INTERMEDIATE PROGRAMMING LESSON
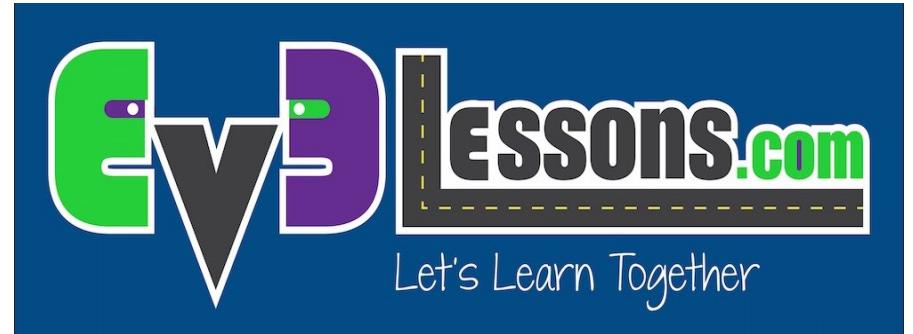
Debugging Techniques

By: Droids Robotics

LESSON OBJECTIVES

1) Learn the importance of debugging

2) Learn some techniques for debugging your code

WHY DEBUG?

- Debugging is a useful strategy to figure out where in your program something is going wrong or what went wrong

- Once your code starts to become long or complicated (e.g. using sensors), it can become hard to figure out where in the program you are

- The following slides show you some ways of knowing where you are in your program or knowing what values your sensors see

- You will see that these techniques can be VERY USEFUL to any programmer.

Locate Error → Think of Solution → Fix Error → Re-Test Program → HURRAY!
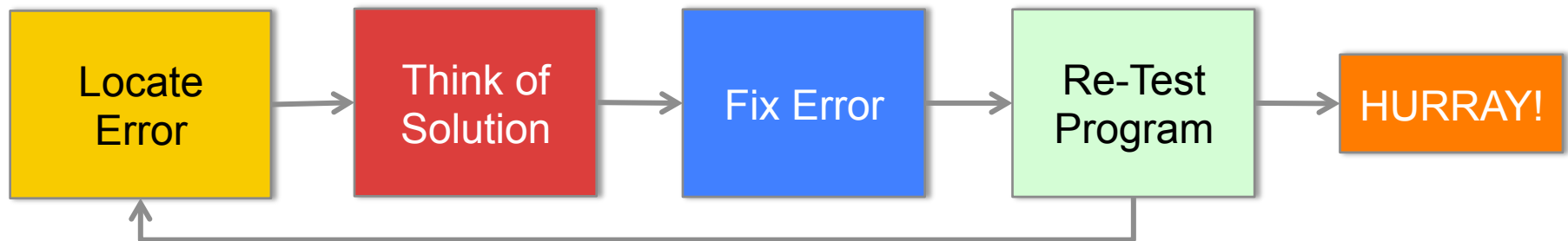
DIFFERENT TECHNIQUES

Play Selected vs. Button Press

- Very similar techniques

- Lets you try out smaller portions of code

- Play Selected requires bluetooth

- Button Press requires some care so you don't jostle the robot when pressing the button

Light, Sound and Display

- Very similar techniques

- Light and Sound are used in the same way

- Teams enjoy the sound more and it is easier to identify sometimes

- Display Block comes in handy for knowing what block is played if your robot gets stuck and if you want to see the sensor values

PLAY SELECTED

- Play selected is useful for running small parts of the program
- Use when you don't want to wait for your robot to complete other parts of the program before getting to the part you want to see
- If you don't have bluetooth built in the computer, we recommend that you purchase a bluetooth dongle (US $10-15) because it makes this type of debugging easier
- To use, highlight the parts of the program you want to run and pick the play button with the parentheses (>)
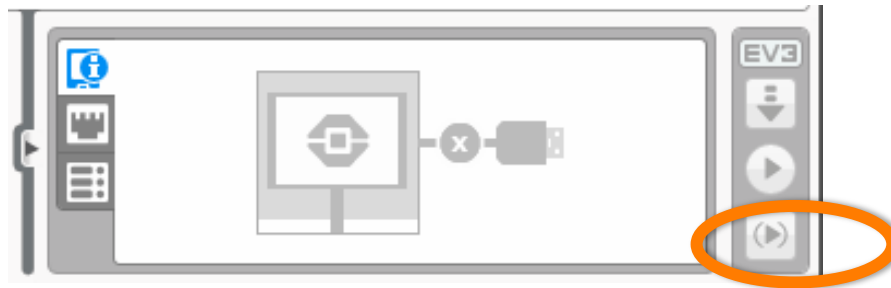
"WAIT FOR" BUTTON PRESS

