Presenter Name: _____Japhet Izeh_____

Subject (Circle All That Apply): Science (Technology) (Engineering) Arts (Mathematics)

Grade Level (Circle All That Apply): (Middle School) (High School) (Collegiate)

Topic Title: _____The Sphero Maze Race_____

Lesson Focus and Goals

SUBJECT OBJECTIVE:	JHSL OBJECTIVE:
1. The objective of this project is to utilize block coding to program a sphero bolt, whereas you will be providing instructional commands possible you want the bolt to perform. This will give you the overall basics of coding, leveling your knowledge up and leaving you with valuable information on what could be done with coding	1. Work with students and teachers to get them a hands-on experience with blocking coding and showing its practicality for the real world. 2. Expose students and teachers to critical thinking skills in the STEM field.

Structure/Activity

1. **Halliburton Introduction Talk** (approx. 5 minutes, only if not completed before with students) - Even though Halliburton is an oil and gas industry, Halliburton is also very invested in the next generation of the STEM Workforce. The Javelina Halliburton STEM Labs provide the opportunities to enhance high-level critical thinking and problem-solving skills associated with sciences, technology, engineering, math, and geosciences (STEM) to talented, first-generation, at-risk, and underserved high school and undergraduate students. Halliburton provides meaningful engagement and resources for students that want to explore the engineering field.

2. **Project Introduction** (approx. 10 minutes) - A brief introduction will be given to the participants about what the spheros is and the language it uses in its code. Students will then be asked to set up the spheros application to proceed with the following lessons for

themselves. This only applies to newly introduced students with no background knowledge on how to set up, and those with experience can just directly log in and get their programming display setup on their iPad provided to code. With the opportunity, students will acquire knowledge on how to connect bolt with their iPad device

3. **Module 3** (approx. 15 minutes) - Students will create the first column of the code, which will consist of the light, sounds, and control commands. As you go further into practice, your knowledge will grow tremendously within the topic, and you will be able to put together ideas of your own using these command columns you will now be familiarized with.

4. **Module 4** (approx. 15 minutes) - Students will create the second column of the code, which will consist of just the control and movement commands. This second column familiarizes the students with the movement command and its purpose, while also providing more information on the controls command aspect of the code. With all this information, the students will be able to fully program a sphero bolt around a maze using their own inputs and commands; And create a project and workshop idea of their own using the commands they're now familiarized with. Everything they learn from this workshop will be inputted into their program for the 'Sphero Maze Race' now they have the knowledge of how to operate the coding system.

Texas Essential Knowledge and Skills (TEKS)

Principles of Applied Engineering; c.2.B, c.7.B & c.10.A. **Principles of Technology**; c.4.A. **Solid State Electronics**; c.3.A, c.3.B & c.3.C. **Robotics I**; c.3A, c.3.B, c.6.A, c.6.D, c.10.A & c.10.C. **Robotics II**; c.6.A & c.6.D. **Engineering Design and Presentation I**; c.7.A, c.7.B & c.7.D. **Engineering Design and Presentation II**; c.3.C & c.3.D. **Engineering Design and Problem Solving**; c.5.C, c.5.D, c.5.F, c.5.G & c.5.K. **Practicum in Science, Technology, Engineering, and Mathematics**; c.5.A. **Extended Practicum in Science, Technology, Engineering, and Mathematics**; c.3.A, c.3.B, c.3.C & c.6.A. **Fundamentals of Computer Science**; c.4.F & c.4.J. **Computer Science I**; c.2.D, c.4.A, c.4.C, c.4.G, c.4.H, c.4.J, c.4.K, c.4.O, c.4.P, c.4.U, c.4.V, c.4.W, c.6.C, c.6.F, c.6.P & c.6.Q. **Game Programming and Design**; c.1.A. **Game Programming and Design**; c.6.G.

Learning Objective

Content Review

Students should know that…

- Coding may be complicated
- Coding is a process of trial and error.
- The definition of refactoring and debugging.

Students have been asked…

1. What is coding and its purpose?
2. What are code blocks and their purpose?
3. What is a loop?
4. What is something in your life you consider a loop?

New Content

Students will know…

- How to properly operate the sound command.
- How to properly operate the control command.
- How to properly operate the lights command and get familiarized with LED's.
- How to properly operate the movement command.

Students will be able to…

- Create a workshop idea of their own using the new commands they just learned about.
- Operate sphero bolt like a professional with the bright insights they've received on code blocks programming.
- Use every command within the program after practicing and experimenting to execute whatever idea comes to mind.

Assessment

Sources of Information:

1.

Sphero Maze Race Workshop

By: Japhet Izeh

Purpose

The purpose of this activity, is to provide you fellow teachers with a workshop idea on the possibilities you're capable of doing with a sphero bolt. In this activity you will learn about the basic functions within the program, giving you an understanding on how to use them at will to create fun interesting workshops of your own. This should be a quick and easy fun understanding session, so let's get to it.

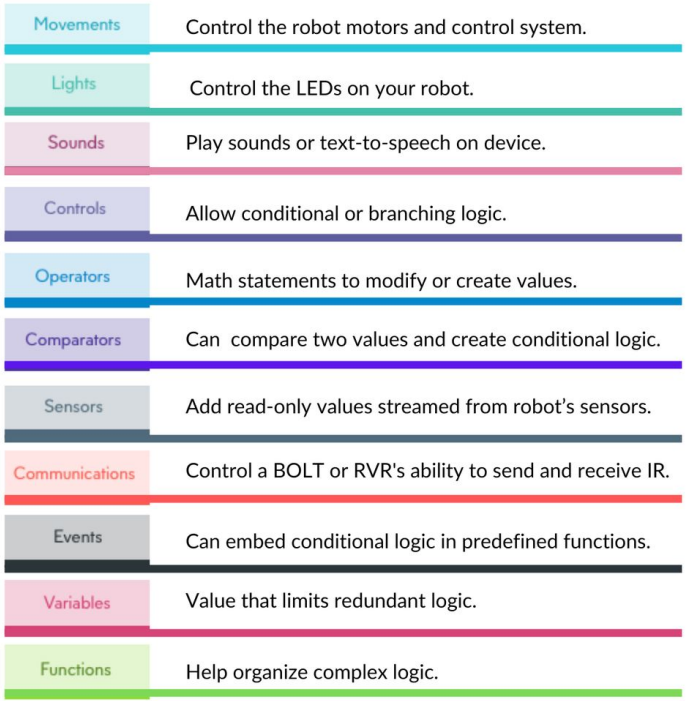
What is Coding and its purpose?

Coding Definition and its purpose

- Coding is the process of creating a set of instructions to translate an idea into action.

- Coding is necessary when talking about websites, apps, games, or other projects that need to have instructions in order to be written. Codes are written in programming languages such as JavaScript, HTML/CSS, SQL, C++, etc..

What are code blocks and their purpose ?

