1s
2 Pause 0.5s
3 Spin Right for 1s
4 END
```

3. Test the file “03 Turn Left, Turn Right”

```
1 Turn Left for 1s
2 Pause 0.5s
3 Spin Left for 0.7s
4 Pause 0.5s
5 Turn Right for 1s
6 END
```

In your notes, explain the difference between spinning and turning. Hint: Carefully observe the motion of the robot’s wheels while performing a spin and a turn.

4. Test the file “04 LEDs”

```
1 LED: ON, OFF, OFF
2 Pause 1s
3 LED: ON, ON, OFF
4 Pause 1s
5 LED: ON, ON, ON
6 Pause 1s
7 LED: OFF, OFF, OFF
8 END
```

Notice that, unlike the motor commands, the LED (“Light Emitting Diode”) commands have a lasting effect on the state of the LEDs.