

FINCH ROBOT: SNAP LEVELS 1-3

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THE FINCH IS A GREAT WAY TO GET STARTED WITH PROGRAMMING. WE'LL USE **SNAP!**, A VISUAL PROGRAMMING LANGUAGE, TO CONTROL OUR FINCH.

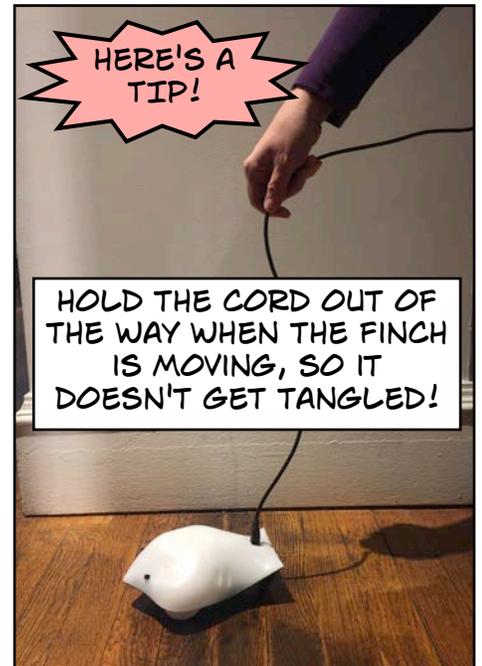


FIRST, PLUG THE FINCH INTO YOUR COMPUTER. USE THE PORT ABOVE THE TAIL.



HERE'S A TIP!

HOLD THE CORD OUT OF THE WAY WHEN THE FINCH IS MOVING, SO IT DOESN'T GET TANGLED!



ON A MAC OR PC, OPEN "BIRDBRAIN ROBOT SERVER."



BirdBrainRobotServer

ON A CHROMEBOOK, OPEN "FINCH CONNECTION APP."



Finch Connection App

BirdBrain

Finch Connected



THIS WINDOW WILL APPEAR, LETTING YOU KNOW IF YOUR FINCH (OR HUMMINGBIRD!) IS CONNECTED.

Open Snap!

Open Snap! locally (no cloud storage)

Open Scratch

CLICK "OPEN SNAP!"

Please select a programming level

- Level 1, Simple Blocks
- Level 2, Blocks with Parameters
- Level 3, Parameters and Timers
- Level 4, Regular Snap!

Open Snap!

CHOOSE "LEVEL 1" WHEN PROMPTED.

AFTER YOU'VE SELECTED THE **SNAP!** LEVEL, YOU WILL BE TAKEN TO A PAGE LIKE THIS IN YOUR BROWSER WINDOW.

THE BIG AREA IN THE MIDDLE IS CALLED THE **SCRIPTS AREA**...ANY COMMANDS THAT YOU WANT YOUR ROBOT TO DO WILL WIND UP HERE.

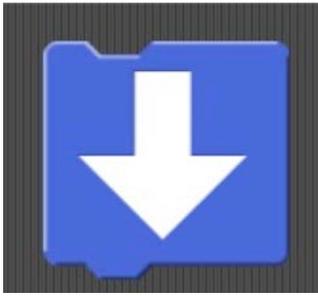
FOR NOW, WE'LL IGNORE THE PRE-LOADED CODE.

ON THE LEFT ARE ALL THE **BLOCKS**. THESE ARE THE PIECES THAT YOU WILL DRAG OUT TO THE SCRIPTS AREA. EACH ONE HAS A SPECIFIC PURPOSE.

TO MOVE BLOCKS, CLICK AND DRAG THEM.

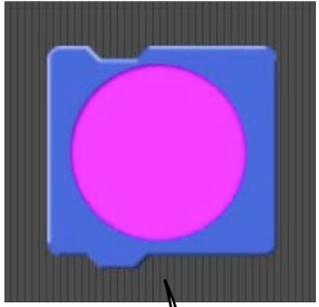
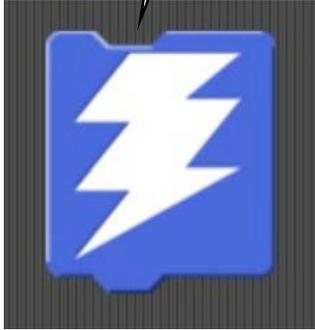
TO START, REMOVE THE THREE BLUE BLOCKS FROM THE YELLOW BLOCK. CLICK ON THE TOP BLUE BLOCK AND DRAG ALL THREE BACK TO THE BLOCK AREA. THEY'LL DISAPPEAR.

