RECON 6.0 PROGRAMMABLE ROVER

OWNER'S MANUAL

BY INGRID EMERICK

This device complies with part 15 of the FCC Rules. Operation is subject to the following two
conditions: (1) This device may not cause harmful interference, and (2) this device must accept
any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to
part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference
in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not
installed and used in accordance with the instructions, may cause harmful interference to radio communications.
However, there is no guarantee that interference will not occur in a particular installation. If this equipment does
cause harmful interference to radio or television reception, which can be determined by turning the equipment off
and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Changes or modifications not expressly approved by the party responsible
for compliance could void the user's authority to operate the equipment.

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numerique de la classe B est conforme à la norme NMB-003 du Canada.

YOUR MANUAL AT A GLANCE

CONGRATULATIONS!

You're the new owner of a RECON 6.0 Programmable Rover, developed by the robot experts at SmartLab. In your capable hands they place this complex and sophisticated robot, which can be programmed to perform all kinds of fun and interesting tasks—from navigating obstacle courses to delivering a bone to the family dog to telling a knock-knock joke. RECON 6.0 can even perform security patrol duty at your bedroom door, collect field intelligence (with its built-in microphone), and entertain your friends with the latest dance moves.

HELLO, MY NAME IS...

There's a saying that "to name something is to own it." As the owner of your new RECON 6.0, that's just what you need to do. Every great robot has a name—HAL, R2-D2, even WALL-E—so start brainstorming. Not only will you name your Rover, but later on you'll program it to introduce itself (in Mission 02).

FEATURES

- Communication indicator lights
- Transport handle
- LCD screen
- 10-button membrane keypad
- Directional arrow pad
- Cargo hold
- Two LED headlights
- Triangular track-drive system

For the entire glossary of RECON 6.0's features and how they function, turn to page 44.

Remember to always carry your **RECON 6.0** by its handle and not its neck (ouch!).

MISSION MAP

Your book has mission maps like this one to help you plot each course.

MAP SCALE

Big square: 1 inch = 1 foot

Small square: 1/4 inch = 3 inches

Your Rover comes with a tape measure to help you with your missions.

CODE

01 18
02 19
03 20
04 21
05 22
06
09

The code area is where you'll write your programming code in shorthand.

POWER UP!

RECON 6.0 needs a power source before the fun can begin, so be sure to install three C batteries, as shown. Once your Rover is juiced up, turn it on, using the hard switch on its bottom. Now you two can get acquainted.

Use the hard switch to turn off RECON 6.0 when not in use.

BATTERY CAUTIONS:

- To ensure proper safety and operation, battery replacement must always be done by an adult.
- Never let a child use this product unless the battery door is secure.
- Keep all batteries away from small children, and immediately dispose of any batteries safely.
- Batteries are small objects and could be ingested.
- Nonrechargeable batteries are not to be recharged.
- Rechargeable batteries are not recommended for use with this toy.
- The supply terminals are not to be short-circuited.
- Rechargeable batteries are to be removed from the toy before being charged.

- Rechargeable batteries are only to be charged under adult supervision.
- Different types of batteries or new and used batteries are not to be mixed.
- Only batteries of the same or equivalent types as recommended are to be used.
- Do not mix alkaline, standard (carbon-zinc), or rechargeable (nickel-cadmium) batteries.
- Batteries are to be inserted with the correct polarity.
- Exhausted batteries are to be removed from the toy.

5

QUALITY CONTROL

The scientists at SmartLab want to make sure your RECON 6.0 is functioning properly. To help them out, run this QA test (that's short for quality assurance in programmer-speak).

RECON 6.0 was built with fun and function in mind, but remember it is a toy. It should properly perform this book's missions— and ones you think up yourself—but may not always be exact.

Follow these steps on the same type of floor (wood, tile, or carpet) that you will be using your Rover on. If you move to a new type of floor and find that your Rover isn't working quite right, rerun these steps.

LET'S GO!

A   **Batteries installed? Turn on the hard switch on the bottom of your Rover.**

B   **Press the ON/OFF button on the keypad.**

The LCD screen should display the words LOAD and PROGRAM. This is the Start Screen. The LOAD icon should be flashing.

While pressing and holding down the RECORD button, press the UP ARROW.

LOAD PROGRAM

C   **You should now see 4 drive commands, with DRIVE FORWARD ⬆ flashing.**

Put RECON 6.0 on the floor, making sure that there is at least 3 feet of space in front of it. Press ENTER. Your Rover should drive forward 3 feet and stop.

⬆⤺⤻⬇
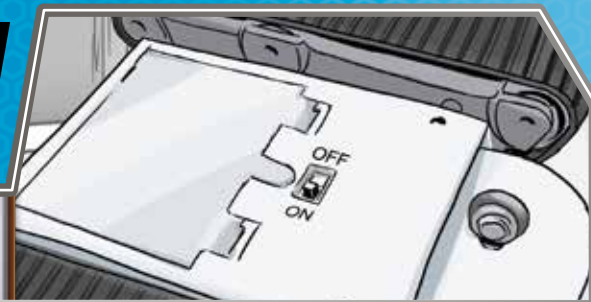
D Using the arrows on the directional pad, scroll to DRIVE REVERSE ⬇ and press ENTER. Your Rover should drive in reverse 3 feet and stop.

↑ ↰ ↱ ⬇

E Scroll to RIGHT TURN ↱. Press ENTER. You should see a flashing number. Write this number here: _____

↱

88

CREDIBLE INTELLIGENCE

A full circle is 360°. This is made up of four 90° segments. Visualize the points on a compass.

Your Rover counts rotations of its drive wheel using a number that measures the rotations needed to achieve a turn. You may have to adjust the number until your Rover performs a full circle, ending at the starting point.

360°
270° 90°
180°

F Set the Rover on the floor. Use masking tape to mark the starting location or just line it up with a straight edge. Tile flooring works great!

STRAIGHT EDGE

G Press ENTER and watch your Rover turn in a circle.

• If the rotation is a full 360°, go to step H.

• If the rotation is short of 360°, scroll up to the next number using the UP ARROW. Realign your Rover. Press ENTER.

• If the rotation overshot 360°, scroll down to the next number using the DOWN ARROW. Realign your Rover. Press ENTER.

Keep adjusting the number up or down—one digit at a time—until your Rover performs a circle to your satisfaction.

When you find the number that works best (returning your Rover to its starting point), press SAVE.

STOPS SHORT

OVERSHOOTS

H Repeat the process from steps E to G with the LEFT TURN ↰. Write the flashing number here: _____

When your RECON 6.0 executes a full circle to the left, press SAVE.

Press SAVE again to return to the Start Screen.

FULL CIRCLE

MISSION OBJECTIVE

Get to know your new RECON 6.0 with this seemingly simple field maneuver. You'll program it to run a triangular course, landing safely back at field command HQ. After completing this mission, you'll know how to:

- ✿ **Enter and save a trip**
- ✿ **Program turns in degrees (45^0 or 90^0)**
- ✿ **Program distance in inches and feet**
- ✿ **Program basic maneuvering commands (forward, left, right, reverse)**

MISSION BACKGROUND

This course has been sketched out for you, and the programming code is supplied, shown on the mission map on page 9. Once you're an ace programmer, you can plug in your own numbers for similar missions. Use the square root button $\boxed{\sqrt{}}$ on a calculator to calculate the length of the third side of the triangle.

