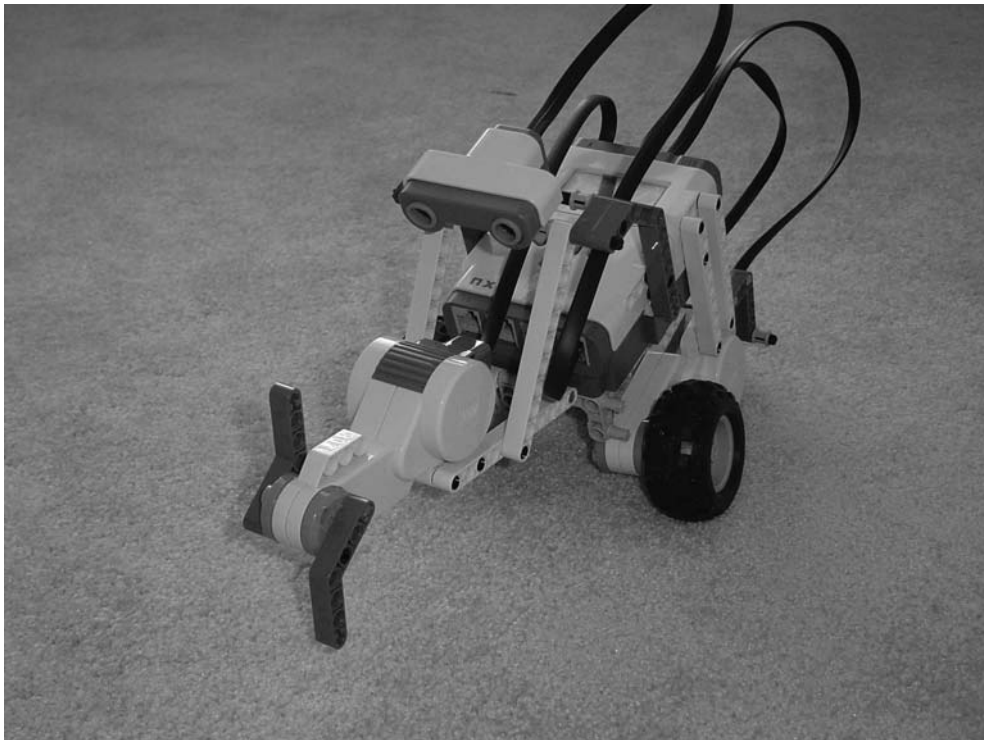




# Record and Play Back

**O**ne nice feature of the NXT-G programming language is the RECORD/PLAY block. With this block, you can record the movements of your bot's motors to a file that is stored on the Brick. This file can be used to later play back the bot's movement.

For this chapter, we'll use SPOT again. But this time, I'm going to add one additional motor (motor A) to make SPOT do something silly like spin an arm or a sensor around. Feel free to do what you like. My SPOT has motor B (in Port B) spinning the left wheel of my bot and motor C (in Port C) spinning the right wheel. I have motor A (in Port A) spinning a small propeller (like an airplane) on the front of the robot (see Figure 5-1).



**Figure 5-1.** *SPOT with his new propeller*

I'm ready to record some basic movement. If you've built your own version of SPOT, follow along. Here's how we will do it.

The RECORD/PLAY block is located on the Common Palette directly below the MOVE block. Drag and drop a RECORD/PLAY block on the beam (see Figure 5-2).



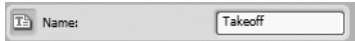
**Figure 5-2.** Start recording a bot's movements with the RECORD/PLAY block.

I know it seems like common sense, but I still need to say it: we cannot play back SPOT's recorded movements until we've actually recorded some. So the first thing we're going to need to do is configure the RECORD/PLAY block to record SPOT's movements. To do this, in the block's Action section, select the Record option as shown in Figure 5-3. This is the default setting when you drop a RECORD/PLAY block onto the workspace.



**Figure 5-3.** First, choose the Record option in the Action section.

Next, we need to specify a name for the recorded movement. As an example, I want SPOT to move forward 2 feet (motors B and C will be spinning forward) and turn left. I then want motor A to spin the propeller a few times. I'm going to type the words **Takeoff** in the Name text box shown in Figure 5-4, but you can type whatever description you like that will help you remember the purpose of the recorded movement.



