Try the following activities by programming the blocks into ScratchX

Activity 1: I'm the Finch. Explore What I Can Do!

In this activity we will explore various features including movement, obstacle detection, beak coloring, and temperature and orientation status.

Emergency Stop

Before running a new script, you will want to press the "space bar" to stop the previous script execution.

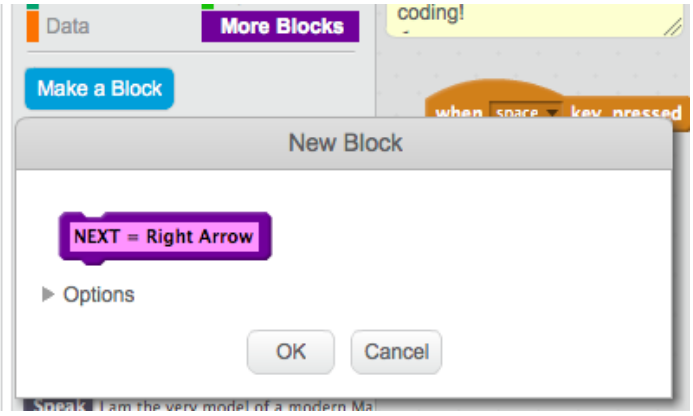
Most industrial equipment will incorporate an emergency **STOP** button for **SAFETY**. Press "**space bar**" to stop all scripts **immediately**.
Safety first!!

Concept: Function

Create functions to re-use code and avoid repeating yourself.

A **Function** is a program script that you plan on using over and over. The function script is assigned to a single block and given a name like **NEXT**. Anytime you call the block **NEXT** the full function will run in its place.

Creating Blocks: NEXT (Event that launches the next action)



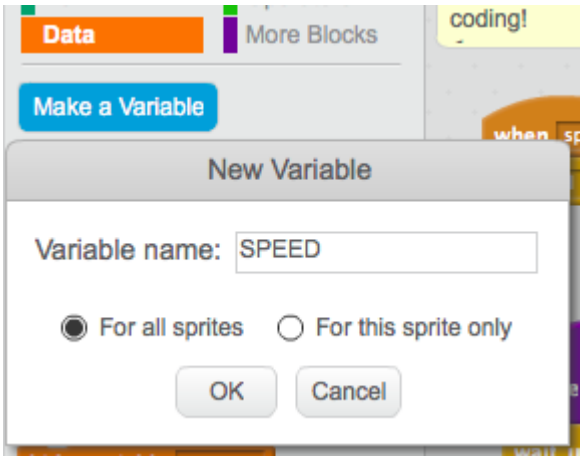
Under "**More Blocks**" click "**Make Block**" to create your "**define**" block

Variable: Create a Variable for Speed

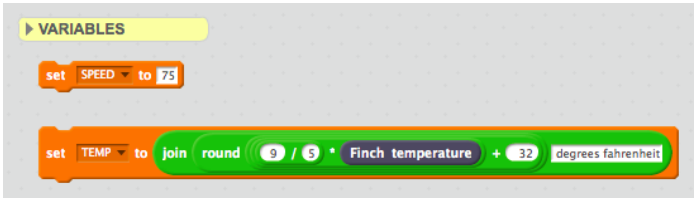
Use variables to store values that you are going to refer to more than once or that you might want to vary the value of.

Variables can be set to specific values anywhere in your project. When that variable **NAME** (ex: SPEED) is used in your script the **NAME** is replaced by the variable's **CURRENT VALUE** (ex: 75).

You will use these blocks later in scripts you write for your program.



Tips: Under "**Data**" click "**Make a Variable**" and create the following variables:



Activity 2: Move Feature

Make the finch move!

*NOTE: Your initial Script screen is probably set to the Background. You will need to create a new sprite to add some scripts (example: say)

What happens if you change **wait** to **2**?

Aren't you glad you made the **NEXT** function? Why?

Now try **removing** the **SPEED** variable and put in different values for the left and right wheels:

left	right	What happened?
0	100	
50	100	
-100	100	
-100	-25	

Activity 3: Beak Coloring Feature

Make the beak change colors!

Tri Color LED's have three LED's in one housing. **RED** - **GREEN** and **BLUE**. The input for each LED can range from **0** (no brightness) to **100** (full brightness)

Which colors would you mix to get YELLOW?

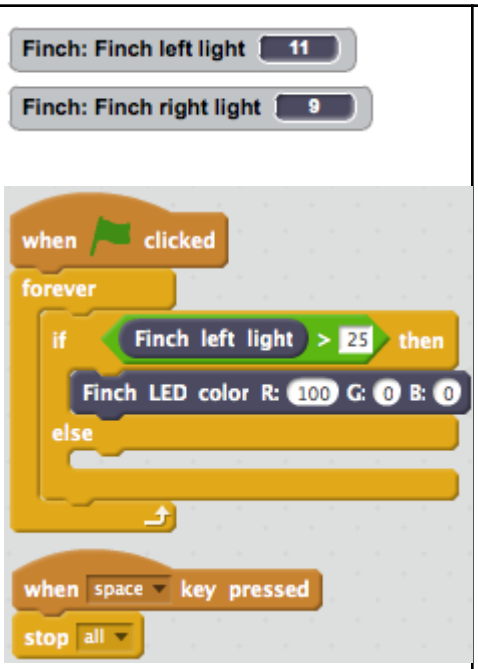
What color will **RED** and **BLUE** appear to be? Go ahead and try it out.

Now **GREEN** and **BLUE**?

Now **RED** - **GREEN** and **BLUE**?

Activity 4: Detect Light

In this activity, the finch's beak will turn red if its left light sensor is sensing the flashlight, else,
if it's right light sensor is sensing the flashlight, its beak will turn green, if neither light sensor senses the flashlight, it will turn blue.



#1 If **Finch left light** detects the flash light, its beak turns red. This conditional logic is implemented with an **if-else** block. The **if** condition is a **comparison expression**

Finch left light **>** 25

which evaluates to either **true** or **false**, depending on what the sensor reading is.

Note that the numerical value 25 was chosen to be bigger than what the Finch currently sees: 11 with its left eye and 9 with its right eye. Depending on where your Finch is right now, these readings could be different.

TASK:

Now, it's your turn to write the rest of the program!
On the **else** branch, write code to test the Finch's right eye.

What you want to accomplish is another conditional! In simple words, the logic goes like this:

If *the* ***Finch right light*** *is sensing the flashlight,* ***then*** *turn its beak green;* ***else****, make it blue.*

Activity 5: Creative Finch Project- Through the Maze!

Objective: Write a script that will allow the Finch to navigate the Maze! Two options to consider in programming your Finch:

Option 1	Option 2
Write a program that turns your device into a remote control to navigate the maze	Write a program that will navigate the Finch through the maze on its own (autonomously) once the green flag is clicked

Consider:

- What keys will you use to control the Finch?
- What movements will the Finch need to make?

*You will also need to create commands that tell the finch which directions to go. You might use these blocks:

*You will also want to program a command for the Finch to Stop

**Once you have tested your commands, time yourself through the Maze!