CS104 Robotics Project

Vincent, Mason, and Zak

Roles of Each Team Member

- All Members
  - SDD Logging
  - Gantt Chart
- Vincent
  - Block Code
    - created in Sphero Edu
  - Github Management
- Mason
  - Algorithm Development
- Zak
  - Flowchart Design
    - created in draw.io using algorithm as template

Algorithm Developments

- All steps that are used within the Algorithms are used to properly run the robot sprint.

  - Must be specific to be successful.

- They are the steps that the programmer must use in order for the program to run successfully.
- They are not only used for developing the program

  - ex) placing the robot and orienting it at the proper angle.

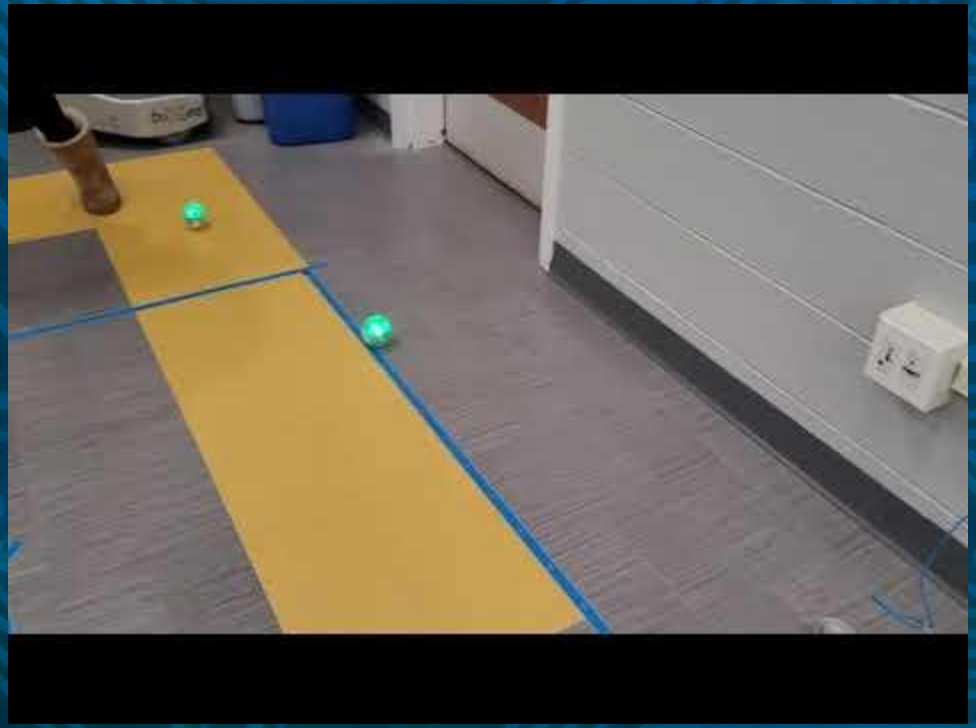
Sprint 1 - Endurance

- Most straightforward sprint

- Challenges
  - Getting the robot to stop at the correct position
  - Adjusting aim angle so robot does not go off track

- How we overcame the challenges
  - Testing constantly by adjusting specific values in the code

