Project - Wheeled Inverted Pendulum (WhIP) Grade: Between 25%-35%

A robot has 3 essential components: perception, cognition and control. Your WhIP currently has control; the PID loop measures body state to maintain balance. Adding perception (to sense the robot's environment) and cognition (decide what to do) will transform your WhIP into a robot.

Form a team (1 to 3 people) to create a robot out of your WhIP. Some ideas for projects are:

- A. WhIP follows a line (e.g. black electrical tape) in some path (e.g. a figure-8, ellipse, and/or rectangle). Perhaps use an infrared sensor
- B. WhIP ascends and/or descends a ramp
- C. WhIP moves constantly avoiding obstacles it encounters. Perhaps use an ultrasonic sensor
- D. WhIP (or multiple WhIPs) carries a load (e.g. stretcher)
- E. WhIP is made taller (say, by 3 times body height) but can still balance; perhaps add weight at the "head" of the WhIP
- 1. Submit team member names and project concept (by end of class)
- 2. Project Presentation (within 2-weeks)
 - PPT (say, up to 5-slides) Presentation: goal to achieve; explain how/why your project is a robot; photos of construction; code flowchart; and working videos
 - Live demonstration

Note: for projects involving more than 1-person, each member must make/program their own WhIP and "compete". For example, for A, B, or E members can "race" i.e. which WhIP performs the task quickest or is tallest.