MISSION TRAINING BRIEF

Before you start, clear the field terrain by using your tape measure to mark off an empty 4' x 4' safe zone. Your Rover's starting position will be at the safe zone's bottom left corner.

b = 2 feet

90°   →   45°

a = 2 feet

reverse

c = 34 inches

45°

01	↑ 2 feet	18	
02	↱ 90°	19	
03	↑ 2 feet	20	
04	↰ 45°	21	
05	↓ 34 inches	22	
06	↰ 45°	23	
07	**Save**	24	
08		25	
09		26	
10		27	
11		28	
12		29	
13		30	
14		31	
15		32	
16			
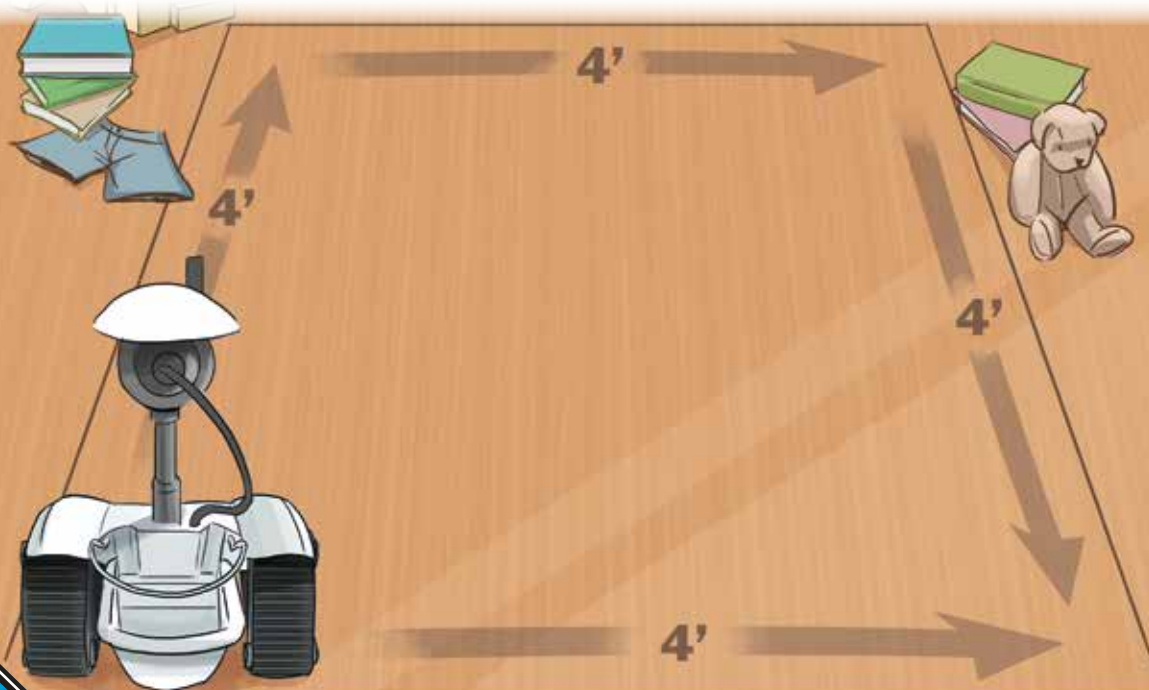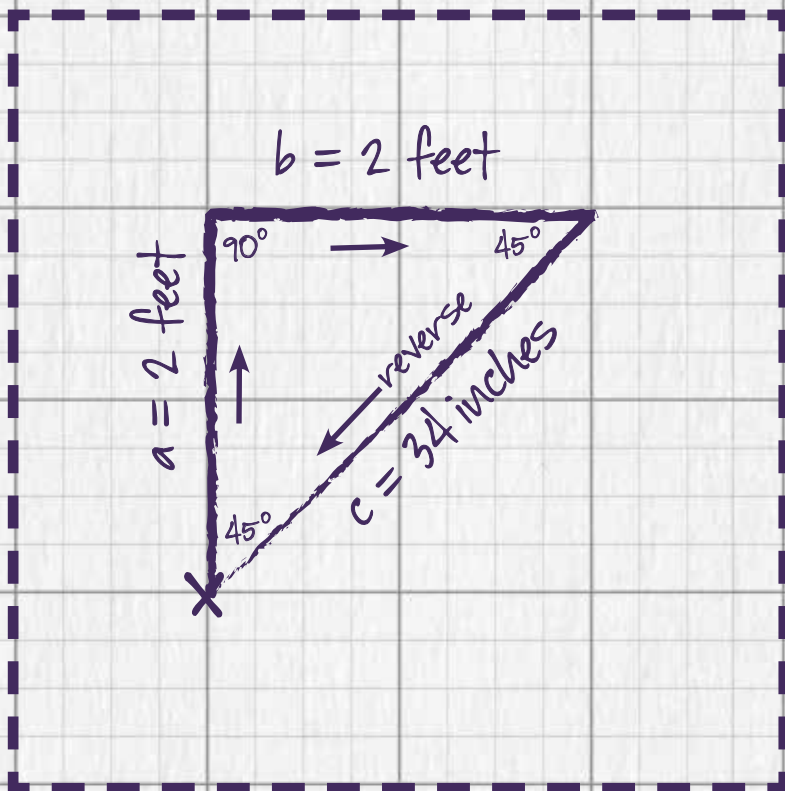
$$2^2 + 2^2 = c^2$$
$$4 + 4 = c^2$$
$$8 = c^2$$
$$\sqrt{8} = c$$
$$2.82 = c$$
$$2.8 \text{ feet} \times 12 = 33.94 \text{ inches}$$
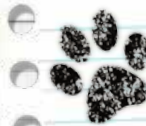
Does $a^2 + b^2 = c^2$ sound familiar? It's the Pythagorean theorem, a 2,500-year-old formula to help you calculate the length of a right triangle's sides.

9

LET'S GO!

Basic Training Missions 01–04 come with step-by-step programming instructions to familiarize you with all of RECON 6.0's functions. There'll be plenty of opportunities to create your own missions and your own code in the Advanced Operations section of this manual.

```
PROGRAM TRIP# :
01  ↑↑              02  FEET
02 ↑↰↱╏╏╏🔊🎤
03
```

CREDIBLE INTELLIGENCE

In RECON 6.0's programming language, to choose a command, the icon must be flashing. This is shown in **red** throughout the directions. Use the directional pad's ARROW buttons to scroll through the commands until the one you want is flashing. Then press the ENTER button to select!
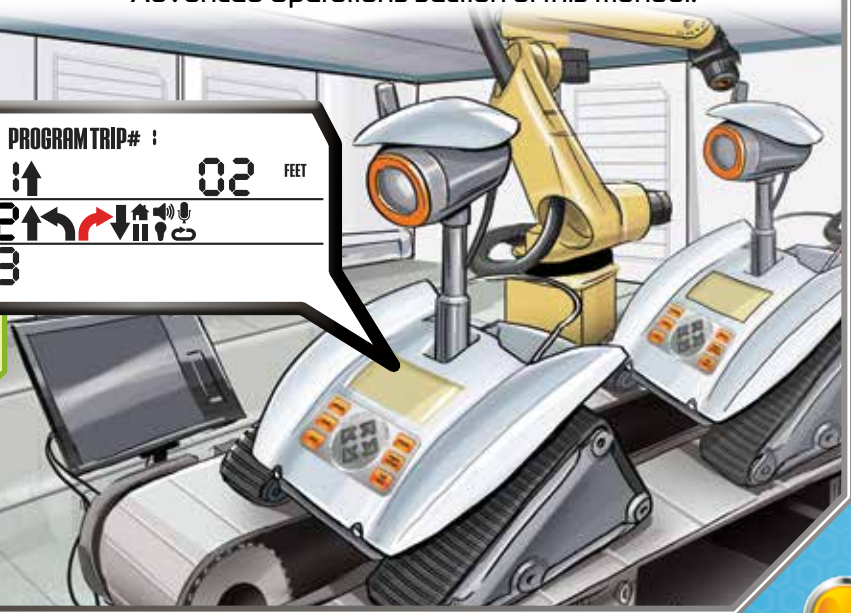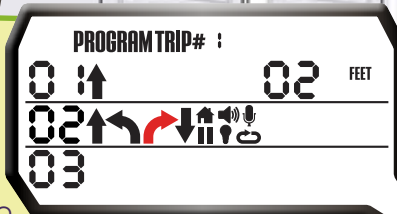
STEP 1: SELECT YOUR TRIP

CREDIBLE INTELLIGENCE

The EXIT button always takes you back to the Start Screen which gives you the choice between **LOAD** and **PROGRAM**.

A	Press ON or EXIT to display the Start Screen.	**LOAD** PROGRAM
B	Toggle so that PROGRAM is flashing. Press ENTER.	LOAD **PROGRAM**
C	You are now in PROGRAM mode and can choose a TRIP# or SOUND#. For this mission, you'll be programming a trip. TRIP# will be flashing, so press ENTER.	PROGRAM **TRIP#** SOUND#
D	This is TRIP #1 and 1 is flashing, so press ENTER.	PROGRAM TRIP# **:**

STEP 2: WRITE YOUR PROGRAM LINES

A

Your screen will now look like this.

The numbers 01, 02, and 03 represent your first three lines of code. All the command icons appear on line 01.

Choose the flashing 01 by pressing ENTER.
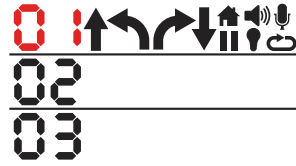
CREDIBLE INTELLIGENCE

The RECON 6.0's screen displays 3 program lines at a time. As you enter more commands, the display will automatically scroll down to 04, 05, etc., until you reach the memory limit of 50 program lines.

