

BUILD IT

Answers to Figure 8 Challenge NXT Questions

Name: _____

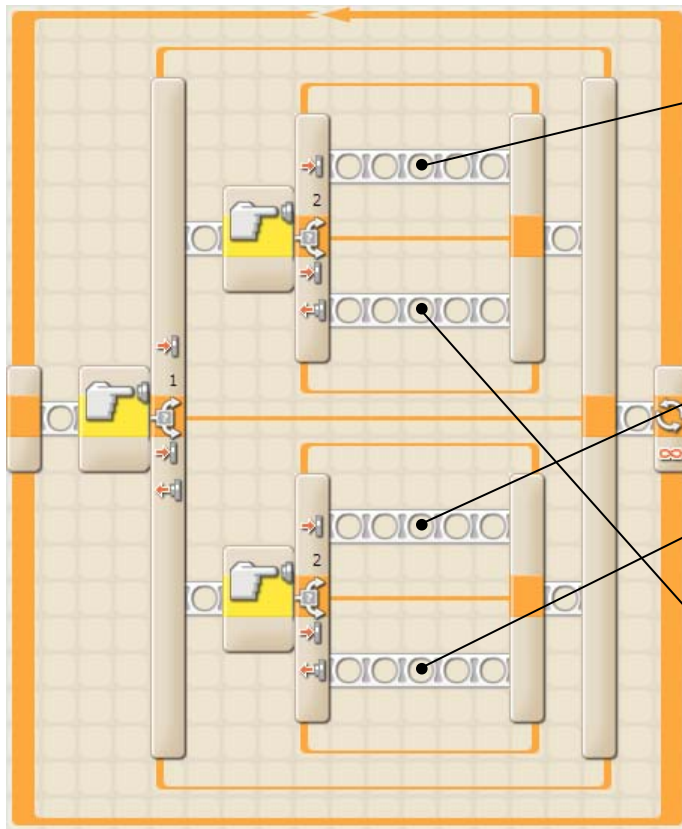
Date: _____

1. You are trying to make a program that works with two touch sensors. You want it to work so that:
 - when both touch sensors are held down, a picture is drawn on the NXT screen
 - when both touch sensors are let go, the NXT plays a sound
 - when touch sensor 1 is held down and 2 is not, a motor spins forward
 - when touch sensor 2 is held down and 1 is not, the motor stops

Shown below is the program so far along with a bunch of icons. Draw a line from each icon to the location in the program where it belongs, and if it doesn't belong in the program at all, cross it out with an "X". (Each switch with a touch sensor is testing for "pressed", not "released" or "bumped".)

Your program so far

2.