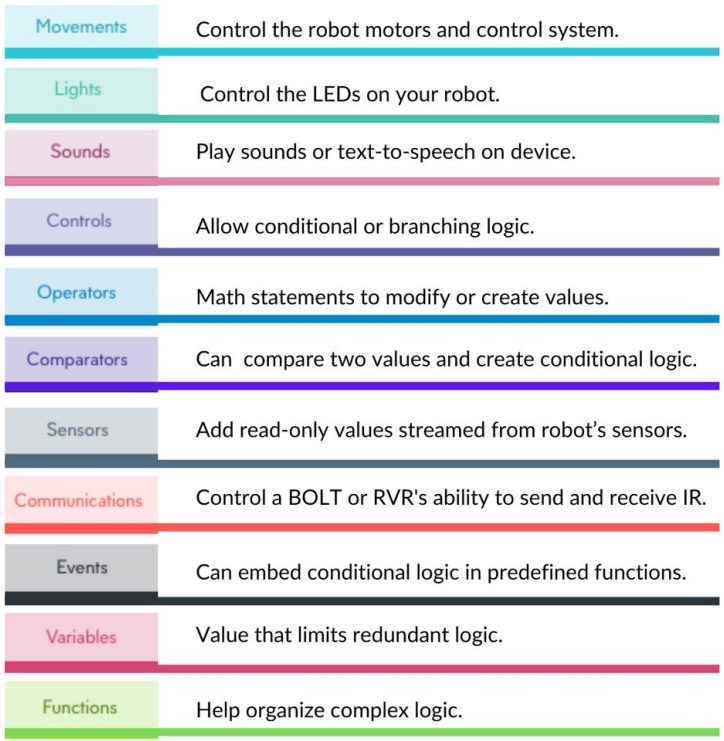


Code Blocks Definition

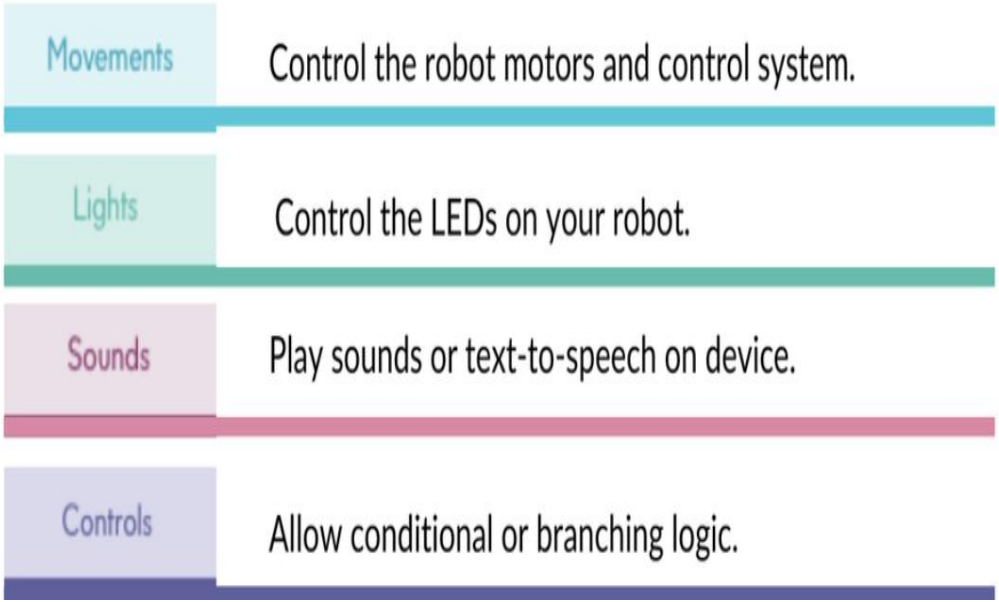
- Blocks is a free, open-source cross-platform IDE that supports multiple compilers including C++, Python, etc..

- Code blocks are used to convert a software code or an algorithm into any particular form so that errors, if any within the code can be minimized.

Code Block Display for sphero edu

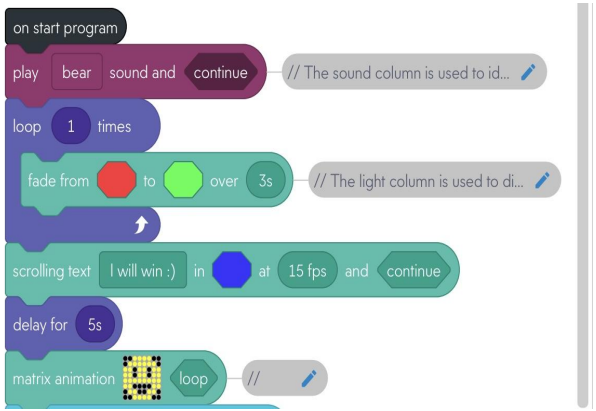


Focused Columns for this program



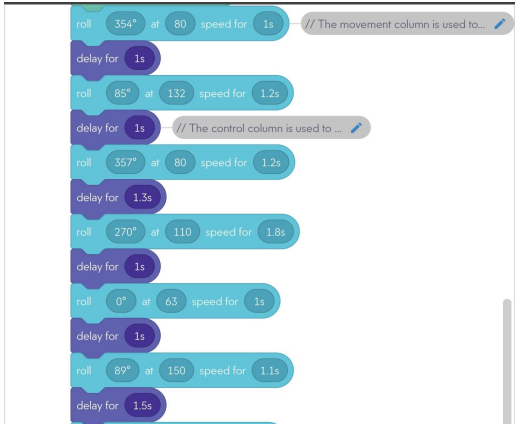
Column Breakdown for this workshop

- Column 1



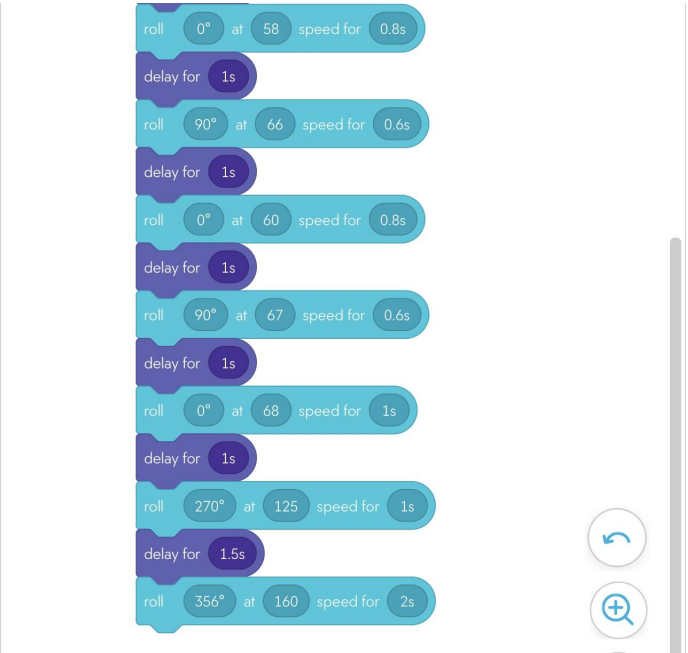
Broken down as color coded, maroon is for sounds, purple for controls, and teal for lights.