NOW WE JUST HAVE THE "WHEN SPACE KEY PRESSED" BLOCK.



THERE ARE THREE TYPES OF BLOCKS FOR THE FINCH.

THE SOUND BLOCK MAKES THE FINCH BUZZ



THE BLOCKS WITH ARROWS MOVE AND TURN THE FINCH.

THE BLOCKS WITH CIRCLES SET THE COLOR OF THE LIGHT IN THE FINCH'S NOSE. THE BLACK CIRCLE TURNS THE LIGHT OFF.

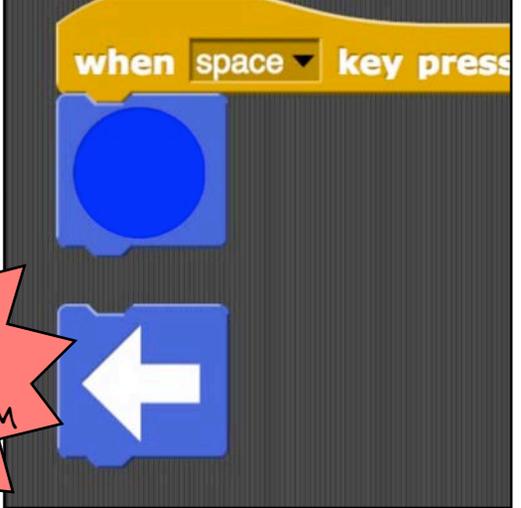
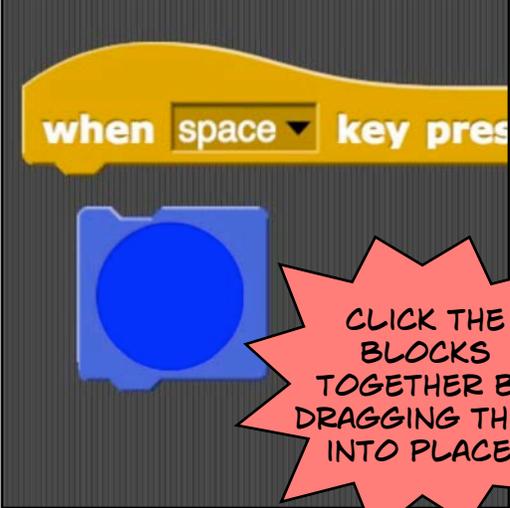
LET'S FOCUS ON THE FIRST STEP. WE'LL NEED THE BLUE CIRCLE BLOCK. IT MAKES THE FINCH'S NOSE TURN BLUE.

NEXT, WE'LL ADD A BLOCK WITH THE ARROW POINTING LEFT. THIS TELLS THE FINCH TO TURN LEFT.

WHAT WE WANT TO DO NOW IS USE THESE BLOCKS TO CREATE A PROGRAM THAT SNAP WILL UNDERSTAND.

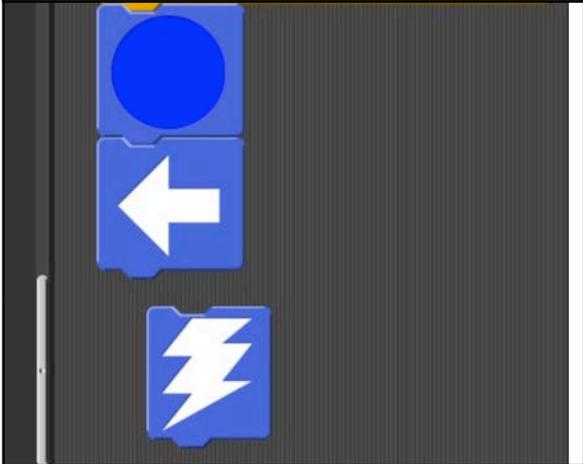
LET'S TRY TO SAY:

"CHANGE THE FINCH'S NOSE TO BLUE, TURN LEFT, AND MAKE A BUZZER NOISE."