Icons



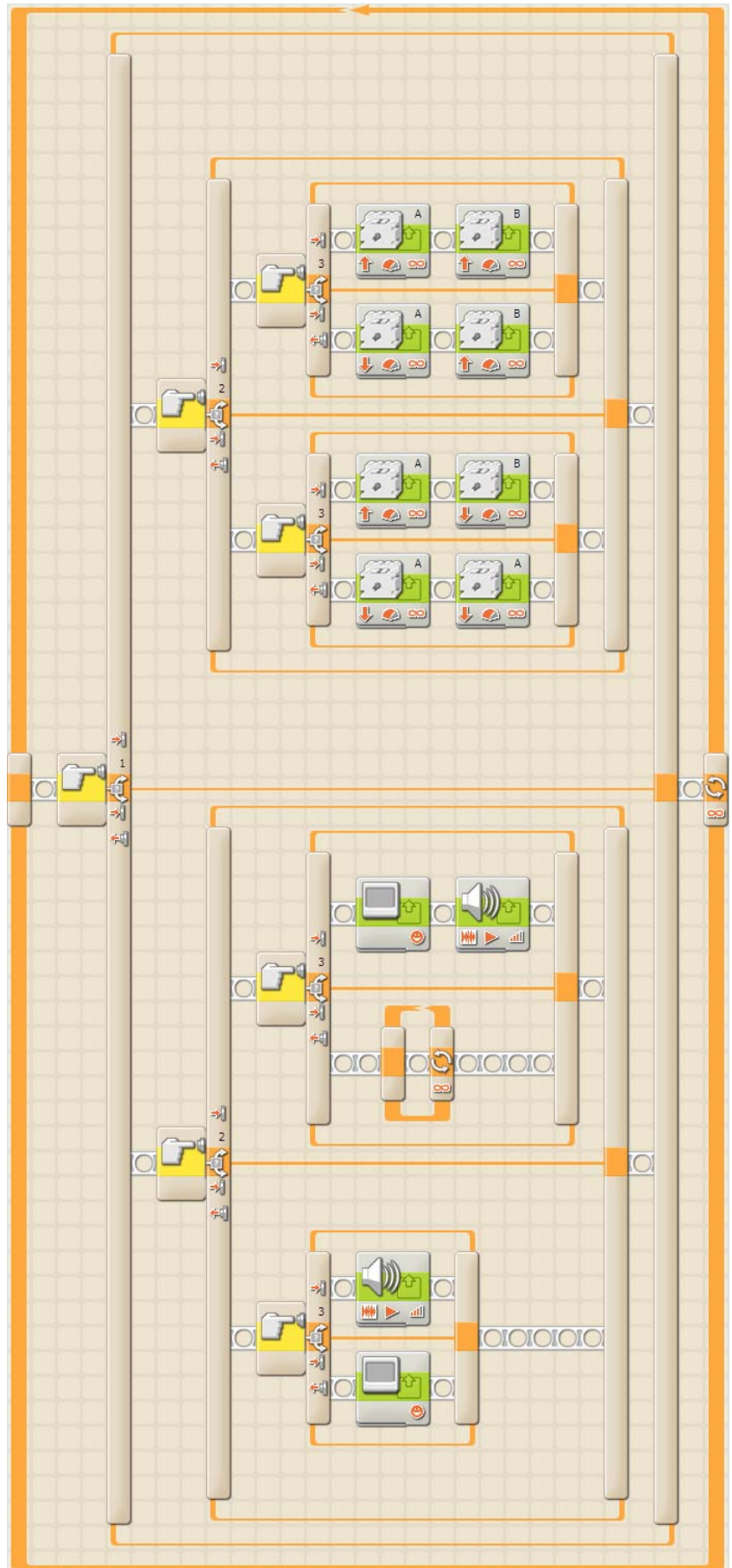
There is a bug somewhere in this program.

a. What is the problem?

There is an empty infinite loop in one of the innermost branches. When the program reaches it, it will get stuck in the loop with no way out, and nothing more will happen.

b. What has to happen to the touch sensors in order for the program to reach the bug? (Each switch with a touch sensor is testing for “pressed”, not “released” or “bumped”.)

- *Touch sensor 1: Released.*
- *Touch sensor 2: Pressed.*
- *Touch sensor 3: Released.*