PROGRAM TRIP# :
01
02
03

B

The first command, DRIVE FORWARD ⬆, is flashing. Press ENTER.

Remember, to choose other commands just use the ARROW buttons on the directional pad.

PROGRAM TRIP# :
01
02
03
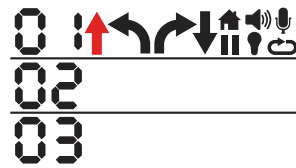
C

The INCHES and FEET icons will now be lit.

As shown on the Mission 01 map on page 9, your RECON 6.0 will first drive forward 2 feet, so choose FEET by pressing ENTER.
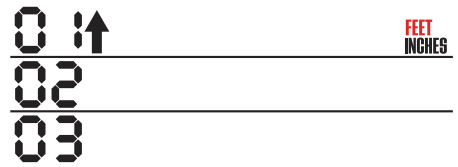
CREDIBLE INTELLIGENCE

The UP and DOWN ARROWS allow you to toggle between two options (like INCHES and FEET, 45 and 90 DEGREES, ON and OFF) as well as scroll through the numbers 1–99.

PROGRAM TRIP# :
01
02
03
FEET
INCHES

D

01 (for 1 foot) will now be flashing.

Press the UP ARROW button until 02 (for 2 feet) is flashing, and hit ENTER.

PROGRAM TRIP# :
01
02
00
02 FEET

E

Program Line 02 will now be flashing. Press ENTER.

Use the RIGHT ARROW button to scroll over to the RIGHT TURN ➡ icon.

Press ENTER.

PROGRAM TRIP# :
01
02
03
02 FEET

11
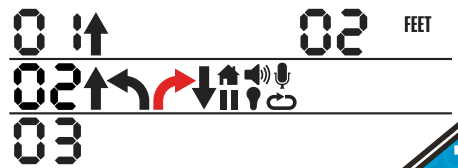
F

The number 45 will be flashing, and the word DEGREES will be lit.

Use the UP and DOWN ARROW buttons to toggle between 45 and 90. Choose 90 and hit ENTER.

PROGRAM TRIP# :		
01 ↑		02 FEET
02	↱	90 DEGREES
03		

CREDIBLE INTELLIGENCE

Your Rover can make a 45º or 90º turn. To figure out how sharp a turn you'll want it to make, you'll need to know what a 45º and a 90º angle look like. 45º is half of 90º.

G
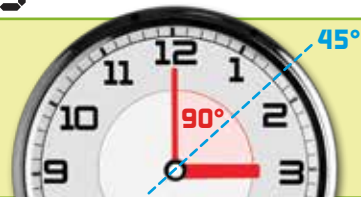
For Program Line 03, hit ENTER.

DRIVE FORWARD ⬆ will be flashing (ENTER). FEET will be flashing (ENTER).

Scroll up to choose 02 (for 2 feet again) and hit ENTER.

PROGRAM TRIP# :		
01 ↑		02 FEET
02	↱	90 DEGREES
03 ↑		02 FEET

H

For Program Line 04, hit ENTER, then scroll over to the LEFT TURN icon ↰ (ENTER).

Choose 45 DEGREES this time (ENTER).

PROGRAM TRIP# :		
02	↱	90 DEGREES
03 ↑		02 FEET
04	↰	45 DEGREES

I

For Program Line 05, hit ENTER.

Scroll to DRIVE REVERSE ⬇ (ENTER).

Toggle to INCHES (ENTER).

Scroll to 34 (ENTER). For faster scrolling, press and hold down the UP ARROW button.

PROGRAM TRIP# :		
03 ↑		02 FEET
04	↰	45 DEGREES
05	↓	34 INCHES

J

For Program Line 06, hit ENTER.

Scroll to LEFT TURN ↰ (ENTER).

Choose 45 DEGREES (ENTER).

PROGRAM TRIP# :		
04	↰	45 DEGREES
05	↓	34 INCHES
06	↰	45 DEGREES

CREDIBLE INTELLIGENCE

At any time during programming, you can return to a line of code you want to change. First scroll to the program line numbers on the far left. Then use the UP and DOWN ARROW buttons to scroll through the program line numbers.

STEP 3:
SAVE AND RUN!

CREDIBLE INTELLIGENCE
If you don't press the SAVE button after you finish programming, you'll lose your code, and your Rover won't be able to run its course. So always SAVE your work!

A Program Line 07 will be flashing, but you won't need it. You've entered all the code you'll need for this mission.

While the Program Line Number is flashing, press SAVE.

The screen will now look like this.

PROGRAM TRIP# :		RUN EDIT	
01 ↑		02	FEET
02	↱	90	DEGREES
03 ↑		02	FEET

CREDIBLE INTELLIGENCE
If you need to make a change, scroll to EDIT and press ENTER. This allows you to change the code. If you need to INSERT or DELETE a line, refer to page 47. Don't forget to save any changes!

B Place RECON 6.0 in the starting position (bottom left).

Choose RUN (ENTER). You have 3 seconds before your RECON 6.0 will be on the move!
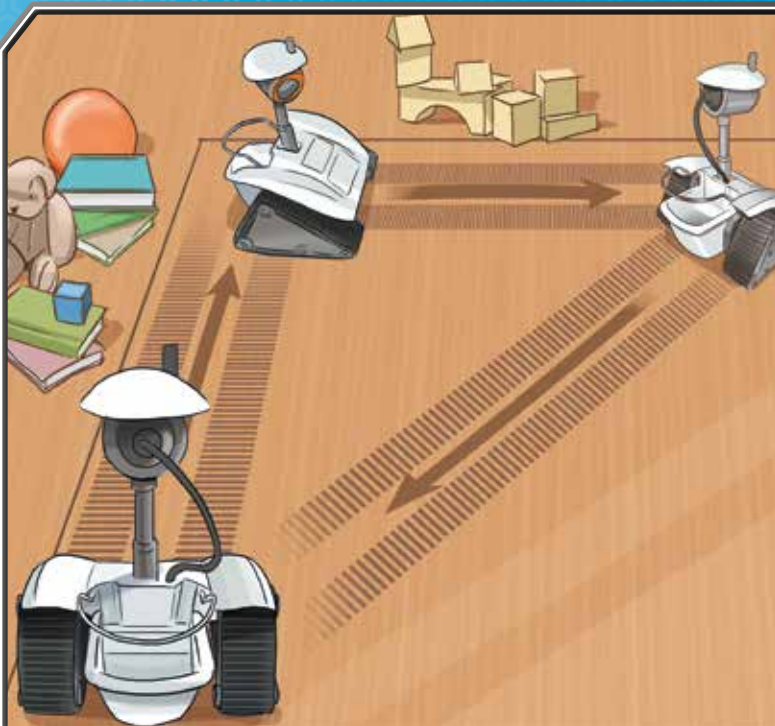
DEBRIEFING
Did your Rover follow the Mission 01 map? If so, then mission accomplished! You've passed Basic Field Maneuvering! If not:

- Double-check your code. Is all of your programming correct?
- Is your starting position accurate?
- Check your measurements. Did you input them correctly?
- Are your batteries low?
- None of the above? Try recalibrating your RECON 6.0 to the current surface. Directions are on pages 6–7.

MISSION OBJECTIVE

Test your RECON 6.0's messaging function by programming it to introduce itself on command. Here's where you get to use the name you thought up earlier. After completing this mission, you'll know how to:

* Prerecord a sound file
* Program to record while your Rover is on a trip (like you will need to know how to do for Mission 10)
* Play a sound file using the speaker

MISSION BACKGROUND

In this mission, you will have a conversation with your RECON 6.0!

So after it introduces itself, you'll have to respond, something like:

"Hello, Otto. It's good to see you!" If you program it right, your Rover will immediately play back your response.

MISSION TRAINING BRIEF

For this mission, you'll need to record a sound file first. Start by practicing the way you want your RECON 6.0 to introduce itself, using your best robot voice.