- To place a Wait for Button Press block in your program, place a wait block into your program
- Go under brick buttons > compare > brick buttons, then choose which button needs to be pressed to continue the program
- Place these wait for button presses every block or two close to where the robot is not working correctly
- This can help you pinpoint which block is causing the robot to fail
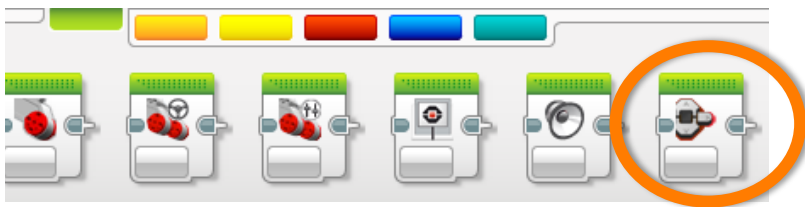- The robot will stop and "wait for you to press the button"
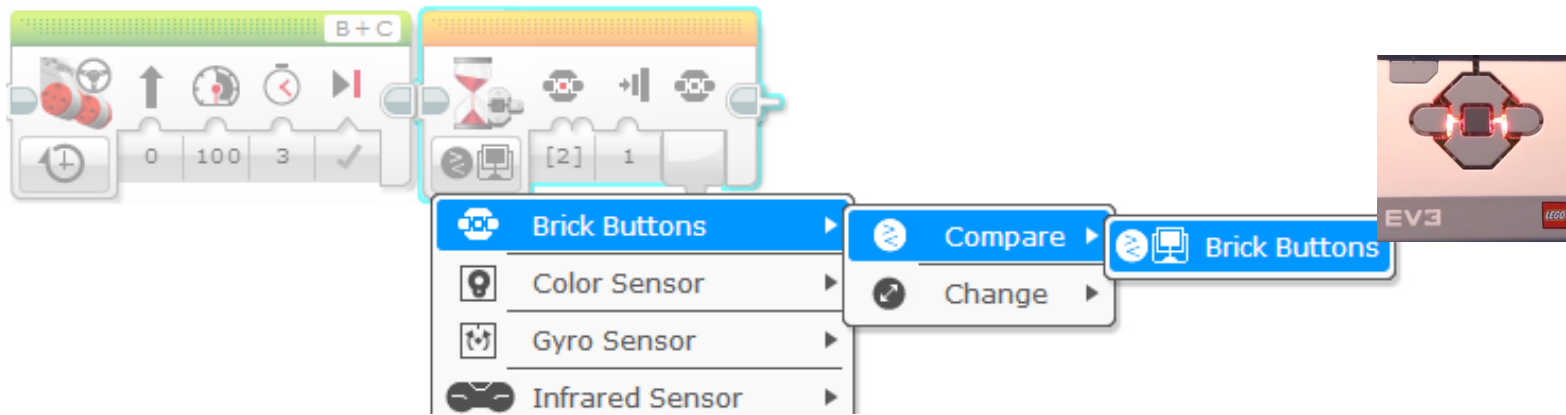
VISUAL ALERTS: BRICK STATUS LIGHT BLOCK
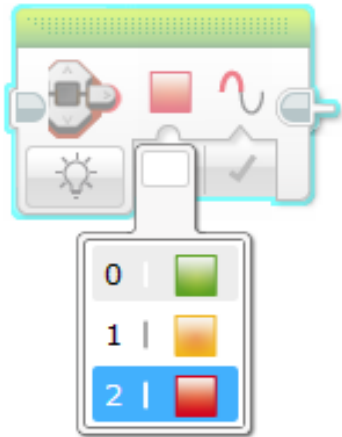
- Brick status light blocks can be used for warnings