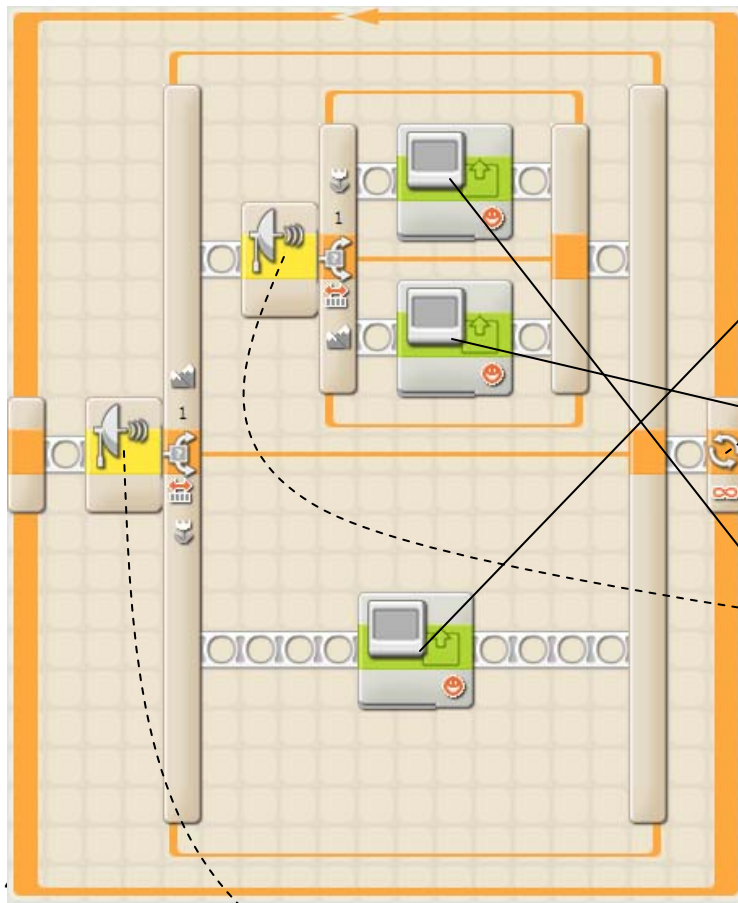


3. Consider a program in which an ultrasonic sensor is used to control the display of a smiley face.

Here is how it works:

- If something is less than a foot from the sensor, a smiling face is shown.
- If something is more than two feet away, a frowning face is shown.
- If something is in between one and two feet away, a neutral face is shown.

Shown below is the program along with the control panels for each of its icons. Draw a line from each control panel to its icon.



Control panel for the smiling face icon. The 'Action' is 'Image'. The 'File' is 'Smile 01'. The 'Position' is X: 22, Y: 4.

Control panel for the frowning face icon. The 'Action' is 'Image'. The 'File' is 'Smile 03'. The 'Position' is X: 22, Y: 4.

Control panel for the neutral face icon. The 'Action' is 'Image'. The 'File' is 'Smile 02'. The 'Position' is X: 22, Y: 4.

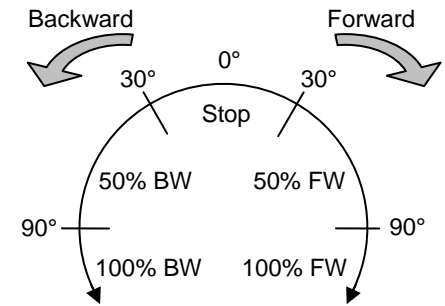
Control panel for the ultrasonic sensor. The 'Sensor' is 'Ultrasonic Sensor'. The 'Compare' is 'Distance'. The 'Distance' is 24. The 'Show' is 'Inch'.

Control panel for the ultrasonic sensor. The 'Sensor' is 'Ultrasonic Sensor'. The 'Compare' is 'Distance'. The 'Distance' is 12. The 'Show' is 'Inch'.