- Column 2



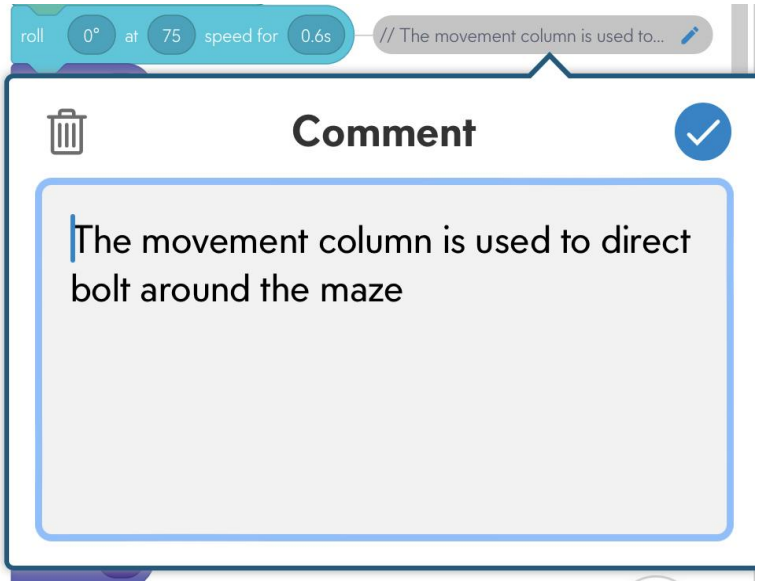
The baby blue color represents movement on this code, and the purple block represents control.

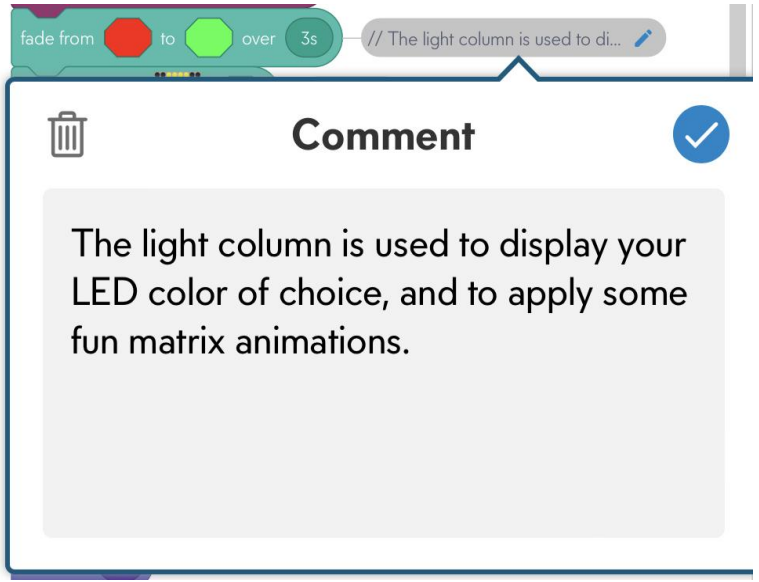
Column 3



This is the end of the code, but column 1 code consists of 3 out of 4 focused column which are lights, sounds, and control. While column 2 section of the code consists of 2 out of 4 which are movement and control.