COMMUNICATION INDICATOR LIGHTS

CODE

🔊 #1, 🎤 #2, 🔊 #2

O

↑ 2 feet

↓ reverse

2 feet

X

01 ↑ 2 feet	20
02 🔊 #1	21
03 🎤 #2	22
04 🔊 #2	23
05 ↓ 2 feet	24
06 Save	25
07	26
08	27
09	28
10	29
11	30
12	31
13	32
14	33
15	34
16	35
17	36
18	37
19	38
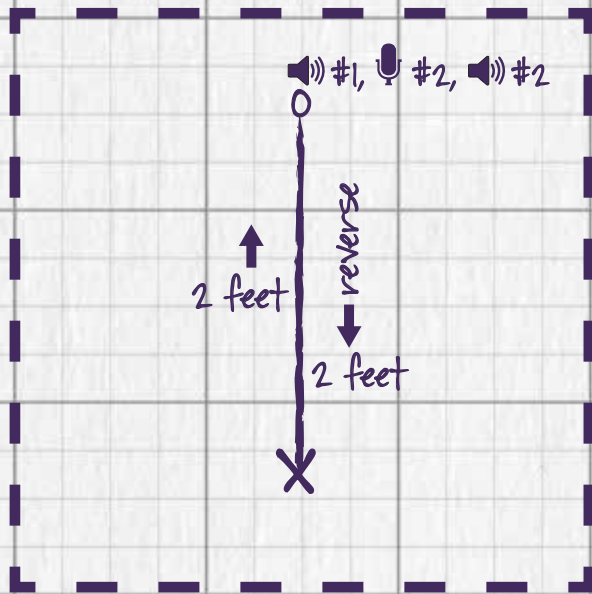
Hello. My name is Otto!

Good morning. It's Max reporting for duty!

Greetings, carbon-based life form, Silicon Dude at your service!

LET'S GO!

STEP 1:
SELECT YOUR SOUND FILE

CREDIBLE INTELLIGENCE

At any time, you can use the LEFT ARROW button on the directional pad to scroll backward when you've made a mistake or gone ahead too far.

A	Press EXIT to return to the Start Screen.	**LOAD** PROGRAM
B	Toggle to PROGRAM (ENTER).	LOAD **PROGRAM**
C	For this mission, program your sound first. Scroll to SOUND# (ENTER) and then 1 (ENTER).	PROGRAM SOUND# **:**

STEP 2: RECORD YOUR SOUND FILE

A	The flashing RECORD SOUND 🎤 will appear. Press and hold the RECORD button and state your greeting. The hidden microphone will pick up your voice. Release the button when you are done recording. It will beep once when you begin and twice when you release the button or when your recording limit of 5 seconds is up!	PROGRAM SOUND# **:** 🎤
B	To listen to what you recorded: Choose the flashing RUN icon on the screen by pressing ENTER. Press EXIT to return to the Start Screen.	PROGRAM SOUND# **:** **RUN** EDIT 🔊🎤
	If you'd like to rerecord: Scroll to EDIT (ENTER). Then scroll to RECORD SOUND 🎤, and press and hold the RECORD button. Press EXIT to return to the Start Screen.	PROGRAM SOUND# **:** **EDIT** 🎤

STEP 3:
CLEAR YOUR SAFE ZONE AND SELECT YOUR TRIP

A

Create a 3' x 3' square safe zone.

Your Rover's starting position will be at bottom center of the zone.

B

Scroll to PROGRAM (ENTER).

LOAD PROGRAM

C

When TRIP# is flashing, press ENTER.
This is TRIP #2, so scroll up to 2 (ENTER).

PROGRAM TRIP# 2

STEP 4:
WRITE YOUR PROGRAM LINES

A

Choose the flashing 01 (ENTER).

The first command, DRIVE FORWARD ⬆, is flashing (ENTER).

PROGRAM TRIP# 2
01
02
03

B

As shown on the Mission 02 map, your RECON 6.0 will first drive forward 2 feet, so choose the FEET icon (ENTER). 01 (for 1 foot) will now be flashing. Scroll up to 02 (ENTER).

PROGRAM TRIP# 2
01   02 FEET
02
03

C For Program Line 02, hit ENTER, then scroll over to PLAY SOUND 🔊 (ENTER).

PROGRAM TRIP#2

01	↑		02	FEET
02	↑↰↱↑↓‖▮🔊🎤⟲			
03				

D 01 will flash next to PLAY SOUND 🔊. This stands for the sound file number you want your Rover to play.

Since you saved the file as SOUND #1 earlier, choose 01 (ENTER).

PROGRAM TRIP#2

01	↑		02	FEET
02		🔊	**01**	
03				

E For Program Line 03, hit ENTER, then scroll over to RECORD SOUND 🎤 (ENTER).

PROGRAM TRIP#2

01	↑		02	FEET
02		🔊	01	
03	↑↰↱↑↓‖▮🔊🎤⟲			

F 01 will flash next to RECORD SOUND 🎤. Since you already recorded your Rover's introduction as SOUND #1, scroll to 02 (ENTER). You've chosen SOUND #2. This sound file will record your reply to your Rover.

PROGRAM TRIP#2

01	↑		02	FEET
02		🔊	01	
03		🎤	**02**	

G For Program Line 04, hit ENTER, then scroll over to PLAY SOUND 🔊 (ENTER).

Then choose SOUND #2 by pressing the UP ARROW and hitting ENTER when you get to the flashing 02.

PROGRAM TRIP#2

02		🔊	01	
03		🎤	02	
04		🔊	**02**	

H For Program Line 05, hit ENTER, scroll to DRIVE REVERSE ↓ (ENTER). FEET will be flashing (ENTER). Scroll to 02 (ENTER).

PROGRAM TRIP#2

03		🎤	02	
04		🔊	02	
05		↓	**02**	FEET

SAVE YOUR PROGRAM!

STEP 5: READY TO RUN!

The screen will now display the first 3 lines of the program code, as shown here.

Place RECON 6.0 in the starting position and choose RUN (ENTER). Remember, you have 3 seconds before your Rover begins its mission.

PROGRAM TRIP # 2	RUN EDIT
01 ↑	02 FEET
02 🔊	01
03 🎤	02

HELLO, MY NAME IS OTTO!

DEBRIEFING

Did it work? Did it introduce itself and then record and play back what you said? If so, then congratulations, you've passed Messaging Protocol! If not:

- Double-check your code and your measurements.
- Double-check that you recorded your greeting as SOUND #1.
- Did you reply to your Rover's greeting?

MISSION OBJECTIVE

Send your RECON 6.0 on a surveillance mission under the cloak of darkness. In this covert assignment, you'll program your Rover to search for intruders and then hightail it back to field command HQ unobserved. After completing this mission, you'll know how to:

- **Program the LED headlights to turn on**
- **Use the PAUSE command**
- **Use the RETURN TO HOME command**

MISSION BACKGROUND

The RETURN TO HOME command tells your Rover to turn 180^0 and run the entire sequence of programming code in reverse order. This includes the maneuvering and the lights. It will not replay any sounds and it won't rerecord. When you send RECON 6.0 on an espionage assignment (as in Mission 10), it will make a secret recording and bring that same recording safely back to you.

MISSION TRAINING BRIEF

Send your Rover into a dark closet or a bedroom. Since the map and code have been created for you here, just make sure your destination is within range. Measure it out in advance to calculate where to start your Rover. And don't forget to turn out the lights!

CODE

Map markings:

- ⬤ (start point) **0**
- ▮▮ 2 secs
- ↱ 90°
- ▮▮ 2 secs
- ↱ 90°
- ▮▮ 2 secs
- ↱ 90°
- ▮▮ 2 secs
- ↱ 90°
- ▮▮ 2 secs

↑ 4 feet 🏠

✕

Code list:

01	↑ 4 feet	20	
02	💡 ON	21	
03	▮▮ 2 secs	22	
04	↱ 90°	23	
05	▮▮ 2 secs	24	
06	↱ 90°	25	
07	▮▮ 2 secs	26	
08	↱ 90°	27	
09	▮▮ 2 secs	28	
10	↱ 90°	29	
11	▮▮ 2 secs	30	
12	🏠	31	
13	Save	32	
14		33	
15		34	
16		35	
17		36	
18		37	
19		38	

LET'S GO!

STEP 1: CLEAR YOUR SAFE ZONE AND SELECT YOUR TRIP

CREDIBLE INTELLIGENCE

This mission has a whopping 12 program lines, but don't worry, a bunch of them are the same. You still have to program all 12, but you'll get to repeat the same code a number of times. Every software program in existence works this way—with lines and lines of repeated code.

A Create a 5' x 2' vertical rectangular safe zone.

Your Rover's starting position will be at the bottom center of the zone, as shown on the map.

B Program Mission 03 as TRIP #3.

PROGRAM TRIP# 3

STEP 2:
WRITE YOUR PROGRAM LINES

A For Program Line 01, enter code for DRIVE FORWARD ↑ 4 FEET.