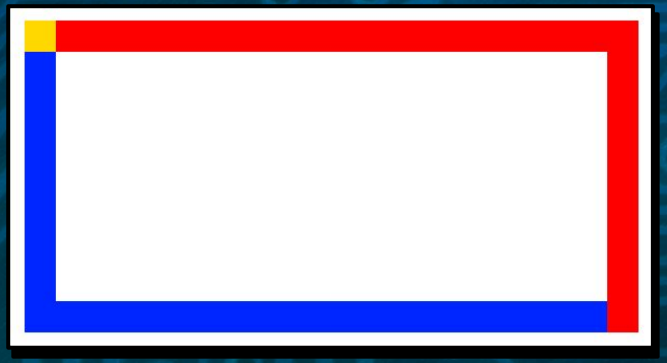
Sprint 1 - Endurance Test Run

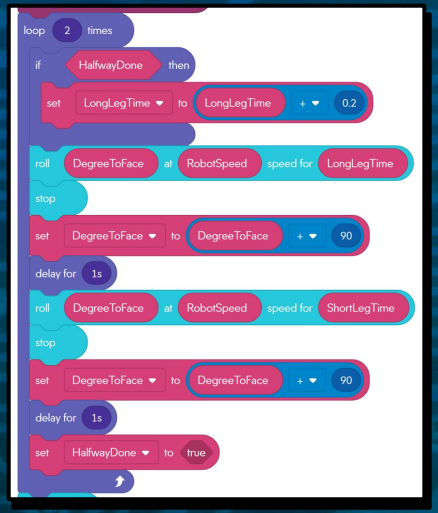


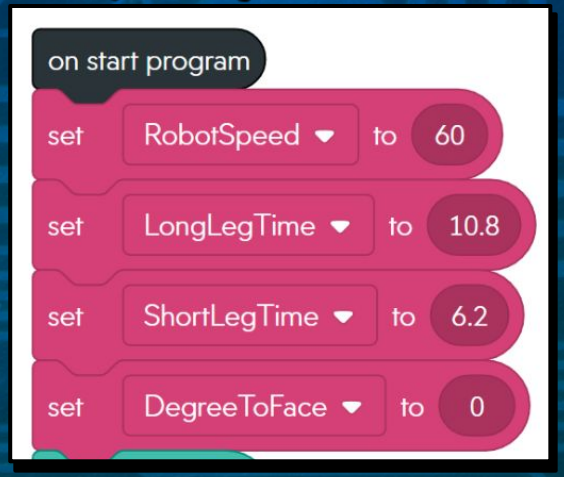
https://youtu.be/Gx9xvKXsH7Y

Endurance Sprint Programming

- Use a programming approach to allow easy adjustment of variables at the beginning
- LOOPING
  - We know the course is a rectangle







Sprint 2 - Accuracy

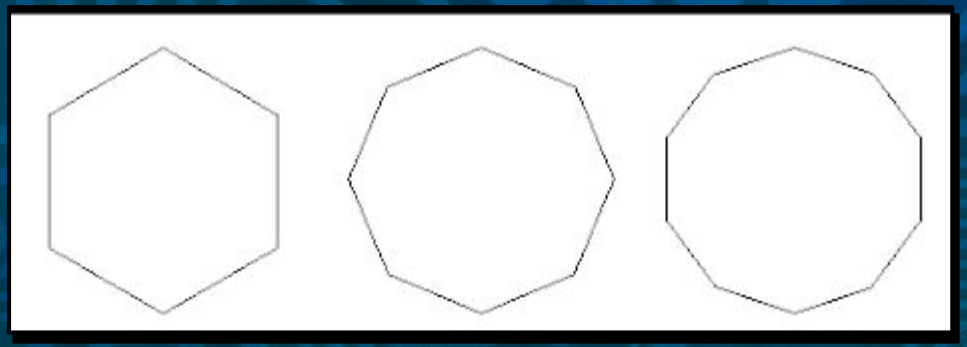
- Most intimidating sprint
- How to approach a challenge:
  - Research yields results
    - Sphero website tutorial
    - Geometry ideas
- Was it accurate?
  - Course shape challenges