Brick Status Light block

- Place these blocks at critical steps in your program
- You will then be able to visualize what block is playing and figure out where the error might be

SOUND ALERTS: SOUND BLOCK

- You can insert different sounds at intervals (about every 5 blocks or so, and then run the program again while listening for beeps.
- Once you pick Play Tone, select Play Type and pick "play once"
- These sounds can help you narrow down where in the program something is going wrong.
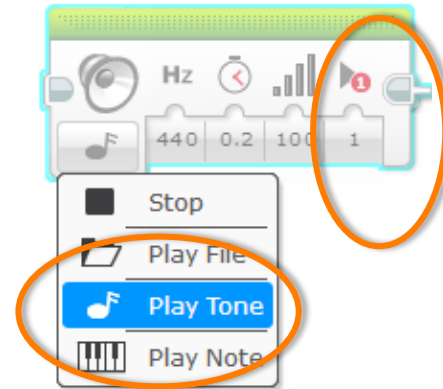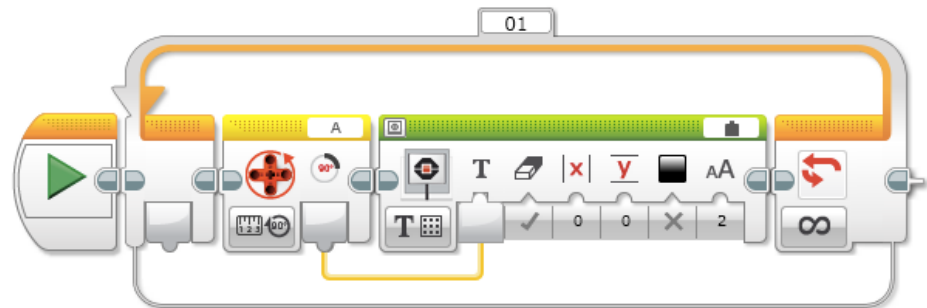
Sound block

PRINT TO SCREEN: DISPLAY BLOCK

- Showing which block is playing on your robot
 - Helps identify what block the robot is stuck on
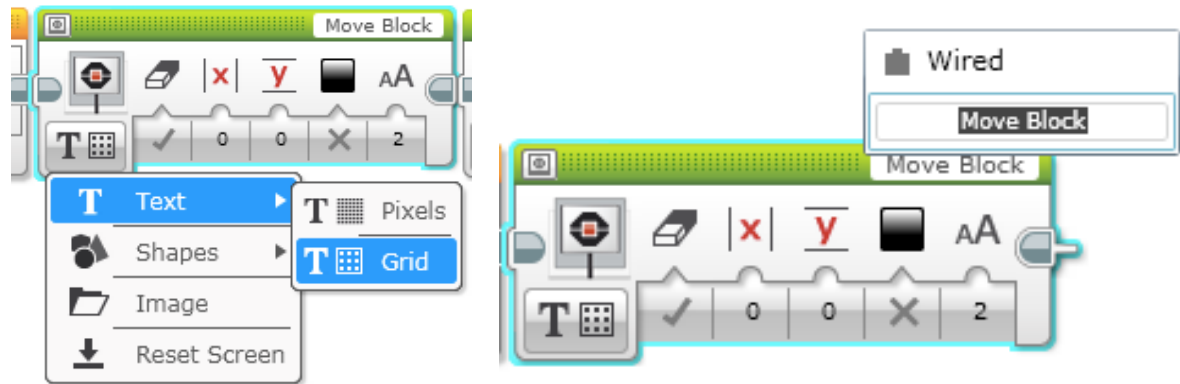
- Seeing the sensor readings – to see what the robot sees!

