ROBOT PROJECT

Group 6:
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SET UP

- Software- We utilized block coding, the Sphero Edu application platform, and a Sphero Bolt to develop and deploy the application.

- Hardware- The hardware platforms we used to develop the project were laptops that contain CPUs, motherboards, power supplies, SSDs, memory, and the Sphero Robot.

SPRINT 1: ENDURANCE

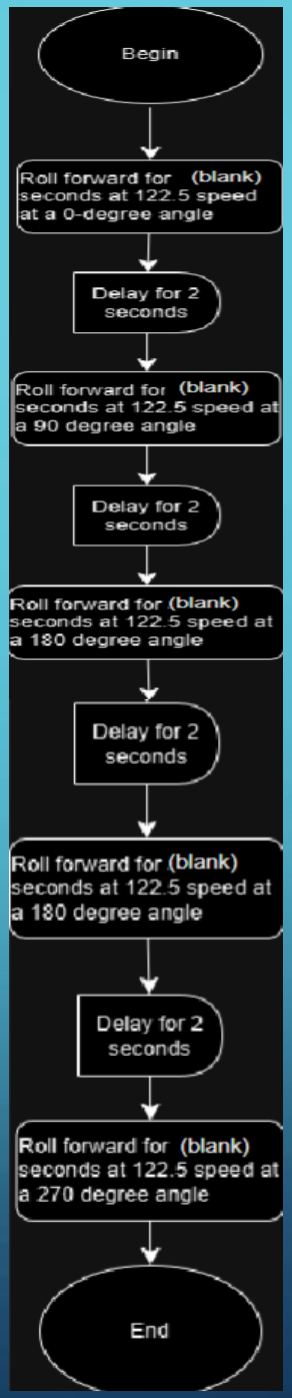
CONDENSED SUMMARY

- Overview- We are piloting a mini robot around a rectangular course set up.
- Purpose- Implement beginner programming, and physically see that code executed through the robot.
- Context- The project is related to a variety of other basic coding projects.
- Dependencies- Basic coding based on the algorithm as well as proper hardware is required. The robot also must calibrate for aim and proper axis orientation.

ALGORITHM

- On the start of the program, Roll forward at 122.5 speed for (X) seconds at a 0-degree angle
    - Delay for 2 seconds
- Roll forward at 122.5 speed for (X) seconds at a 90-degree angle
    - Delay for 2 seconds
- Roll forward at 122.5 speed for (X) seconds at a 180-degree angle
    - Delay for 2 seconds
- Roll forward at 122.5 speed for (X) seconds at a 270-degree angle
- End

SYSTEM FLOW


Begin
Roll forward for (blank) seconds at 122.5 speed at a 0-degree angle
Delay for 2 seconds
Roll forward for (blank) seconds at 122.5 speed at a 90 degree angle
Delay for 2 seconds
Roll forward for (blank) seconds at 122.5 speed at a 180 degree angle
Delay for 2 seconds
Roll forward for (blank) seconds at 122.5 speed at a 180 degree angle
Delay for 2 seconds
Roll forward for (blank) seconds at 122.5 speed at a 270 degree angle
End

Sprint 1 Data:

SPRINT 2: ACCURACY

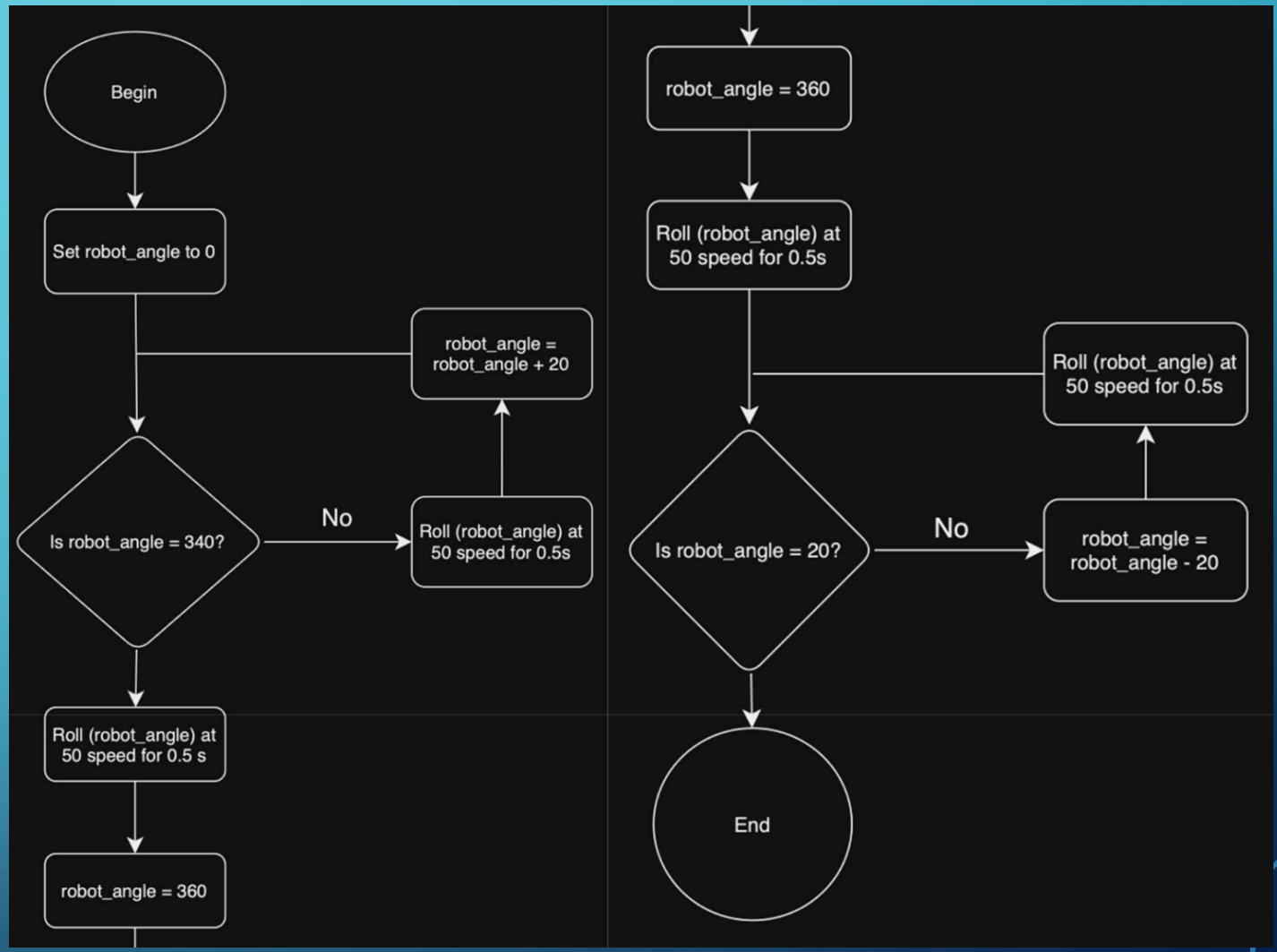
CONDENSED SUMMARY

- Overview- We are piloting a mini robot around a figure-eight loop.
- Purpose- Implement beginner programming, stick to the loop accurately, and ensure proper axis orientation.
- Context- The project is related to a variety of other basic coding projects such as having the robot move in a rectangular shape in the prior Sprint.
- Dependencies- Basic coding based on the algorithm as well as proper hardware is required. The robot also must calibrate for aim and proper axis orientation.