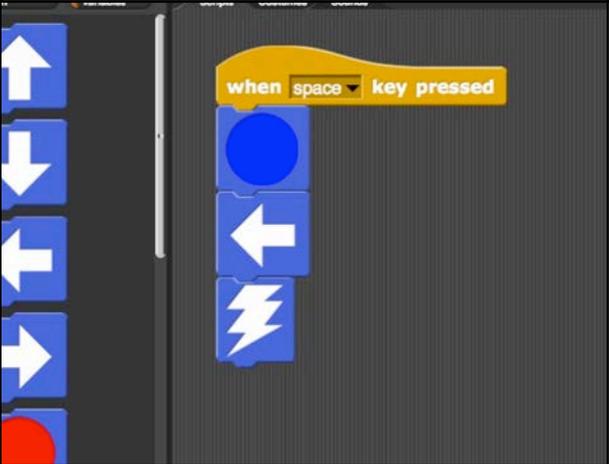


CLICK THE BLOCKS TOGETHER BY DRAGGING THEM INTO PLACE!

FINALLY, ADD THE SOUND BLOCK SO THAT THE FINCH WILL BUZZ.



THE FINAL STATEMENT SHOULD LOOK SOMETHING LIKE THIS:



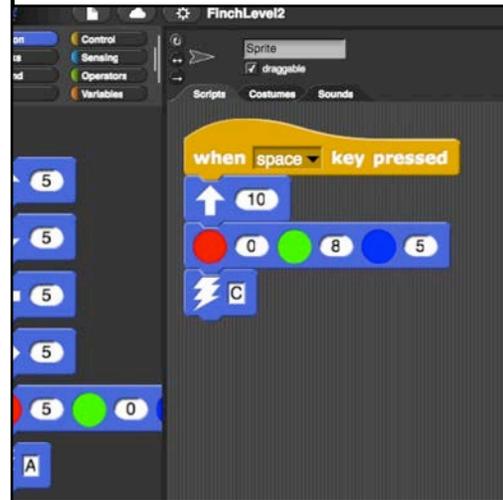
START YOUR PROGRAM BY CLICKING THE SPACE BAR! DOES THE FINCH DO WHAT YOU EXPECTED?

GREAT JOB! NOW WE'RE GOING TO TRY OUT A SIMILAR EXERCISE IN **LEVEL 2** OF SNAP.

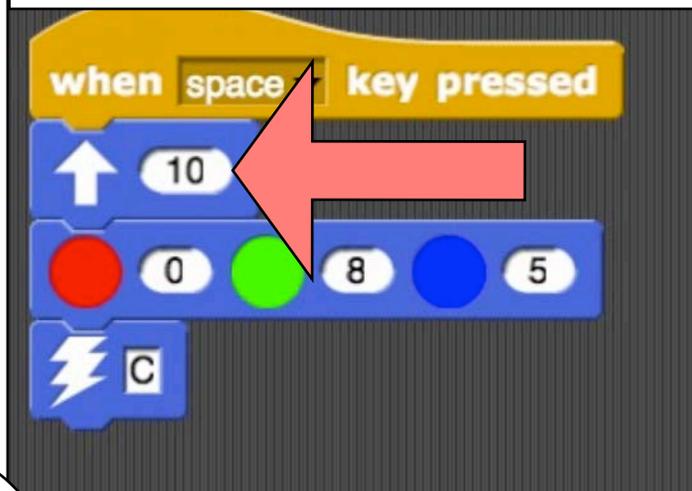
GO BACK TO THE BIRD BRAIN ROBOT SERVER, AND REOPEN SNAP ON LEVEL TWO: "BLOCKS WITH PARAMETERS."



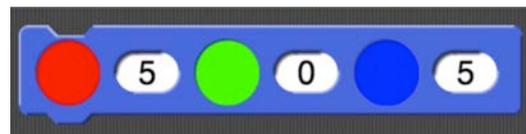
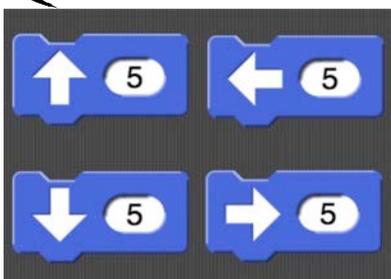
LOOK FAMILIAR? CHECK OUT THE WHITE CIRCLES NEXT TO EACH BLOCK.



THE WHITE CIRCLES ALLOW YOU TO ENTER VALUES.

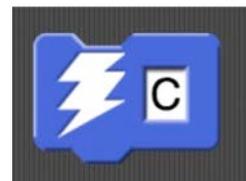


THE VALUES IN THE MOVEMENT BLOCKS CONTROL SPEED. 0 IS NO MOVEMENT, WHILE 10 IS AS FAST AS POSSIBLE.