Column purpose for this workshop





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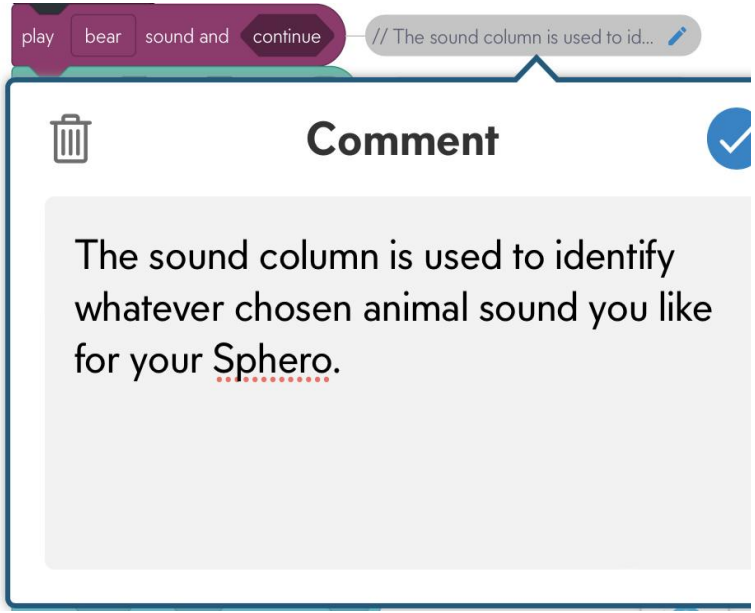
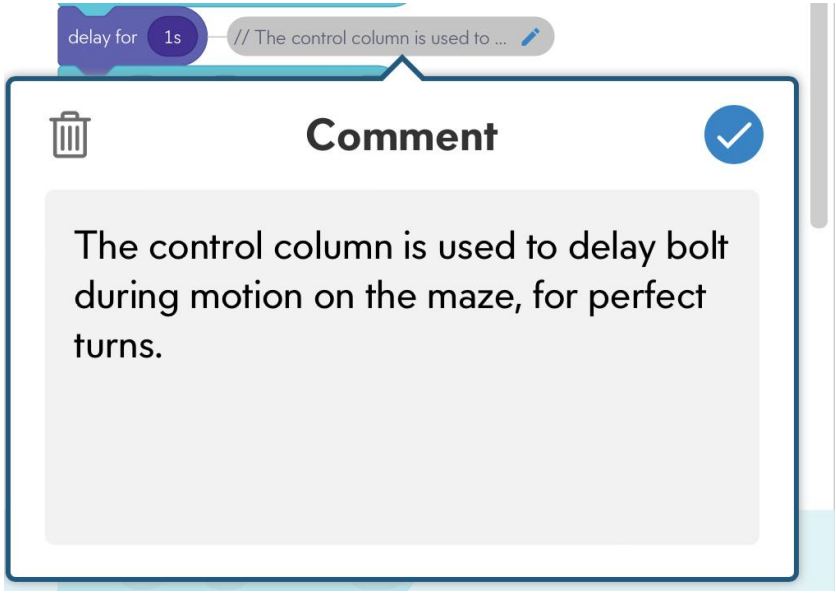
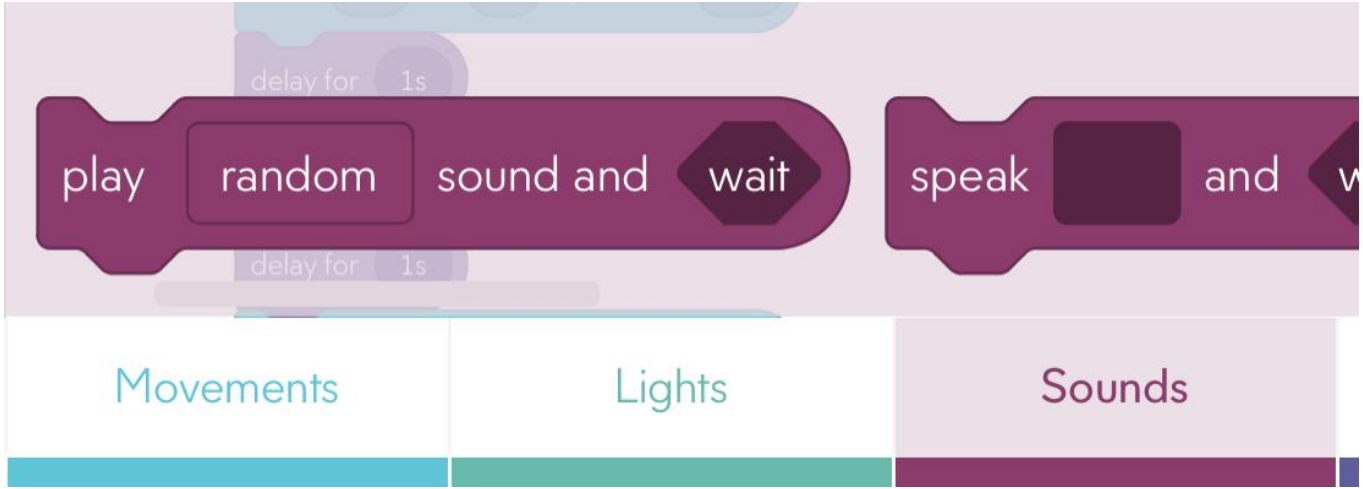
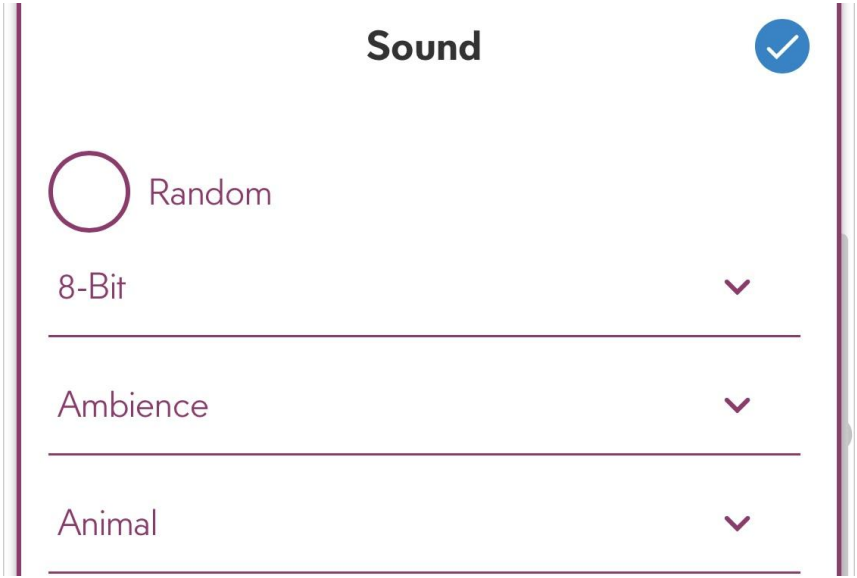

play
bear
sound and
continue
// The sound column is used to id...
Comment
The sound column is used to identify whatever chosen animal sound you like for your Sphero.


delay for
1s
// The control column is used to ...
Comment
The control column is used to delay bolt during motion on the maze, for perfect turns.

Coding For Animal sounds (Step 1)

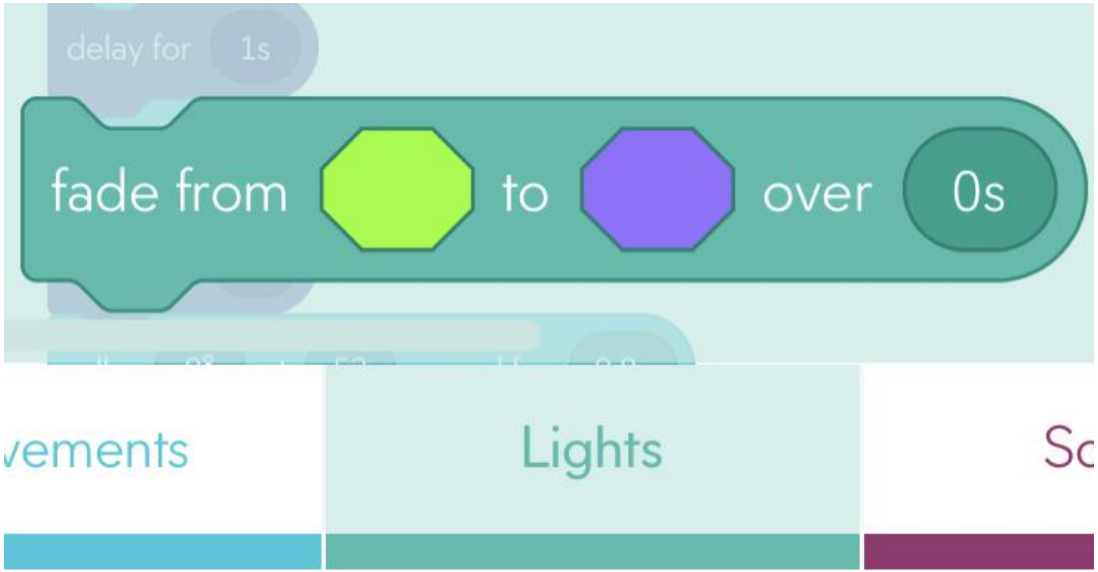


Continued...