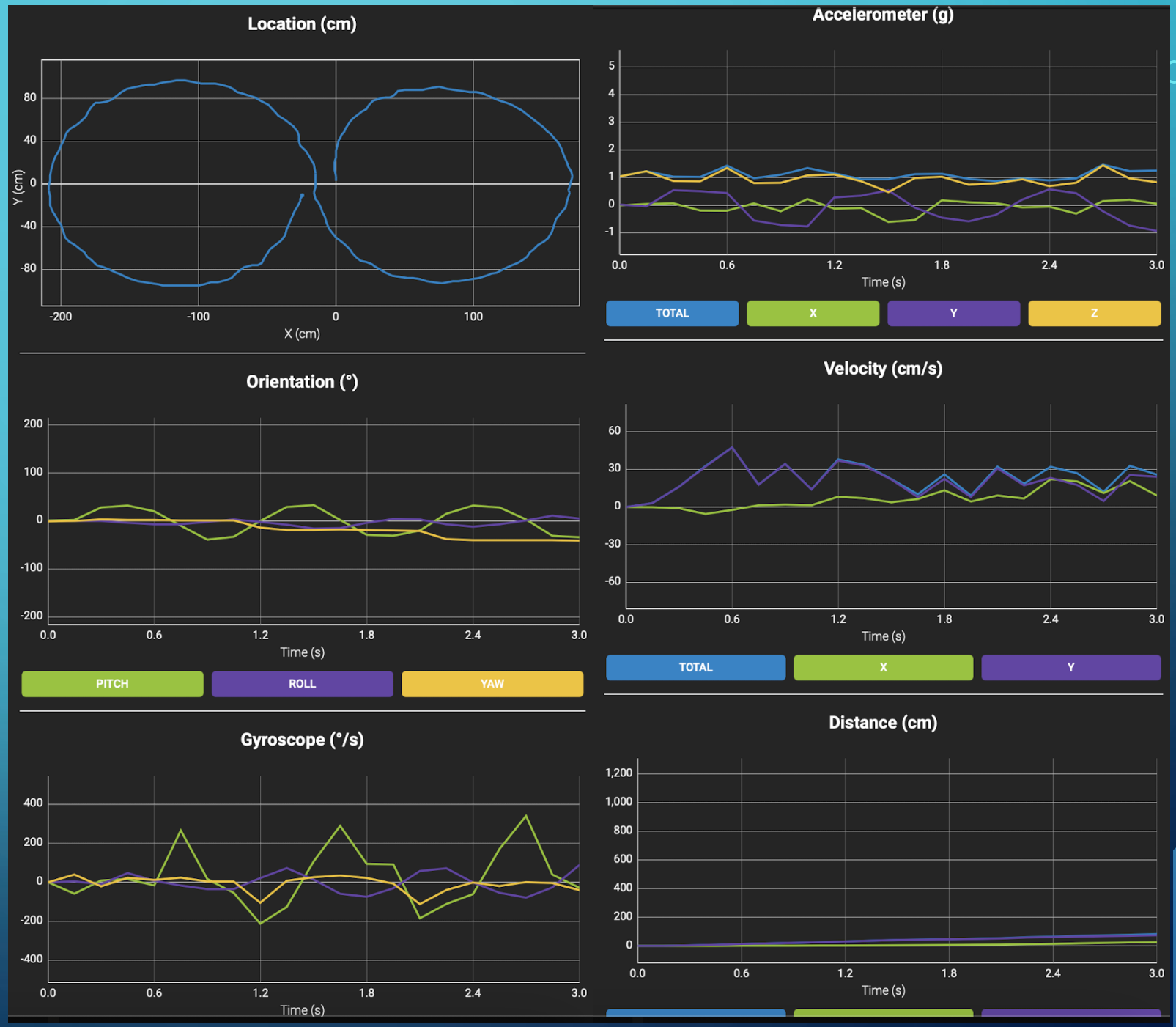
ALGORITHM

- On the start of the program, Set Robot angle to 0
- While robot_angle does not equal 340
    - Roll as (robot_angle) at 50 speed for 0.5s
    - Robot_angle = robot_angle + 20
- Roll at (robot_angle) at 50 speed for 0.5s
- Robot_angle = 360
- Roll at (robot_angle) at 50 speed for 0.5s
- While robot_angle does not equal 20
    - Robot_angle = robot_angle – 20
    - Roll at (robot_angle) at 50 speed for 0.5s
- End