PROGRAM TRIP# 3
01	↑	04 FEET
02		
03		

B For Program Line 02, scroll over to HEADLIGHTS 💡 (ENTER).

ON will now be flashing (ENTER).

PROGRAM TRIP# 3
01	↑	04 FEET
02	💡	OFF ON
03		

C For Program Line 03, scroll over to PAUSE ‖ (ENTER).

Toggle to SECONDS (ENTER). 01 will now be flashing. Scroll up to 02 (for a 2-second pause) and ENTER.

PROGRAM TRIP# 3
01	↑	04 FEET
02	💡	ON
03	‖	02 SECS

D For Program Line 04, enter code for RIGHT TURN, 90 DEGREES.

PROGRAM TRIP# 3
02	💡	ON
03	‖	02 SECS
04	↱	90 DEGREES

E For Program Lines 05–11 (the next 7 lines of code), enter the following:

05—PAUSE ⏸ , 2 SECONDS.

06—RIGHT TURN ↱ , 90 DEGREES.

07—PAUSE ⏸ , 2 SECONDS.

08—RIGHT TURN ↱ , 90 DEGREES.

09—PAUSE ⏸ , 2 SECONDS.

10—RIGHT TURN ↱ , 90 DEGREES.

11—PAUSE ⏸ , 2 SECONDS.

F For Program Line 12, scroll to **RETURN TO HOME** 🏠 (ENTER).

CREDIBLE INTELLIGENCE

To insert a line of code between 2 existing program lines, use the INSERT button. The new line will be entered as the same program line number that is flashing. All the lines after it will shift down and be renumbered.

To delete a line of code, press and hold the DELETE button for 3 seconds. Remember, the program line number needs to be flashing.

PROGRAM TRIP# 3

```
10      ↱       90 DEGREES
11          ⏸   02 SECS
12 ↑↰↱↓⏸ 🏠 ))) 🎤
```

SAVE YOUR PROGRAM!

STEP 3: READY TO RUN!

Place RECON 6.0 in the starting position and choose RUN (ENTER).

DEBRIEFING

Did it work? Did your Rover follow the Mission 03 map? If not:

- 🟢 **Did you program the headlights to come on?**
- 🟢 **Did you turn out the lights in your room?**

MISSION OBJECTIVE

Program your RECON 6.0 to run a safety patrol, securing your bedroom door and warning potential intruders or unwanted guests to keep out. After completing this mission, you'll know how to:

- Use the LOOP command
- Measure and program your own distance coordinates
- Listen to your Rover's preprogrammed sound files, and use one in a trip

MISSION BACKGROUND

By using the LOOP command, your Rover will repeat the sequence (including lights and sound) as many times as you'd like.

MISSION TRAINING BRIEF

You'll need to record a warning message first—something firm and direct:

- "Halt! Move away from the perimeter."
- "Step away from the door!"
- "Security breach! Security breach!"

And don't forget to use your best angry robot voice!

CODE

Bedroom

Door

reverse   Ⓒ   reverse

X
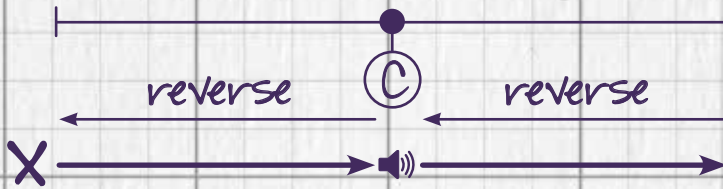
Hallway

Door width _____ + 12″ = Patrol Distance _____

Patrol Distance _____ ÷ 2 = Center Point Number _____

Code		Code	
01	↑ ___ feet or inches	20	
02	🔊 #2	21	
03	↑ ___ feet or inches	22	
04	↓ ___ feet or inches	23	
05	🔊 #2	24	
06	↓ ___ feet or inches	25	
07	↻ ___	26	
08	Save	27	
09		28	
10		29	
11		30	
12		31	
13		32	
14		33	
15		34	
16		35	
17		36	
18		37	
19		38	

LET'S GO!

STEP 1:
PREP STEPS—PATROL ZONE

Your Rover will stop and sound its warning at the center point (at the middle of the door) before continuing to the other side. When you write the programming code, you'll need to know at how many feet (or inches) your Rover performs this act of security.

Write these numbers in the blanks to the right and on your mission map.

Measure the width of your door using your tape measure (most are between 2 ½ and 3-feet).
DOOR WIDTH: _____

Add 12 inches (1 foot) to this number.
(That will allow for 6 inches per side.)
PATROL DISTANCE: _____

Divide the patrol distance number in half.
CENTER POINT NUMBER: _____

STEP 2: RECORD YOUR SOUND FILE

A You'll want to record your warning under SOUND #2. Remember, RECORD SOUND 🎤 will appear.

Press and hold the RECORD button and state your RECON 6.0's warning. Release the button when you are done recording.

Remember, it will beep once when you begin and twice when you release the button or when your recording limit of 5 seconds is up!

PROGRAM   SOUND#2
🎤

B To listen to what you recorded:

Choose the flashing RUN icon on the screen by pressing ENTER.

PROGRAM   SOUND#2 **RUN** EDIT
🔊🎤

C If you'd like to rerecord:

Scroll to EDIT [ENTER]. Then scroll to RECORD SOUND 🎤 and press the RECORD button again.

PROGRAM   SOUND#2   **EDIT**
🎤

STEP 3: WRITE YOUR PROGRAM LINES

A Program this mission as TRIP #4 .

01—DRIVE FORWARD ⬆, center point FEET or INCHES. Use the center point number you calculated in Step 1.

02—PLAY SOUND 🔊 #2.

03—DRIVE FORWARD ⬆, center point FEET or INCHES.

04—DRIVE REVERSE ⬇, center point FEET or INCHES.

05—PLAY SOUND 🔊 #2.

06—DRIVE REVERSE ⬇, center point FEET or INCHES.

B For Program Line 07, scroll to LOOP ↪ (ENTER). 01 will flash on the screen. Scroll to the number of times you want your Rover to repeat this patrol (ENTER).

Recommended: 3 loops. If you work your Rover too hard, it may get off track. Nobody's perfect. Even robots need a break!

SAVE YOUR PROGRAM!

STEP 4: READY TO RUN!

Place RECON 6.0 in the starting position (6 inches to the left of your door) and rotate its head to the right. Choose RUN (ENTER) to activate your room guard!

DEBRIEFING

Did it work? Did the Rover follow your Mission 04 map? If not:

● Did you program the sound to play at the right place?

● Did you calculate the correct number for your center point?

● Did it get off course? Perhaps you had it do too many loops.

● Did you make sure it was exactly parallel to the door?

● Did you calibrate your Rover to your current surface?

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MISSION OBJECTIVE

Program your RECON 6.0 to tell a knock-knock joke. Surprise unsuspecting participants and entertain friends and family, while simulating artificial intelligence (AI).

CONGRATULATIONS!

You've advanced to Advanced Technical Operations! Be warned—you're on your own now. Well, there are maps and codes to get you started, but no more step-by-steps.

MISSION BACKGROUND

It may seem like it, but your Rover doesn't have a brain. It can only perform the tasks you program it to do, one line of code at a time. In this first Advanced Ops mission, you will mimic AI technology. If you are successful, you can trick friends and family members into believing that your Rover actually does think on its own!

MISSION TRAINING BRIEF

You'll need to plan out the joke beforehand. You'll also have to estimate how long it will take to say each line. Remember you only have 5 seconds per sound file. Try timing your Rover's responses in advance. Oh, and you won't need a map for this one.

Whether you decide to use the sample knock-knock joke or one of your own, you'll need to:

Start by saying each line in your best robot voice. Record them into sound files #2–#4. The pause times should match the time you'll need to say your response lines.

SAMPLE SCRIPT

RECON	KNOCK KNOCK! (RECORD IN SOUND #2)
YOU	WHO'S THERE?
RECON	ART. (RECORD IN SOUND #3)
YOU	ART WHO?
RECON	R2-D2! (RECORD IN SOUND #4)

PROGRAM TRIP #5

01	PLAY SOUND #2.
02	PAUSE 2 SECONDS.
03	PLAY SOUND #3.
04	PAUSE 2 SECONDS.
05	PLAY SOUND #4.
	SAVE.

CODE

RECON: Knock Knock!