**Figure 5-4.** Give your recorded movement a unique name.

The name you type in the Name text box is the name of a file that will be stored on the Brick. This file must be stored on the Brick in order for you to later play back the movement, so try to make the name memorable and easy to understand.

Now, look at Figure 5-5. The Recording section of the configuration panel is where you will specify which ports should be monitored. In my example, motors B and C will move my bot around, and motor A will spin the propeller. So I want to select all the ports. If you are not using one of the motor Ports, you don't need to select it. You won't get an error if you select a motor port and don't use it, however.



**Figure 5-5.** Configure the motor ports to monitor and record.

The last item you will need to configure is the amount of time (in seconds) you wish to record your bot's movements (see Figure 5-6). You can type in the number of seconds you want to record or click the up and down arrows with your mouse to select the number in the Time section.



**Figure 5-6.** Enter the number of seconds to record in the Time section.

You can record anywhere from 1 second up into the hundreds of hours. Is this realistic? Not really. Your NXT Brick has a limited amount of memory, and you'll find that you are limited to a few minutes at most. And even recording a few minutes of movement will probably not leave much memory for your actual program. You'll have to play around with the Time section to test its limits.

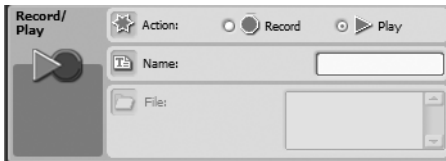
Once you've got your RECORD/PLAY block configured, save the program, and upload it to your NXT bot. Place the bot at its starting position, and press the Run button for your new program. Using your hands, guide the bot through the movements you wish your bot to perform.

For my example, I simply push the bot forward 2 feet and stop. I then turn the bot to the left and stop. Next, I spin the little propeller on the front of the bot 5 or 6 times, and I'm finished.

I suggest that you time your movements as you're doing them. If you come close to the number of seconds you configured, you can simply leave the recording time alone. If you didn't have enough time, go back and add the right number of seconds to your program, save it, and run it again to record the complete movements. Most importantly, if you originally configured *too much time*, reduce the number of seconds you entered in the Time section; because the recording process will continue to run until the time is over, the file stored on the Brick will be larger than it needs to be.

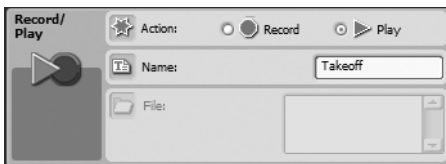
Okay, so you've successfully recorded your bot's movements, and there is a file stored on the Brick with the name you gave it in the Name section (you can verify this by connecting your Brick to your computer and checking its memory contents). Now, let me show you how to play back the file.

It's so easy, you're going to laugh. Create a new program, and drop in a RECORD/PLAY block. This time, however, select the Play option in the Action section (see Figure 5-7).



**Figure 5-7.** *Configure your bot to play back the recorded movement.*

The only other section that can be configured now is the Name section. Type the name of the file that contains the recorded movements in the Name section (see Figure 5-8). For my example, I've typed **Takeoff**, the name I gave the file that moves the bot forward 2 feet, turns it left, and then spins the propeller a few times.



**Figure 5-8.** *Enter the name of the file you created during the Record process.*

Next, you need to save the new program and upload it to your Brick. Before you run the program, place your bot in the original starting position (or wherever you like), and press the Run button to run the program. The bot will begin to move and will match the movements you recorded earlier. That's it for the RECORD/PLAY block.

Here are some ideas for using the RECORD/PLAY block:

- A fun use for it is to record your bot doing some sort of dance (for 10 to 20 seconds) and save it to a file called Dance. If you keep the Dance file on your brick, you can drop in a RECORD/PLAY block anywhere in your program and have your bot do the little dance (you can drop it in multiple times, too).
- Teams could use this block when giving a presentation. The bot might have interesting parts and mechanisms that you wish to focus attention on, and the RECORD/PLAY block could be used to let the audience view these more easily. Configure the times properly, and you can synchronize it to a speech given on the robot and its different components.

Chapter 6 will show you how to give your robot the ability to talk and make some noise!