SAMPLE VIDEO ON NEXT SLIDE

- The video on the next slide is NOT intended as a solution to the Search Engine mission and isn't even very good code to get there
- Instead, what you should look at is how debugging techniques were used during the run
  - Wait for button press
  - Sounds alerts
  - Brick lights
  - Sensor readings displayed on brick

SAMPLE VIDEO – CLICK TO PLAY
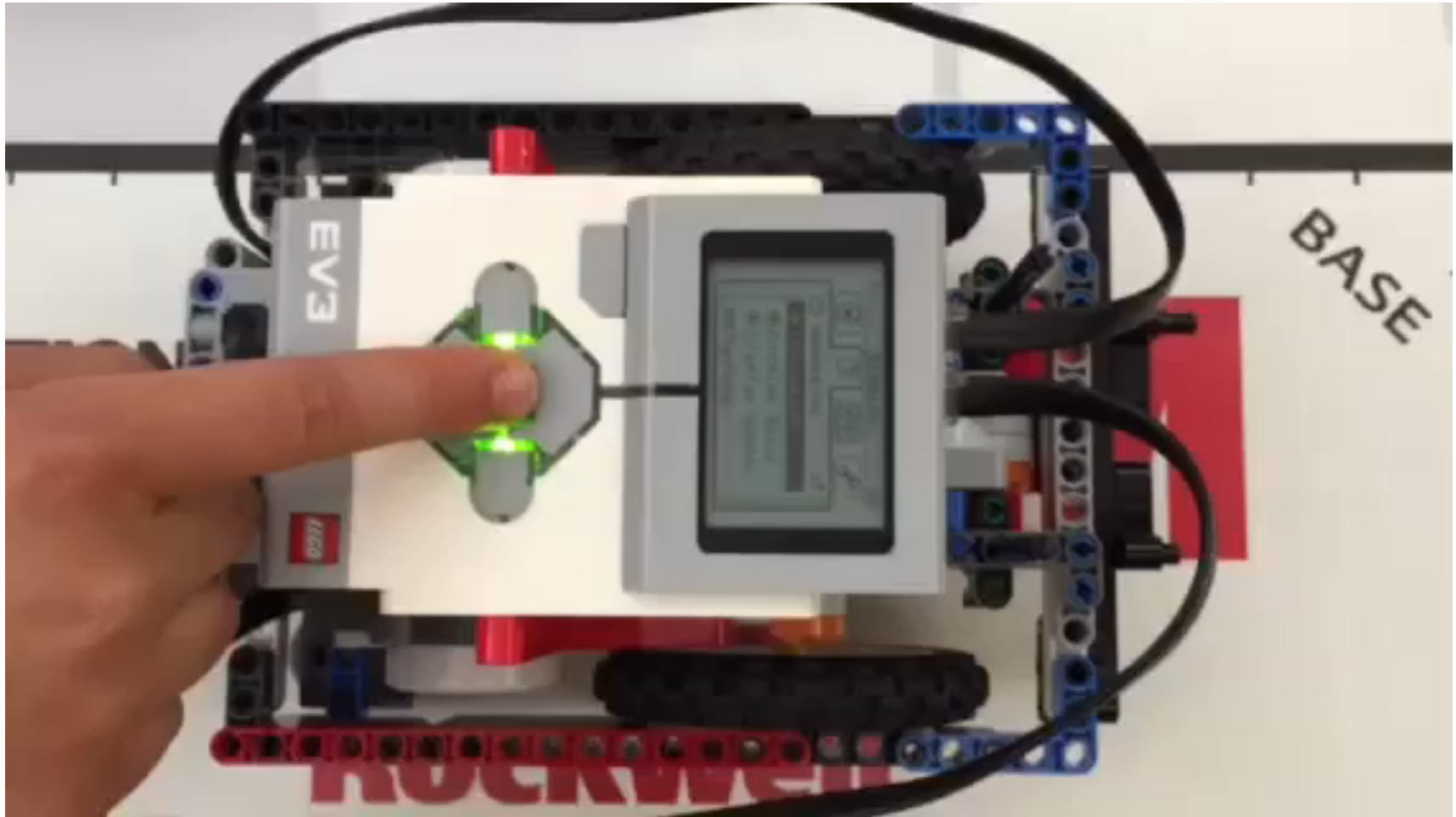
OTHER METHODS

- Recordings:
    - You can record your runs with a camera. Then watch each run and observe what went wrong

- Comments:
    - You can also use "comments" to help debug – we add comments to remember what older values were entered into a block. We watch the run and then adjust these values

DISCUSSION GUIDE

- What are some good ways of debugging your code?
  - Ans. Any of the techniques mentioned in this lesson

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CREDITS

This tutorial was created by Sanjay Seshan and Arvind Seshan from Droids Robotics.

More lessons are available at www.ev3lessons.com

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