ME: Who's there? (PAUSE __2__ SECS)

RECON: _____

ME: _____ (PAUSE _____ SECS)

RECON: _____

01 🔊 #2	18
02 ⏸ 2 secs	19
03 🔊 #3	20
04 ⏸ 2 secs	21
05 🔊 #4	22
06 Save	23
07	24
08	25
09	26
10	27
11	28
12	29
13	30
14	31
15	32
16	33
17	34

THE QUEST FOR ARTIFICIAL INTELLIGENCE

Ever since mathematician Alan Turing first dreamed up a machine that could "think," researchers have been working away on developing an electronic brain—one that not only can solve problems, but can reason, apply logic, and speak English. And while the idea of artificial intelligence is thousands of years old, researchers have made great strides in AI technology in the past few decades, thanks to today's fast and powerful computers.

MISSION OBJECTIVE

Program your RECON 6.0 to play a greeting while kindly delivering a treat to the family dog, cat, little brother or sister, gerbil, rabbit, or any creature that'll be impressed by such an encounter.

MISSION BACKGROUND

What's the point of having a robot if you can't have a little fun at the expense of the sleeping dog or jittery cat? If you don't have a Fido or Fifi, no problem. Any *alien* will do. Just choose an unknowing, and preferably stationary, one. Of course, if you know where some real aliens hang out, then by all means initiate contact, Earthling.

MISSION TRAINING BRIEF

Since your Rover will greet your alien, offering it a treat verbally, you'll need to record your greeting first and then program your trip. Don't forget to load RECON 6.0's cargo hold with a snack.

Practice Alien Contact by following the code provided, adding your specific distances.

SAMPLE

RECORD IN SOUND #1: SIT, FIDO! STAY.
RECORD IN SOUND #2: GOOD BOY. TAKE THE TREAT.

PROGRAM TRIP #6

01	DRIVE FORWARD __ FEET.
02	PLAY SOUND #1.
03	RIGHT TURN, 90 DEGREES.
04	RIGHT TURN, 90 DEGREES.
05	PLAY SOUND #2.
06	PAUSE 8 SECONDS.
07	DRIVE FORWARD __ FEET
	SAVE.

MISSION MAP

CODE

01 ⬆ ___ feet
02 🔊 #1
03 ↱ 90°
04 ↱ 90°
05 🔊 #2
06 ⏸ 8 secs
07 ⬆ ___ feet
08 Save
09
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34

BOOLEAN LOGIC

Boolean (BOO-lee-un) logic makes it possible for your computer to play chess with you and to spell-check your homework, and for your RECON 6.0 to offer your dog a bone and navigate the obstacle course in your living room. This logical system of true-false statements lets programmers build software that works kind of like our brains, processing a large number of variables—but coming up with the correct answers at *superfast* speed.

MISSION OBJECTIVE

RECON 6.0 isn't just for covert ops and dangerous field assignments; it likes to have a good time too! In this lighthearted mission, you'll teach (well, program) your Rover to perform a funky dance.

MISSION BACKGROUND

While RECON 6.0 can do a lot of tricky maneuvering, it can't move side to side the way a human can. To make it look more like dancing, program your Rover to pivot left and right and make short moves forward and back. Don't forget to add a soundtrack to Rover's choreography. SOUND #9 should do the trick.

MISSION TRAINING BRIEF

You can program your Rover to do any dance you like. Start by doing the dance yourself, and then map out those dance steps on a piece of paper. Turn those steps into forward, backward, left, and right maneuvers on your mission map. From that point, you should be able to throw down the code in no time.

Try our sample choreography first. You only need to clear a 3' x 3' safe zone and let your Rover loose.

PROGRAM TRIP #7

01	PLAY SOUND #9, ON.
02	LEFT TURN, 90 DEGREES.
03	RIGHT TURN, 90 DEGREES.
04	LOOP, 01.
05	DRIVE REVERSE 5 INCHES.
06	LEFT TURN, 90 DEGREES.
07	RIGHT TURN, 90 DEGREES.
08	LOOP, 01.
09	LEFT TURN, 90 DEGREES.
10	LOOP, 07.
	SAVE.

MISSION MAP

STAGE
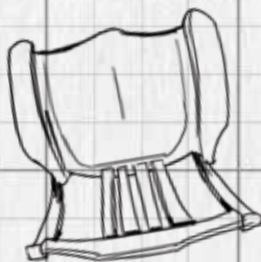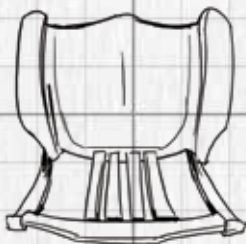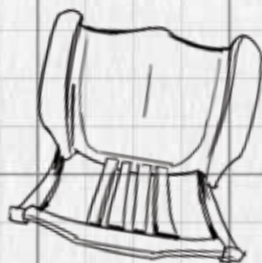
CODE

01	🔊 #9	18	
02	↖ 90°	19	
03	↗ 90°	20	
04	↻ 01	21	
05	↓ 5 inches	22	
06	↖ 90°	23	
07	↗ 90°	24	
08	↻ 01	25	
09	↖ 90°	26	
10	↻ 07	27	
11	Save	28	
12		29	
13		30	
14		31	
15		32	
16		33	
17		34	

THRILLING

Tokyo's International Robot Exhibition 2009 featured a first-of-its-kind robot dance-off. Break-dancing bots and kimono-clad cyberfan dancers hit the stage to strut their stuff. Gold was garnered by Ryuki II, grooving to a song called "Joyful" by a Japanese pop group. Silver was awarded to a robot named Black Tiger Neo, dancing to Michael Jackson's "Thriller."

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MISSION OBJECTIVE

Back in Mission 01, you programmed your RECON 6.0 to perform a simple field maneuver. This time you'll program a much more advanced—and exciting— one. To really put your Rover to the test, you're going to add some obstacles to the terrain!

MISSION BACKGROUND

Obstacles! You can make towers using LEGO® bricks or blocks for your Rover to knock down or maneuver around. Or build ramps, create tunnels, or design a slalom course. Plot your trip so there is enough room for the Rover to pass each obstacle.

MISSION TRAINING BRIEF

Use the mission map to determine the distances and the turning degrees of the obstacle course. Enter your findings and calculate where your obstacles should go. There are a few things to consider. First, your map is one inch for one foot. Second, your Rover is about 8 inches across. (That's wider than a line on a map!) Third, your Rover pivots and turns from its front center, marked with an "x" in the illustration below. You can also use this point to measure your Rover's starting and ending positions.

6 INCHES   6 INCHES

1 FT.
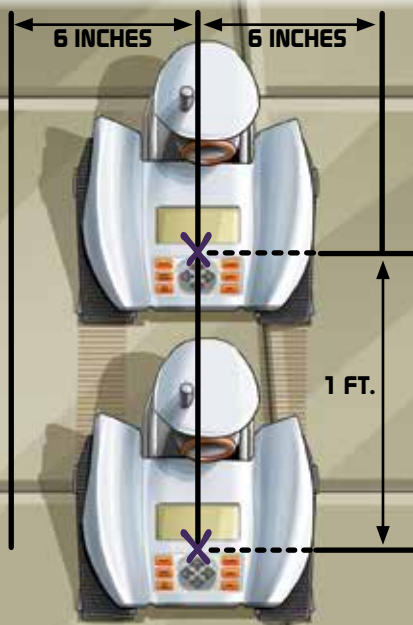
PROGRAM TRIP #8

01	DRIVE FORWARD __ FEET.
02	RIGHT TURN, __ DEGREES.
03	DRIVE FORWARD __ FEET.
04	RIGHT TURN, __ DEGREES.
05	DRIVE FORWARD 34 INCHES.
06	LEFT TURN, __ DEGREES.
07	DRIVE FORWARD __ FEET.
08	LEFT TURN, 90 DEGREES.
09	DRIVE FORWARD __ INCHES.
10	LEFT TURN, __ DEGREES.
11	DRIVE FORWARD __ FEET.
12	LEFT TURN, __ DEGREES.
13	DRIVE FORWARD __ INCHES.
	SAVE.

CREDIBLE INTELLIGENCE

This mission's obstacle course makes for a real challenge. Starting your Rover even slightly out of alignment can result in it ending up a full foot or more off-target. So be sure to start your RECON 6.0 in a straight position, or those blocks will tumble! If necessary, recalibrate your Rover using the directions on pages 6–7.