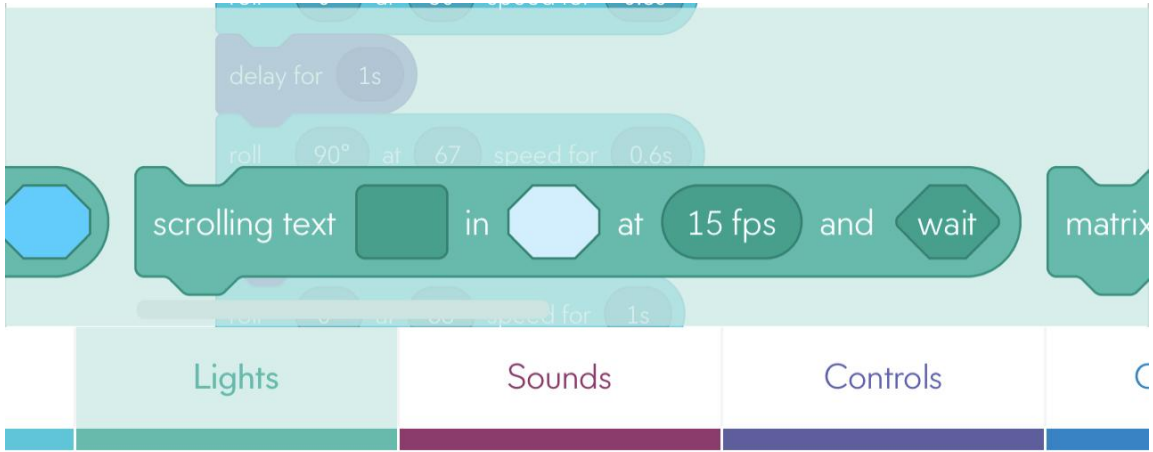

Sound
Random
8-Bit
Ambience
Animal


Animal
Random Animal
Alligator
Baby Bird
Bear
Bee

Coding For Lights(Step 2)



Coding for Lights continued..



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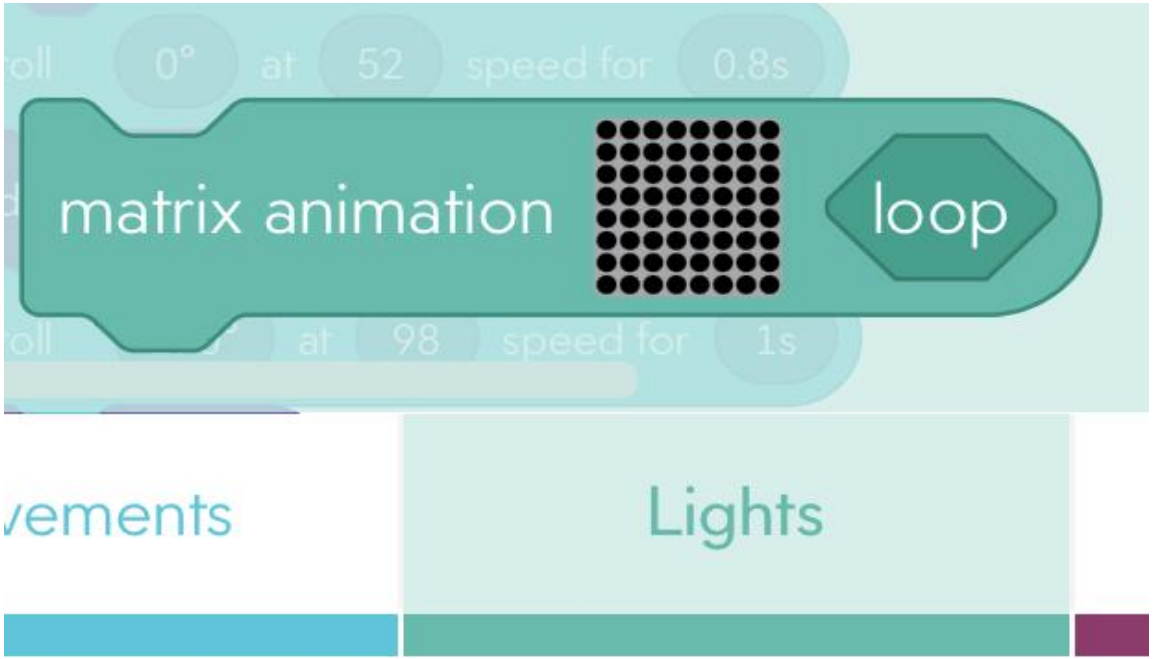
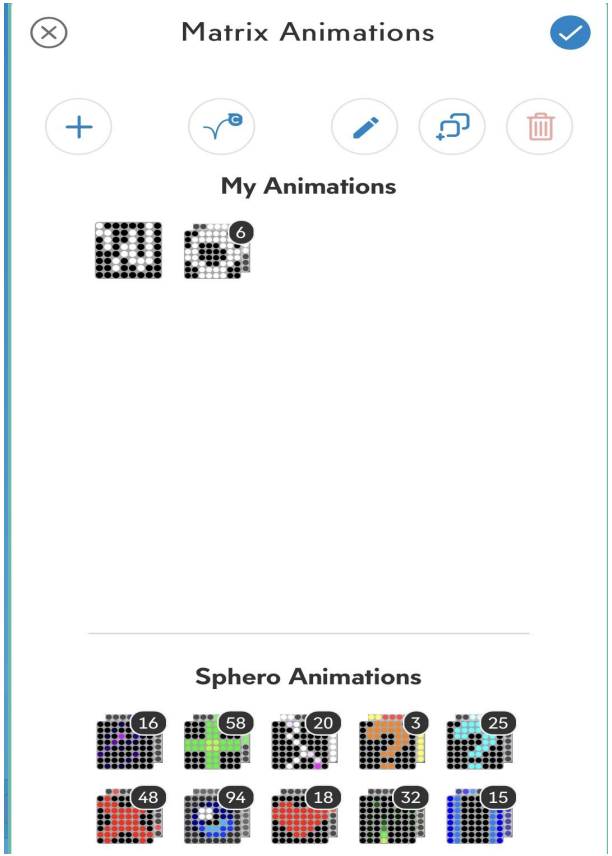
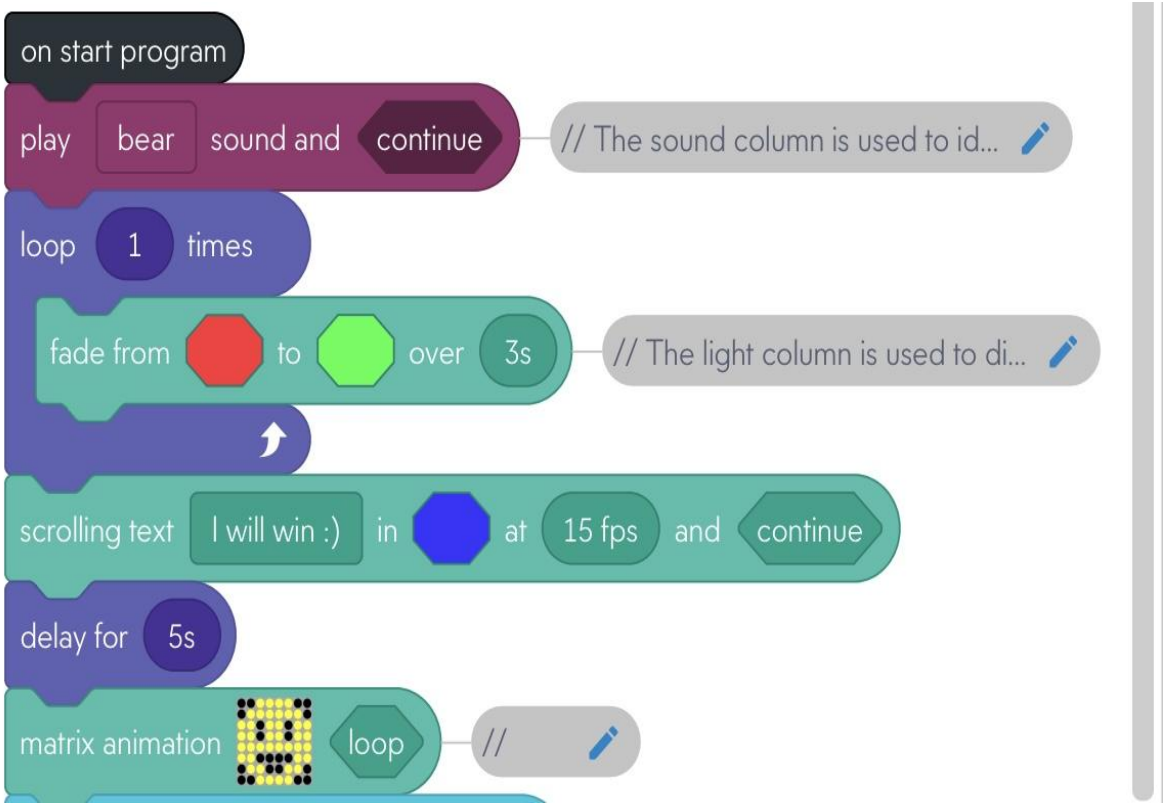
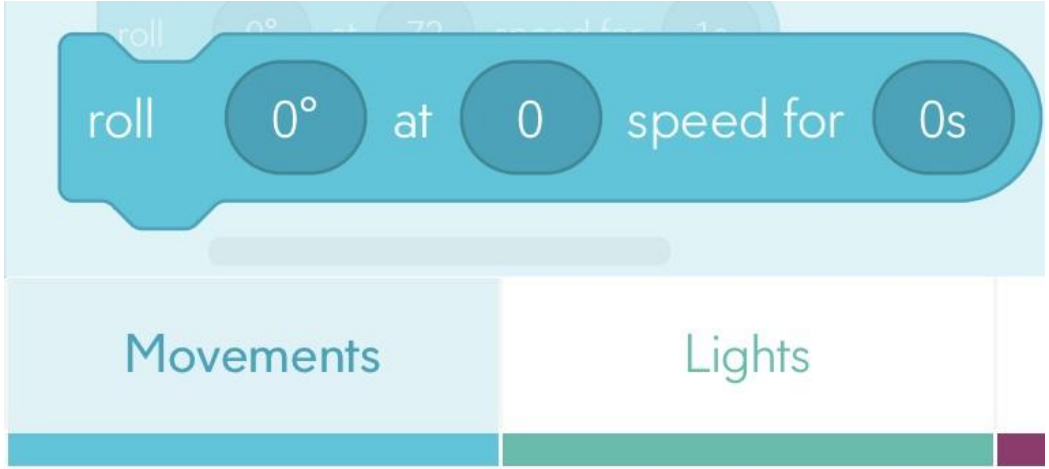