THE VALUES IN THE COLOR BLOCK CONTROL THE BRIGHTNESS OF THE LEDS IN THE BEAK. MIX AND MATCH BETWEEN 0 AND 10 TO GET DIFFERENT BEAK COLORS.

THE LETTER IN THE SOUND BLOCK REPRESENTS A MUSICAL NOTE FROM A TO G.



TIP! EACH BLOCK LASTS FOR **HALF** OF ONE SECOND. YOU NEED TO STACK BLOCKS TO INCREASE THE LENGTH OF TIME THAT SOMETHING HAPPENS.

LET'S TAKE A CLOSER LOOK AT THE PRE-LOADED CODE STATEMENT.

THE MOVEMENT BLOCK INDICATES THAT THE FINCH WILL MOVE FORWARD AT A SPEED OF 10.

THE BEAK COLOR BLOCK INDICATES THAT THE BEAK SHOULD BE A MIXTURE OF GREEN AND BLUE.

THE SOUND BLOCK INDICATES THAT THE FINCH WILL PLAY THE NOTE C.

BEFORE MOVING ON THE SNAP LEVEL 3, NOW MIGHT BE A GOOD TIME TO EXPERIMENT MORE WITH THE MOVEMENT BLOCKS. HOW DOES THE FINCH MOVE FOR A PROGRAM LIKE THIS?

TRY IT OUT BY PRESSING THE SPACE BAR! HOW DOES THE FINCH REACT? DOES THE BEAK TURN OFF AT THE END?

LET'S MOVE ON TO LEVEL 3 OF SNAP!

Please select a programming level:

- Level 1, Simple Blocks
- Level 2, Blocks with Parameters
- Level 3, Parameters and Time
- Level 4, Regular Snap!

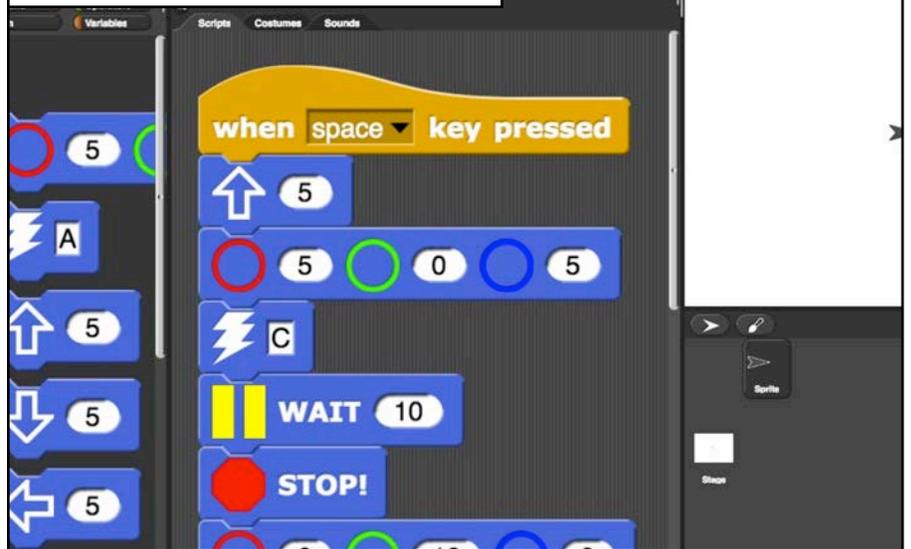
Open Snap!

Open Snap!

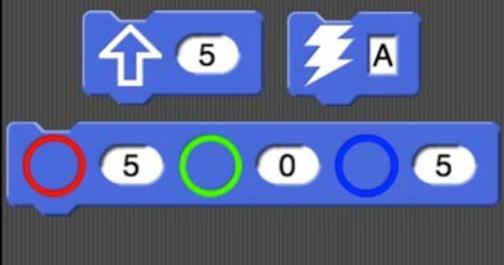
Open Snap! locally (no cloud storage)

Open Scratch

IT SHOULD LOOK LIKE THIS:



THE MOTION BLOCKS LOOK A LITTLE DIFFERENT, BUT THEY WORK IN THE SAME WAY AS LEVEL 2.