MISSION MAP

CODE

01	↑ ___ feet	18	
02	↱ ___	19	
03	↑ ___ feet	20	
04	↱ ___	21	
05	↑ 34 inches	22	
06	↰ ___	23	
07	↑ ___ feet	24	
08	↰ ___	25	
09	↑ ___ inches	26	
10	↰ ___	27	
11	↑ ___ feet	28	
12	↰ ___	29	
13	↑ ___ inches	30	
14	Save	31	
15		32	
16		33	
17		34	

34 inches

X

DOING THE DIRTY WORK

Got dog hair and dust bunnies? It's Roomba® to the rescue! In 2002 iRobot, a company started by some scientists from the MIT Artificial Intelligence Lab, introduced the ultimate obstacle-course rover. The Roomba robotic vacuum cleaner uses hazard avoidance technology from defunct minesweeping robots. It can clean a room without knocking over that Ming vase or another priceless antique.

MISSION OBJECTIVE

Send your RECON 6.0 on a search and rescue mission. Only it won't be looking for missing mountain climbers or buried treasure. In this mission, your Rover will fetch a treat for you—the real reason mankind has been dreaming of robots for so long.

MISSION BACKGROUND

Once you've decided what you want your Rover to fetch (maybe a cookie, a drink, or your baseball cards from your baby brother's clutches), you'll need to program it to do your bidding. So record your sound file first—something like, **"Please deposit a cookie into my cargo hold."**

MISSION TRAINING BRIEF

Your Rover will need to travel its course, ask for the object, and then head back to field command HQ. The course can be as simple or complex as possible. You might want to make it straightforward, like from the living room to the kitchen, where you're most likely to catch someone who can fulfill your request.

Check out our sample below, then use the mission map and tape measure to map out the coordinates that work at your house. The map was left blank for this reason.

PROGRAM TRIP #9

01	DRIVE FORWARD 5 FEET.
02	RIGHT TURN, 90 DEGREES.
03	DRIVE FORWARD 4 FEET.
04	PLAY SOUND # __.
05	RIGHT TURN, 90 DEGREES.
06	RIGHT TURN, 90 DEGREES .
07	PAUSE 15 SECONDS.
08	DRIVE FORWARD 4 FEET.
09	LEFT TURN, 90 DEGREES.
10	DRIVE FORWARD 5 FEET.
	SAVE.

MISSION MAP

CODE

01	18
02	19
03	20
04	21
05	22
06	23
07	24
08	25
09	26
10	27
11	28
12	29
13	30
14	31
15	32
16	33
17	34

SEARCH AND RESCUE

In 2010 California State University in Los Angeles hosted the Search and Rescue Robot Challenge, a competition that challenges students from around the world to take artificial intelligence and robotics technology to a whole new level, creating robots that can aid emergency workers, like police officers, firefighters, and paramedics.

MISSION OBJECTIVE

RECON 6.0 makes the perfect espionage agent. You can program it to gain access to an off-limits site (your sibling's room!), record valuable information, and then return to field command HQ undetected, revealing its findings to you.

MISSION BACKGROUND

No matter if your course is simple or complicated, you'll want to make your Rover as inconspicuous as possible. How? With a little advanced planning. Scout out a good hiding place behind enemy lines. Then use your tape measure to carefully calculate the distances you'll need your RECON 6.0 to return from this reconnaissance mission.

MISSION TRAINING BRIEF

In order to collect as much information as possible, you can record more than 5 seconds at a time by doubling or tripling up on sound files.

Check out the sample *recon*naissance schematic. As in Mission 09, the mission map and code are blank for you to map out your unique coordinates.

PROGRAM TRIP #10

01	PAUSE 10 MINUTES.
02	RECORD SOUND #1.
03	RECORD SOUND #2.
04	RECORD SOUND #3.
05	DRIVE FORWARD 2 FEET.
06	LEFT TURN, 90 DEGREES.
07	DRIVE FORWARD 3 FEET.
08	LEFT TURN, 90 DEGREES.
09	DRIVE FORWARD 7 FEET.
10	LEFT TURN, 90 DEGREES.
11	DRIVE FORWARD 4 FEET.
	SAVE.

MISSION MAP

CODE

SPIDER ROVER

Move over, James Bond; it's Spider Rover! Scientists in the
United States and Taiwan have developed wall-crawling reconnaissance rovers.
These silicon spies can scale walls, sneak into buildings, and have
audiovisual recording technology.
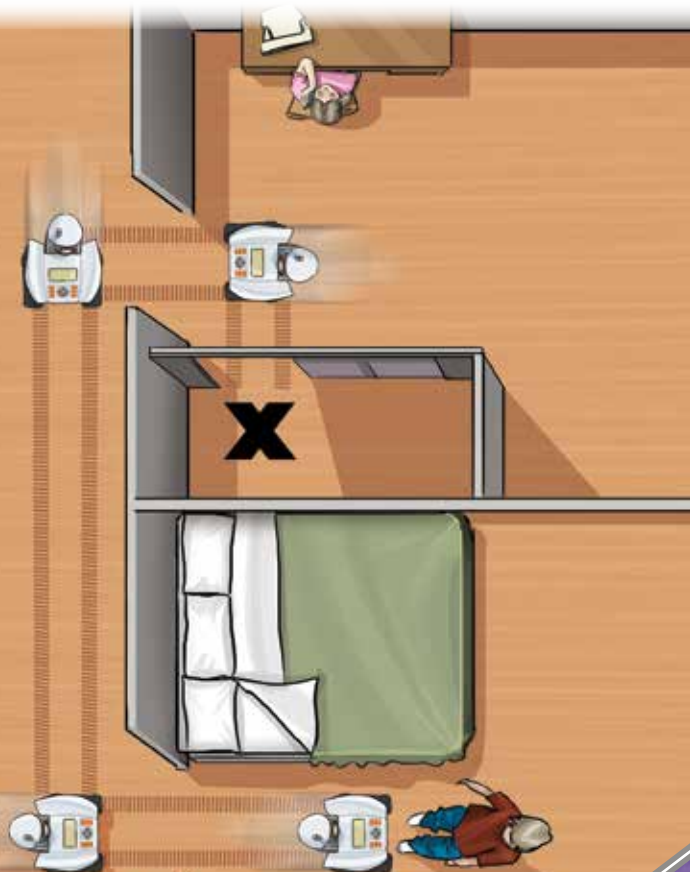
EXCELLENT WORK!

You've earned your wings, and now you're an ace programmer! By successfully completing all of these missions, you are licensed to send your RECON 6.0 on the most difficult and dangerous missions you can dream up! **Use the blank maps on the next few pages to get started.**

As any software developer knows, to design good code you need to follow 3 basic steps: design, program, and test. The same is true here. For each Rover mission, you'll need to:

✿ DESIGN THE MISSION
This means envisioning what you want RECON 6.0 to do, using your tools to measure and map out the course.

✿ PROGRAM YOUR ROVER
This means turning your design ideas into a logical sequence by filling in the blank code map, double-checking to make sure you didn't miss any steps, and finally, programming your code.

✿ TEST YOUR PROGRAM
Run your mission. Did your RECON 6.0 do what you wanted it to do? If not, pinpoint where it went wrong and go back and fix your code. Remember to use the EDIT command, resave it, and run it again.

✿ RESULTS!
If you follow all 3 of these steps every time you create a mission, your RECON 6.0 will reward you with perfectly executed missions and hours of fun!

TROUBLESHOOTING

As you experiment with your own missions, your RECON 6.0 may not perform how you imagined. What now? If you have any problems, review these troubleshooting suggestions to guide you:

- ✿ **Double-check your code. Is all of your programming correct?**
- ✿ **Is your starting position accurate?**
- ✿ **Check your measurements. Did you input them correctly? Did you use inches instead of feet?**
- ✿ **Did you calibrate your RECON 6.0 to the current surface as shown on pages 6–7?**
- ✿ **Did it get off track? Perhaps you looped it too many times.**
- ✿ **Are your batteries low?**
- ✿ **Is your payload too heavy?**

MISSION MAP

CODE

01	20
02	21
03	22
04	23
05	24
06	25
07	26
08	27
09	28
10	29
11	30
12	31
13	32
14	33
15	34
16	35
17	36
18	37
19	38

MISSION MAP

CODE

01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
17
18
19

20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38

MISSION MAP

CODE

01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
17
18
19

20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38

COMMANDING CAPABILITIES

The scientists at SmartLab have worked night and day to produce this state-of-the-art RECON 6.0 Programmable Rover. And they've tricked it out with some pretty cool features and capabilities:

- **The Rover can hold 9 missions at a time in its memory bank with up to 50 commands each.**

- **It has a sound file bank of 9 unique sounds: 4 to record yourself and 5 prerecorded sound effects, including a laser blast!**