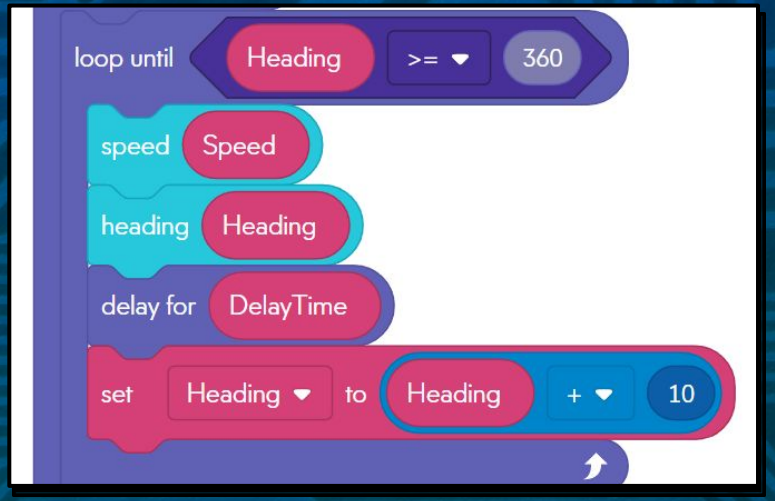
Sprint 2 - Accuracy Test Run

https://youtu.be/QCU5f_AwZuU

Accuracy Sprint Movement

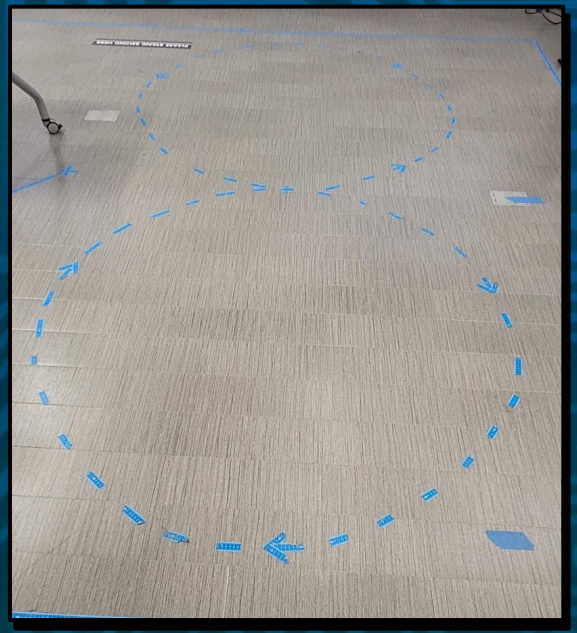
- Move in a short line, then turn at a small angle repeatedly