THE **BIGGEST DIFFERENCE** IN LEVEL 3 IS THAT THE FINCH WILL NOT STOP MOVING UNLESS YOU TELL IT TO!

YOU DO THAT BY USING THE **STOP** BLOCK.



ANOTHER **BIG DIFFERENCE** IS THAT THE FINCH WILL MOVE FROM BLOCK TO BLOCK VERY QUICKLY.

TO WRITE A PROGRAM, YOU'LL NEED TO TELL THE FINCH TO **WAIT**.



ONE OTHER CHANGE IS THIS BLOCK. IT ALLOWS YOU TO SET BOTH THE LEFT AND RIGHT WHEEL SPEEDS. THIS CONTROLS HOW THE FINCH TURNS.



THE BEST WAY TO UNDERSTAND THESE CHANGES IS TO WRITE A **PROGRAM!** SOON THEY'LL MAKE PLENTY OF SENSE. JUST LIKE WE DID IN LEVEL 1, REMOVE ALL THE BLOCKS UNDERNEATH THE YELLOW BLOCK IN THE PRE-LOADED CODE.

LET'S ADD A FORWARD MOVEMENT BLOCK, A WAIT BLOCK, AND A STOP BLOCK. FOR THE WAIT BLOCK VALUE, 1 EQUALS 1/10TH OF A SECOND.

```
when space key pressed
  move up 5
  wait 20
  stop
```

2 SECONDS!

THIS PROGRAM SAYS, FINCH WILL MOVE FORWARD AT A SPEED OF 5, CONTINUE DOING THIS FOR 2 SECONDS, AND THEN STOP.

TIP: WITHOUT THE **STOP** BLOCK, THE FINCH WILL KEEP MOVING **FOREVER!**

BUT FIRST, LET'S MAKE IT A LITTLE MORE EXCITING. ADD OTHER MOVEMENT BLOCKS BEFORE THE **STOP** BLOCK. FOR EACH MOVEMENT BLOCK, YOU'LL NEED A **WAIT** BLOCK TO TELL THE FINCH HOW LONG TO MOVE.

```
when space key pressed
  move up 5
  wait 20
  move down 10
  wait 15
  stop
```

TRY IT OUT! THE FINCH SHOULD MOVE FORWARD AND THEN SHOOT BACKWARDS.

BUT WHAT ABOUT LIGHTS AND SOUND? LET'S KEEP GOING. ADD A **BEAK COLOR** BLOCK TO THE PROGRAM.

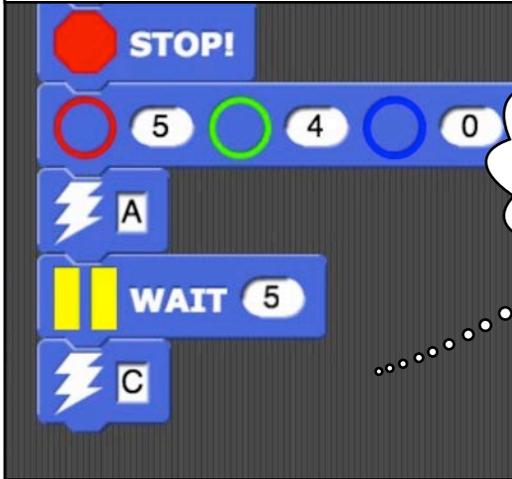
```
when space key pressed
  move up 5
  wait 20
  move down 10
  wait 15
  stop
  set beak color to 5, 4, 0
```

THE BEAK COLOR IS GOING TO STAY THIS WAY FOR THE REST OF THE PROGRAM. HOW WOULD YOU TURN IT OFF?

THE **SOUND** BLOCK STILL ONLY PLAYS A NOTE FOR A HALF SECOND.

```
move down 10
wait 15
stop
play sound A
```

YOU NEED A **WAIT** BLOCK BETWEEN THE NOTES SO THEY DON'T PLAY AT THE SAME TIME.



CAN YOU ADD MORE **SOUND** BLOCKS TO MAKE THE FINCH SING?

THESE ARE JUST A FEW OF THE THINGS YOU CAN DO WITH THE FINCH ROBOT! EXPERIMENTATION IS THE BEST WAY TO LEARN MORE. CHECK WWW.FINCHROBOT.COM FOR MORE IDEAS AND TUTORIALS:



LET'S TAKE A LOOK AT THE ENTIRE **PROGRAM**. IT'S GOTTEN PRETTY LONG!