- **You can program multidirectional navigation, turning headlights off and on, and commands like LOOP and RETURN TO HOME.**

LCD SCREEN

LOAD PROGRAM TRIP#8 SOUND#8 RUN EDIT

88 ↑ ↖ ↗ ↓ 🏠⏸ 🔊 🎤 💡 ↺ 88 DEGREES OFF / MINS FEET ON / SECS INCHES

88 ↑ ↖ ↗ ↓ 🏠⏸ 🔊 🎤 💡 ↺ 88 DEGREES OFF / MINS FEET ON / SECS INCHES

88 ↑ ↖ ↗ ↓ 🏠⏸ 🔊 🎤 💡 ↺ 88 DEGREES OFF / MINS FEET ON / SECS INCHES
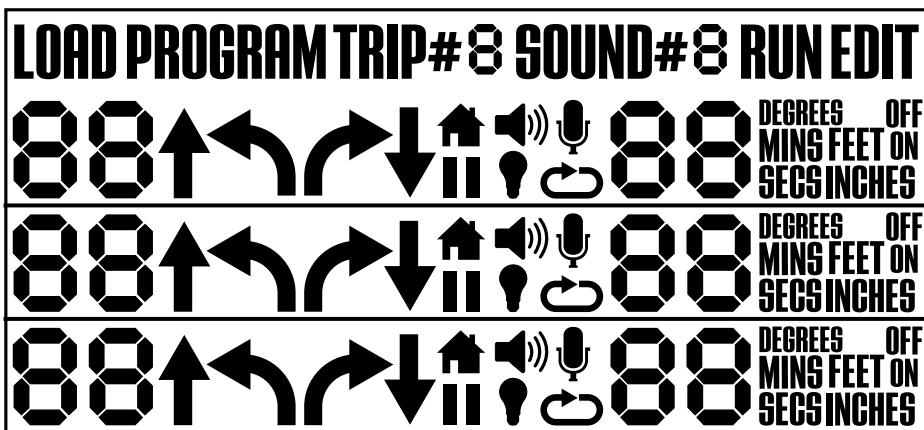
EAT YOUR CARROTS

You see LCD screens all over the place these days—on computers, televisions, video game devices, even alarm clocks, telephones, and calculators! But that doesn't make them any less amazing. LCD stands for *liquid crystal display*. It's made up of tiny pixels filled with liquid crystal and backlit to create images. It's lightweight and requires very little power to work, which is why it's used in so many battery-operated gadgets. Its invention can be traced back to 1888, when an Austrian scientist discovered liquid crystals while experimenting with carrots!

LCD BASICS

LOAD accesses a previously recorded trip so you can view, edit, or run it. It also accesses all 9 sound files, so you can listen to them.

LOAD PROGRAM

PROGRAM is where you can start a new trip or writeover a previously programmed trip from scratch. You can also access sound files #1–#4 to record your own custom sounds.

LOAD **PROGRAM**

TRIP# A trip is a program that tells your Rover what you want it to do. You can store up to nine different trips at a time. # (number) indicates which trip will be loaded or programmed.

LOAD PROGRAM **TRIP# 8** SOUND# 8 RUN EDIT

SOUND# There are four 5-second blank sound files and five prerecorded ones. # (number) indicates which sound file will be programmed (#1–#4), or loaded:
#5 funny horn
#6 beep! beep!
#7 laser blast
#8 siren
#9 dance beat (This sound needs to be turned on and off, so your Rover has a soundtrack to dance to.)

LOAD PROGRAM TRIP# 8 **SOUND# 8** RUN EDIT

RUN activates a programmed trip. It will also play a sound file.

LOAD PROGRAM TRIP# 8 SOUND# 8 **RUN** EDIT

EDIT allows you to access (and thus edit) an existing trip or sound file.

LOAD PROGRAM TRIP# 8 SOUND# 8 RUN **EDIT**

PROGRAM LINE Each program line allows you to program one of 10 commands. It can store up to 50 program lines per trip. Only 3 program lines are displayed at one time.

88↑↖↗↓♠♪⛯🎤👣88 DEGREES MINS FEET ON SECS INCHES OFF

PROGRAM LINE NUMBERS tell you which line of the program you are on. Each line is automatically entered into the program as you create a new program line. Each trip will always begin at Program Line 01.

LOAD PROGRAM TRIP#
01 88↑↖↗↓♠♪⛯🎤👣88 DEGREES MINS FEET ON SECS INCHES OFF
02
03

LCD ICONS

DRIVE FORWARD is used to program the Rover to move in a forward straight line. Distance can be programmed in units of feet or inches.

LEFT TURN is used to program the Rover to turn left. Turns can be programmed at either 45^0 or 90^0.

RIGHT TURN is used to program the Rover to turn right. Turns can be programmed at either 45^0 or 90^0.

DRIVE REVERSE is used to program the Rover to move in a backward straight line. Distance can be programmed in units of feet or inches.

RETURN TO HOME is used to repeat all program lines in reverse order, returning Rover to its starting position. It will turn 180^0 and follow its same route but will not play sounds or record.

PLAY SOUND is used to play 1 of 9 sounds. Sound files #1–#4 are rerecordable, but sound files #5–#9 come prerecorded and cannot be recorded over.

RECORD SOUND is used to program the Rover to record a sound while out on a mission. It will automatically record for a full 5 seconds and save it to the sound file number assigned to it.

PAUSE is used to program the Rover to stop for a specified length of time. Time can be programmed in units of minutes or seconds.

HEADLIGHTS The Rover has two bright LEDs that can be programmed to turn on in one line of code and then off again in another.

CAUTION:
Do not expose the eyes to the light source. Never stare directly at these LEDs.

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LOOP is used to run a trip multiple times without re-entering the same program lines. The LOOP command programs the Rover to return to the first line of the program and run it again. When performing multiple loops in a program, each loop will have the Rover return to the first line of code that appears one line after the previous loop code. The number of times looped is entered in COMMAND VALUE (see below). It tops out at 99.

COMMAND VALUE After choosing a command, this is where you indicate the number desired. Hold down the button to scroll through the numbers faster. For sound files, this number references the sound file number.

DEGREES is used with the LEFT and RIGHT turn commands to program the degrees of rotation, either 45 or 90.

MINS — **MINUTES** is used in conjunction with the PAUSE command to program the number of minutes.

SECS — **SECONDS** is used in conjunction with the PAUSE command to program the number of seconds.

FEET is used in conjunction with the DRIVE FORWARD command to indicate the distance in feet.

INCHES is used in conjunction with the DRIVE FORWARD command to indicate the distance in inches.

OFF/ON (on the LCD screen) is used to program the headlights to go off or on. It is also used with sound file #9 (dance beat), so the Rover will be accompanied by music during his time on the dance floor.

KEYPAD

ON/OFF

Use the ON/OFF button on the keypad during play, but when you're done having fun for the day, turn your Rover off using the hard switch on its bottom.

If the ON/OFF button is pressed before a new program has been saved, the program will not be saved. Any time the Rover is turned on, it will start at the Start Screen.

INSERT

The INSERT button is used to add a new line of programming between existing lines. Press INSERT on the program line below the one you want to enter. The program line needs to be flashing for a line of code to be entered above it.

DELETE

Delete a line of code by pressing and holding the DELETE button for 3 seconds. The program line number you want to delete needs to be flashing.

EXIT

Pressing the EXIT button will return the display to the Start Screen. If the EXIT button is pressed before saving, your program will not be saved.

STOP

The STOP button stops the Rover in its tracks. It can only be used when the Rover is running a trip.

RECORD

The RECORD button is used when recording a sound as well as part of the Diagnostics Test on pages 6–7.

ENTER

The ENTER button is used to make a selection when an icon is flashing—including numbers, commands, programming modes, etc.

SAVE

The SAVE button is used to save a trip after programming or editing is complete. When the SAVE button is pressed, any programming previously assigned to that TRIP# or SOUND# will be erased and saved over. The PROGRAM LINE number needs to be flashing for SAVE to save.

DIRECTIONAL PAD

This pad of arrows is used to scroll through numbers or commands, and to navigate program lines. The directional pad contains 4 buttons: UP, DOWN, LEFT and RIGHT. Use the LEFT ARROW to scroll backward.

ON/OFF

INSERT
DELETE

EXIT
STOP

RECORD

ENTER

SAVE

MISSION MAP

CODE

01	20
02	21
03	22
04	23
05	24
06	25
07	26
08	27
09	28
10	29
11	30
12	31
13	32
14	33
15	34
16	35
17	36
18	37
19	38