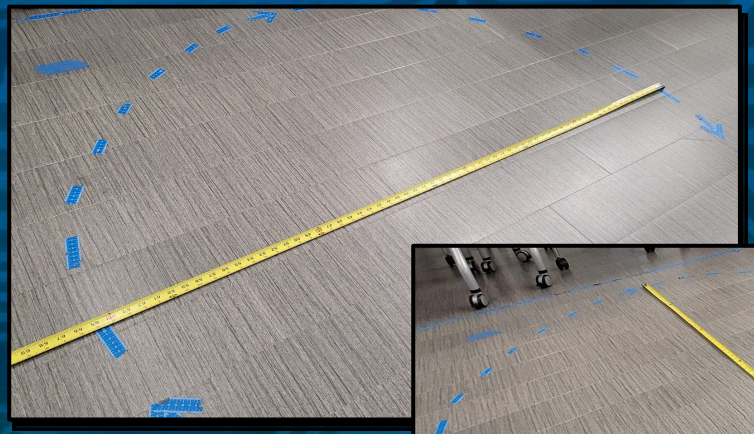


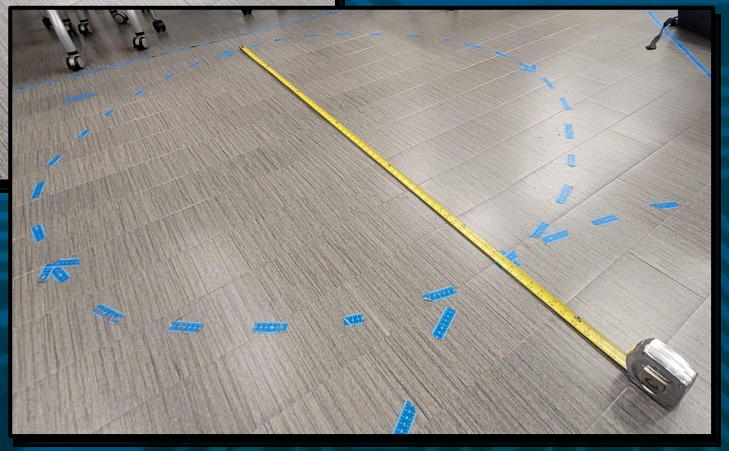


Accuracy Sprint Course Challenges

- The dimensions of the track are not perfect

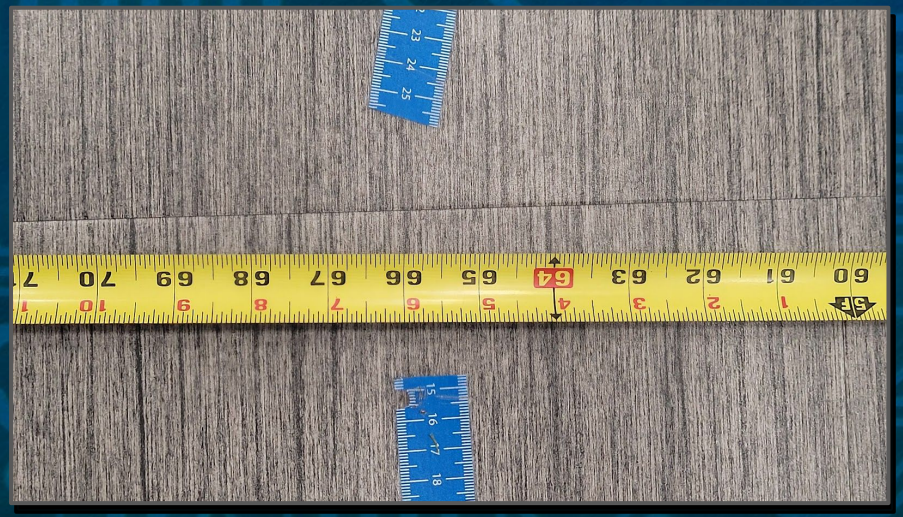


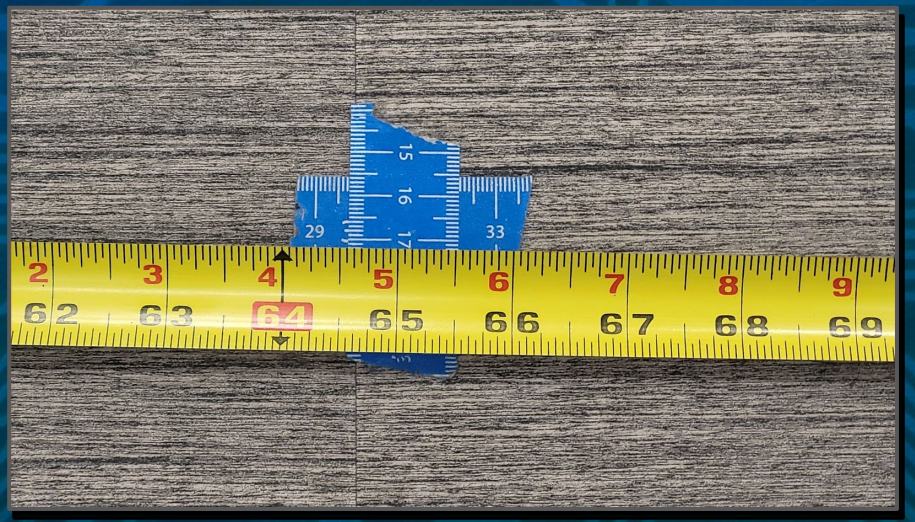




Accuracy Sprint Course Challenges

We program for perfect circles, when that is not the case in the real world