0°
at
52
speed for
0.8s
matrix animation
loop
at
98
speed for
1s
vements
Lights

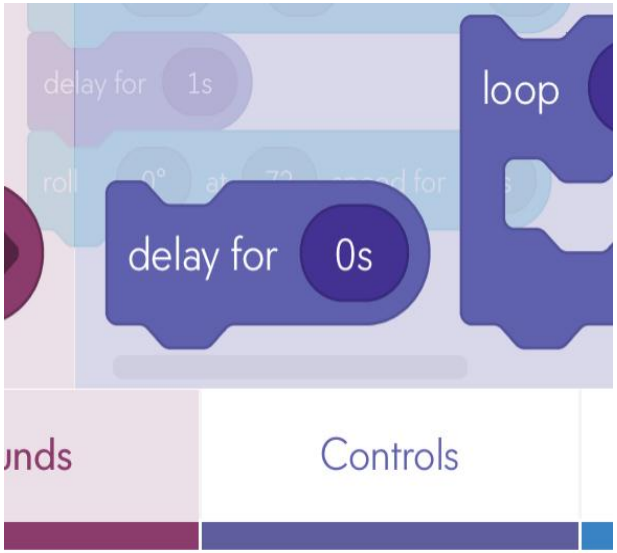

Matrix Animations
My Animations
6
Sphero Animations
16
58
20
3
25
48
94
18
32
15

Step 1 and 2 completion

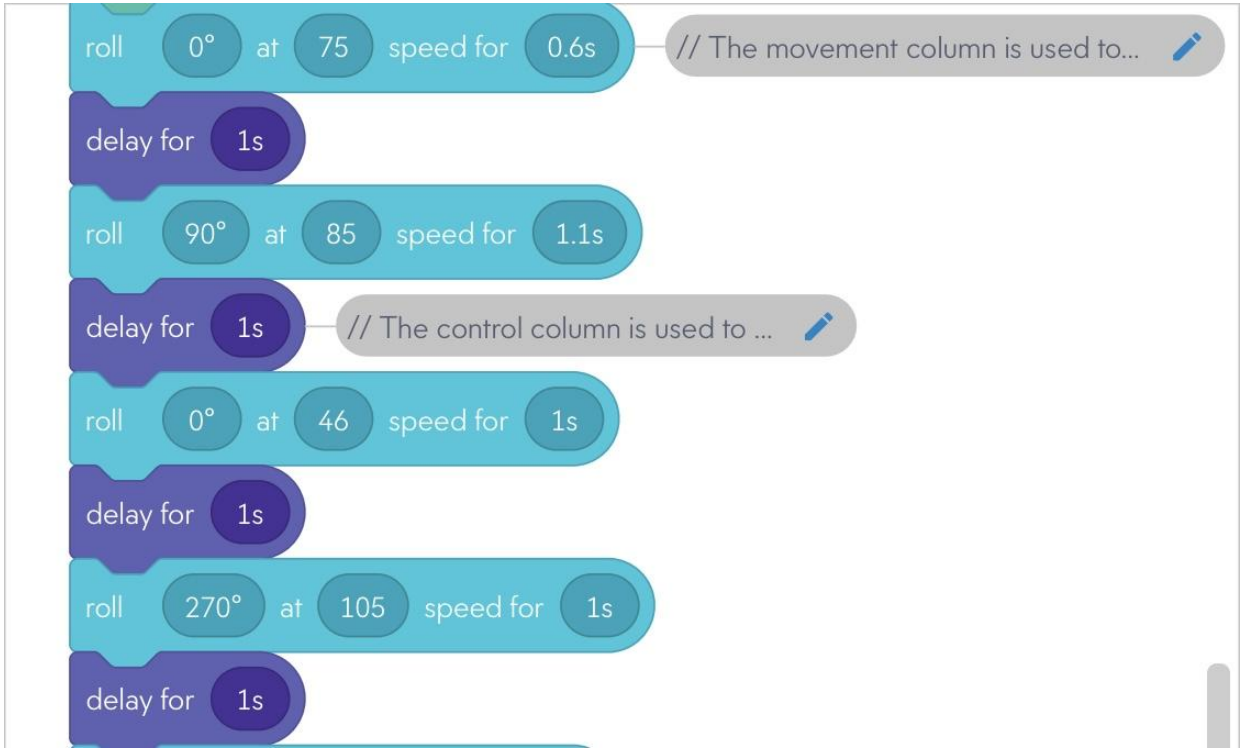


Step 3 [Block Organization]