SYSTEM FLOW


Begin
Set robot_angle to 0
robot_angle = robot_angle + 20
Is robot_angle = 340?
No
Roll (robot_angle) at 50 speed for 0.5s
Roll (robot_angle) at 50 speed for 0.5 s
robot_angle = 360
robot_angle = 360
Roll (robot_angle) at 50 speed for 0.5s
Roll (robot_angle) at 50 speed for 0.5s
Is robot_angle = 20?
No
robot_angle = robot_angle - 20
End

Sprint 2 Data:



SPRINT 3: AGILITY

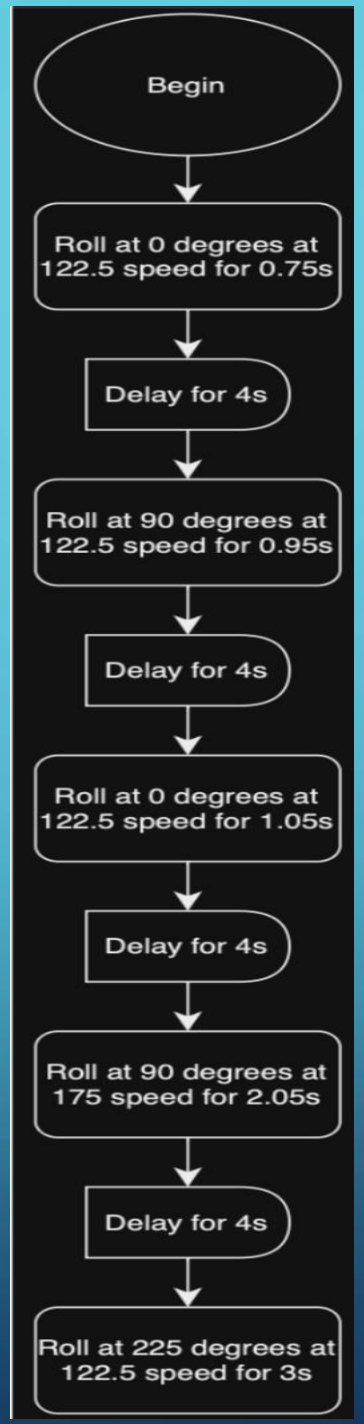
CONDENSED SUMMARY

- Overview- We are piloting the robot around the obstacle course to avoid objects, move up a ramp, and knock down pins.
- Purpose- Implement beginner programming and effectively guide the robot through that programming.
- Context- We have built off prior projects such as guiding the robot around in a figure eight loop using simple coding.
- Dependencies- Basic coding based on the algorithm as well as proper hardware is required. Sensors within the robot are necessary for proper collaboration and control.

ALGORITHM

- On the start of the program, Roll forward at 0 degrees at 122.5 speed for 0.75 seconds
    - Delay for 4 seconds
- Roll forward at 90 degrees at 122.5 speed for 0.95 seconds
    - Delay for 4 seconds
- Roll forward at 0 degrees at 122.5 speed for 1.05 seconds
    - Delay for 4 seconds
- Roll forward at 90 degrees at 175 speed for 2.05 seconds
    - Delay for 4 seconds
- Roll forward at 225 degrees at 122.5 speed for 3 seconds
- End

SYSTEM FLOW


Begin
Roll at 0 degrees at 122.5 speed for 0.75s
Delay for 4s
Roll at 90 degrees at 122.5 speed for 0.95s
Delay for 4s
Roll at 0 degrees at 122.5 speed for 1.05s
Delay for 4s
Roll at 90 degrees at 175 speed for 2.05s
Delay for 4s
Roll at 225 degrees at 122.5 speed for 3s

Sprint 3 Data:

CONCLUSION

In these sprint projects, we got to hone our coding and problem-solving skills as well as getting real-world experience using other skills we learned in class such as flowcharting and algorithm making. Most coding projects never work initially, and require corrections, so the troubleshooting practice we gained will be critical to our success in future courses.