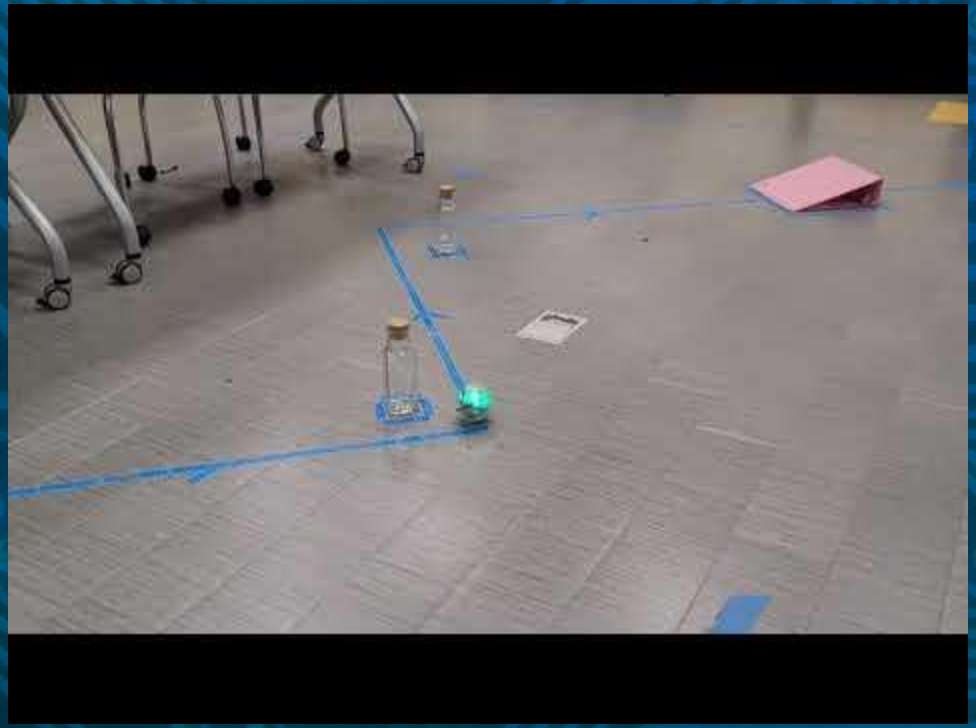




Sprint 3 - Agility

- Don´t trust physics
  - Ramp landing will usually be different on every test run
- Timing is everything
  - Overshoot or undershoot = object collision
- Cheating on bowling
  - Ensure all pins are knocked over
    - [never said we couldn´t]