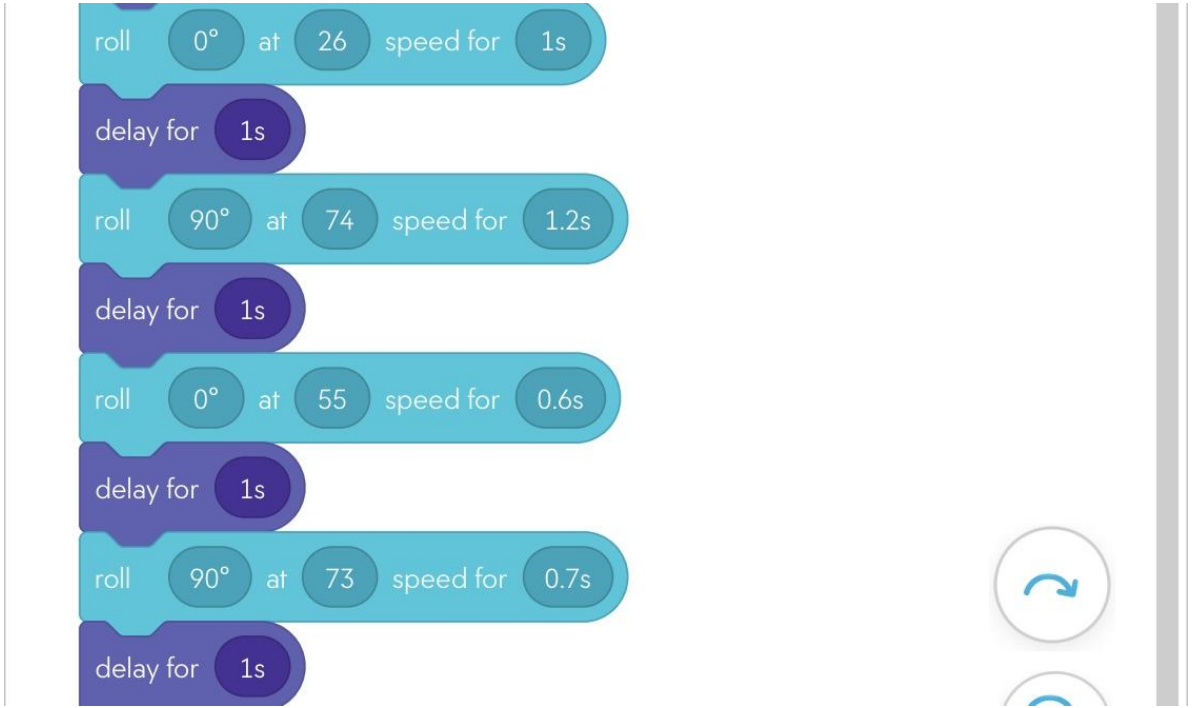




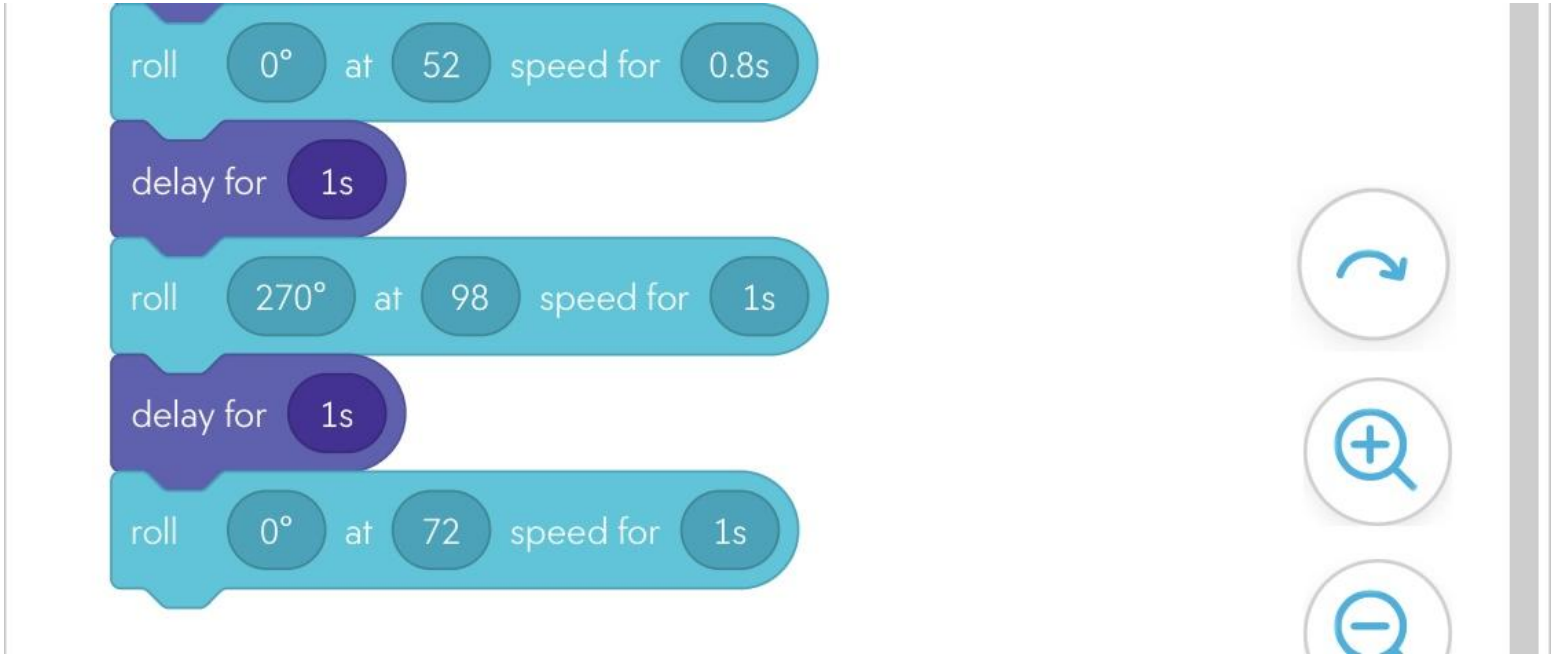
Step 3 continued...



