

Project Design and Schedule

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Milestones and Deliverables

Date	Milestone	Delievable
2019/02/22	Gathered All necessary hardware	Design and Schedule Documentation
2019/02/28	Communicate with each hardware individually to ensure everything works properly	communication data and result of individual communication with each part.
2019/03/01	Wiring each hardware part to each other and setting up framework for self balancing.	Hardware wiring, setup, and attachment to balancing frame.
2019/03/08	Software implementation for communication between each module and basic balancing.	Code for calculating tilt and self balancing for balancing robot.
2019/03/14	Testing and refinement of balancing robot.	Robot able to stay upright and maintain balance with two wheels.

The final deliverable is a self balancing robot with two wheels connected to a three layered platform holding the power source, wiring, and sensors. In the case that we are behind schedule, we could remove the top layer to simplify the balancing implementation. In the case that we are ahead of schedule we plan to implement bluetooth controlled steering to move the robot forward or backwards manually.

Software Implementation Design (object oriented)

Wheel control - This section of the code would be used to control the motor and thus the wheel direction and speed. Information would be passed in by the balance calculator with information on which direction to move the wheel and speed to move at.

Sensor processor - This section of the code communicates with the shield (Adafruit motor controller) and the sensor to gather information on the tilt of the robot and sends the data to balance calculator to figure out the counter force necessary to maintain balance.

Balance Calculator - this section receives and processes data from the sensor processor and uses that data to calculate direction and speed for wheel control to maintain balance. This could send data directly to wheel control or store data and data would be sent to wheel control through main loop.

Use Cases

- Build should be able to balance it self on two wheels
- Build should not have to be connected to a grounded power source.
- Structural framework should be well balanced and efficiently designed.

User Manual

This self balancing robot should be fully implemented and does not require any manual input or configuration. To extend usage the power source (2000 mAh, 9.6 V battery pack) may be disconnected for charging purposes. Please ensure power source is properly connected to the shield (Adafruit motor controller) power connector before setting down the robot in an upright position.