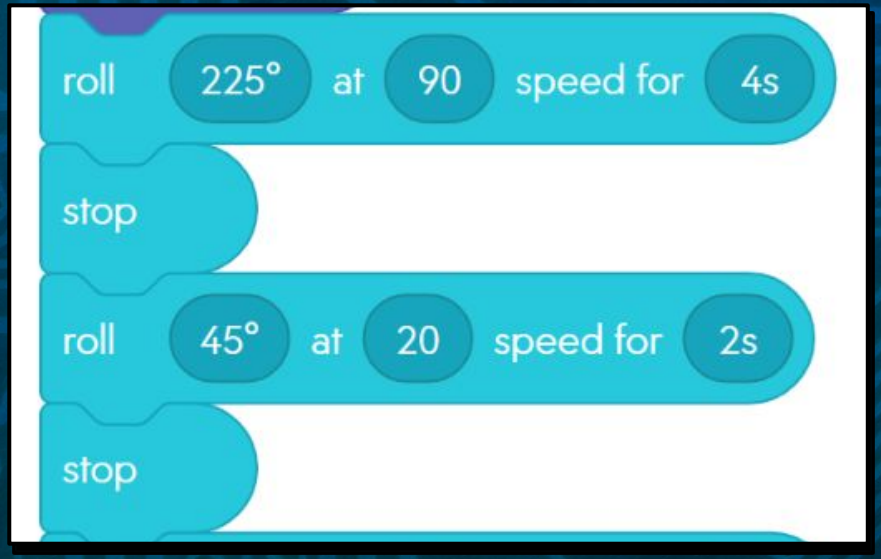
Sprint 3 - Agility Test Run

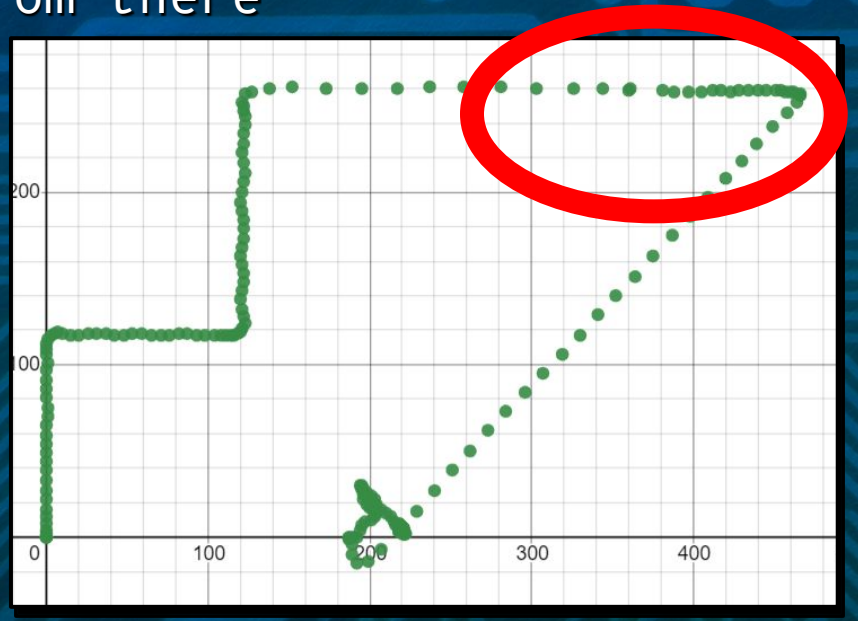


https://youtu.be/LT2LWjVF-tk

Agility Sprint Challenges

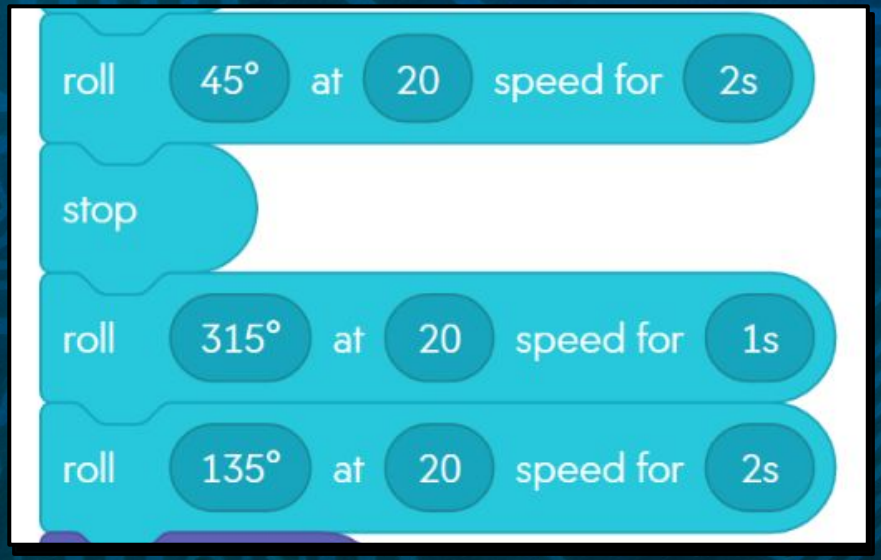
- Ramp Speed & Landing
  - Solution: Let robot fall near ramp back and adjust from there

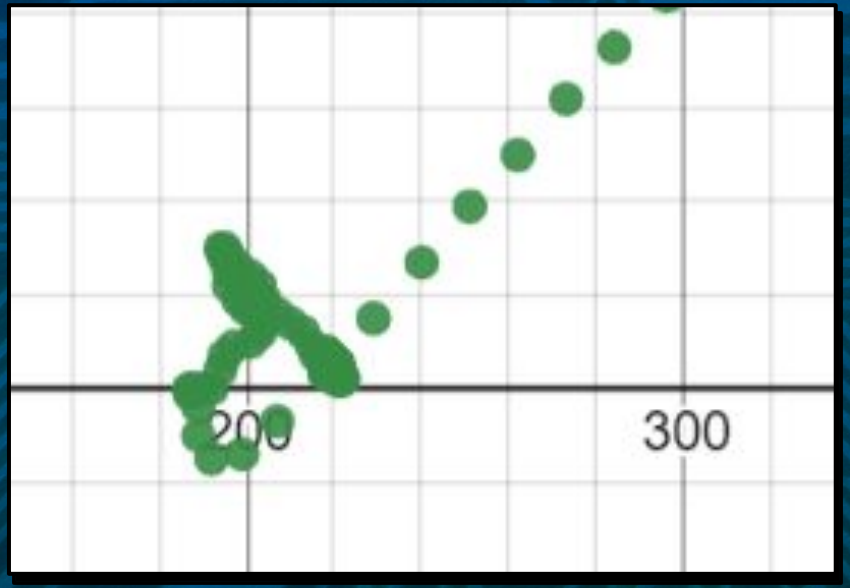




Agility Sprint Challenges

- Pins
  - Solution: Move robot back and forth to knock over all pins





What We've Learned About Software Engineering

- Every variable must be taken into account and worked around to create an end result that functions properly
- Very time consuming since everything about software engineering is very detail-oriented
- Most of the work is recording information in the System Design Document

What We'd Do Differently

- Ensure the robot is charged before using it to test
- Use a robot on wheels rather than a sphere
- Work around each other´s schedules better

Questions?