Project 1: Dynamic PID Tuning

Group 1: Gears

1) Motor specs:
    a. What is the top speed of our motor?
    b. What is the peak torque?
    c. Can you derive one of the motor constants? If so, how and what is it?
    d. Can you derive the motor constant? If so, how and what is it?
2) What do you think our final output shaft's top speed, after gearing, should be?
3) What gear ratio will facilitate that?
4) Make a SolidWorks model of the motor, gear train, and any necessary mounting components.
    a. Use an existing CAD model of the motor if you can. See group 4 for help.
    b. Use M3 hardware

Group 2: Encoder

1) What are three different encoder types/options
2) In ~2 paragraphs explain the theory of how your 1st option operates. You may insert pictures to support your explanation.
3) In ~2 paragraphs explain the theory of how your 2nd option operates. You may insert pictures to support your explanation.
4) In ~2 paragraphs explain the theory of how your 3rd option operates. You may insert pictures to support your explanation.
5) What option do you think is best for our application and why?
6) Implement it. Let me know what resources you need.

Group 3: Knobs + Switches

1) Read through the code I've posted, especially all the comments. Did you do it?
2) Scroll through and browse the tutorials that I posted in the comment's code. Did you do it?
3) Find the necessary components for implementing your knobs and switches. Let me know if you need help.
4) Sketch the wiring diagram for your system, including values for the different components. Insert a screenshot in the answer box.
5) Set up your components on a breadboard and fill out the code blocks to test your setup.
6) Stretch goal: start a SolidWorks assembly to house your hardware.

Group 4: Base

1) Aid group 1 and group 3 in finding existing CAD models for all our hardware.

2) Design a base to mount the Pi, power supply, and parametric mounting patterns for group 1 and 3's mounts so that you can easily adapt to their designs. Insert a screenshot of your design

3) Manufacture it. When possible, use M3 hardware, otherwise stick with other metric sized hardware. I recommend making the base out of acrylic and not metal to reduce accidental shorting.