Step 4

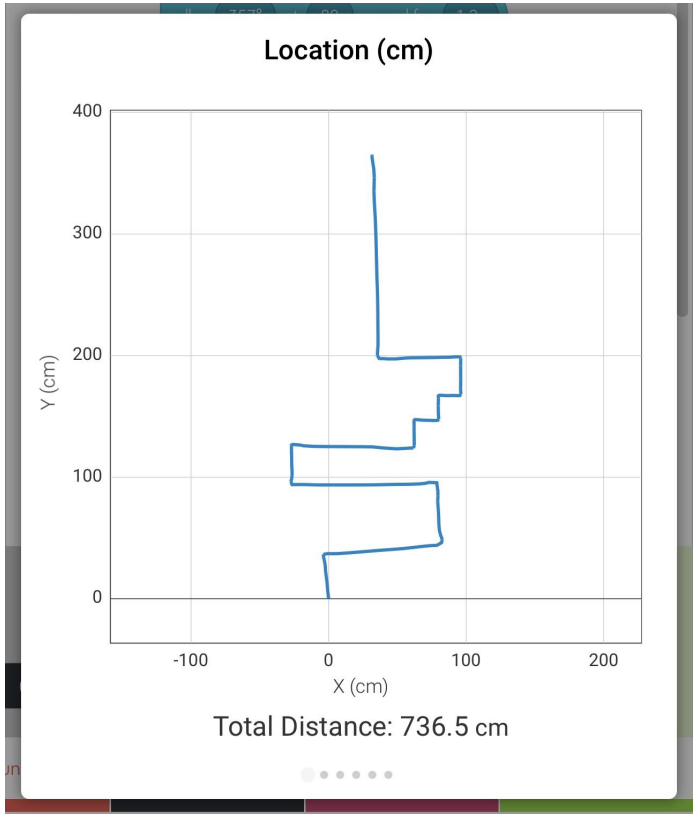

roll 0° at 26 speed for 1s
delay for 1s
roll 90° at 74 speed for 1.2s
delay for 1s
roll 0° at 55 speed for 0.6s
delay for 1s
roll 90° at 73 speed for 0.7s
delay for 1s

Step 5

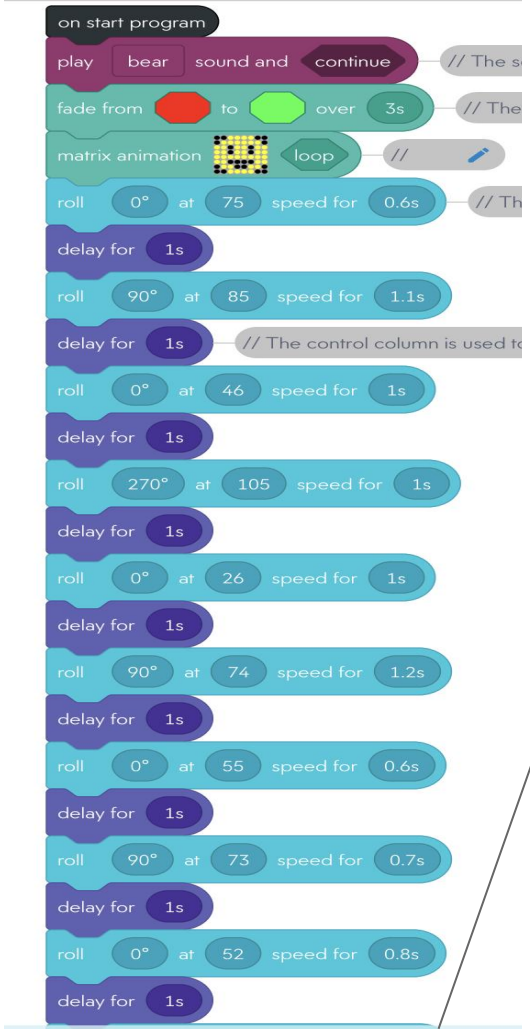

roll 0° at 52 speed for 0.8s
delay for 1s
roll 270° at 98 speed for 1s
delay for 1s
roll 0° at 72 speed for 1s

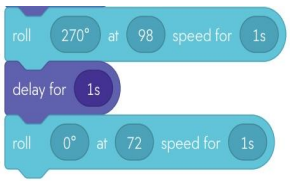
Video display for Bolt

End goal project



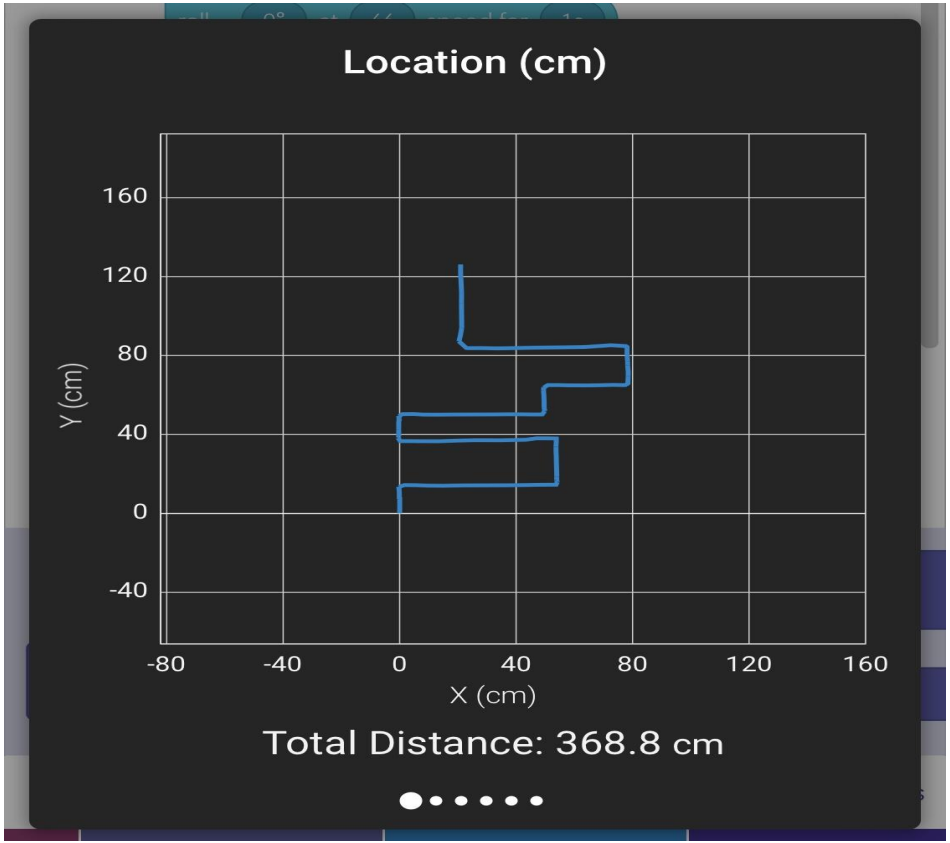
Bolt Code completion for project 1





Project 1
(the blueprint)

End Goal for project 1



Any Questions :) ?

References

- https://www.technologyforyou.org/what-is-coding-and-what-is-it-used-for-a-beginners-guide/