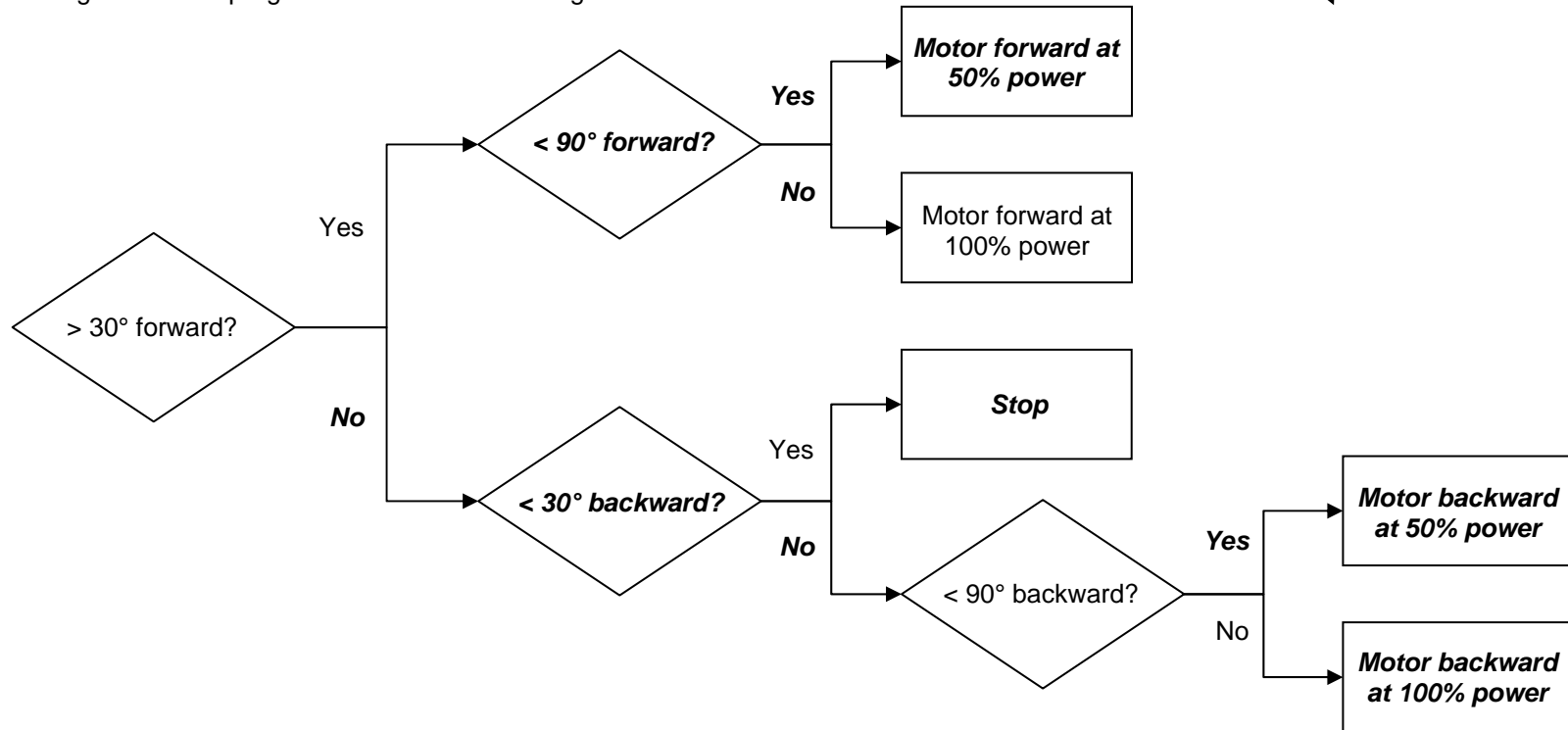
5. You want to make a program that will control a motor with a rotation sensor.

This is how you want it to work:

- When the rotation sensor is in between 30° *forward* and 30° *backward*, the motor should stop.
- When the sensor is *forward* more than 30° but less than 90°, the motor will spin *forward* at 50% power.
- When the sensor is *backward* more than 30° but less than 90°, the motor will spin *backward* at 50% power.
- When the sensor is *forward* more than 90°, the motor will spin *forward* at 100% power.
- When the sensor is *backward* more than 90°, the motor will spin *backward* at 100% power.



The flow diagram for this program would look something like this:



One problem – some of the words or phrases that should be in this flow diagram are missing. Use the list of words and phrases below to fill in the diagram above. (You may use a word or phrase more than once, and some may not be used at all.)

Yes	< 30° forward?	> 90° forward?	< 90° backward?	Motor backward at 50% power
No	> 30° backward?	< 90° forward?	Stop	Motor forward at 100% power
> 30° forward?	< 30° backward?	> 90° backward?	Motor forward at 50% power	Motor backward at 100% power