ME 102B Project Assignments 1 & 2

1.

For shop training, Nilesh and Taylor are certified with machines in the Etch lab. If need be, Rocklin will also undergo machine shop training later on in the semester. Nilesh, Rahul, Rocklin, and Taylor are all proficient in CAD and everyone will have access to CAD files.

Rocklin will be responsible for receiving shipments and the purchase/returning of parts and materials. Nilesh will be the P.O.C. for borrowing shop materials and tools.

For work submissions, whoever's free at the time will submit the assignment. If a member gives a date that they will complete work by, it is expected that they will finish by that date. Exceptions will be made only if sufficient notice is given (approx. 24-48 hours).

Late work completion and meeting absences will be excused only if communication stays consistent and constant. In the event of a member ceasing communications and neglecting work, the rest of the team will notify the teaching team if attempts to reach out are unsuccessful.

The following people agree to follow the terms listed above:
Rocklin Duong
Taylor Jazan
Rahul Kariyawasam
Nilesh Kothari

2. Our selected opportunity is enhancing human mobility.
3.

	Exo attachment	Interactive smart balance board	Stair-shoes	Smart/enhanced Wheelchair
Feasibility (4)	4	4.75	3.5	4.25
Cost (2)	3.5	3.75	2.75	2.25
Team Enthusiasm (1)	4.5	4.75	3	3.5
Practicality (3)	4.75	4.75	3.75	4.5

Total Score	41.75	45.5	33.75	38.5

The concept we decided to pursue is the interactive smart balance board because it has the highest score average between all members for all criteria.

Group 24 : Project Pitch

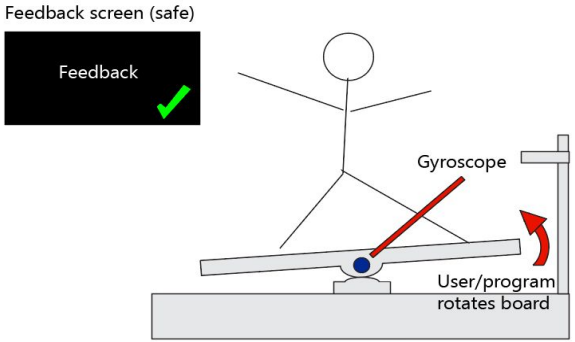
Nilesh Kothari, Rahul Kariyawasam, Rocklin Duong, Taylor Jazan

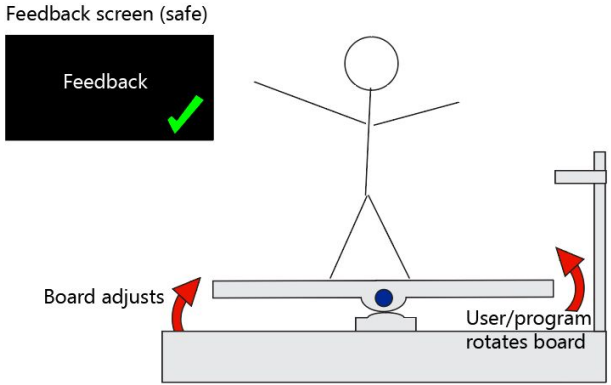
Interactive Balance Board

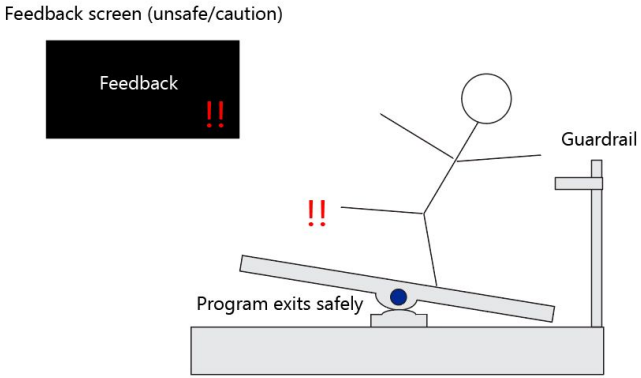
- A multi-functional balance board to be used for both balance training and entertainment purposes
- *Why work on this device?* Because it was the solution with the highest score average, and we have several ideas for prototypes
- This product is designed for entertainment or physical training purposes for anyone and is meant to be a solution to enhancing human mobility
- Some existing devices include the following:

Strategy and Behavioral Goals

- The board should automatically adjust to maintain balance when a user stands on it
- The board should minimize any drift or oscillation while correcting, maintaining stability without significant error or over-correction, and make these corrections smoothly
- System provides intuitive feedback about a user's balance including safely exiting programs when unsafe conditions are passed







Materials

- **Wooden Plank or Board:** This will serve as the base of your balance board. The size should be large enough to stand on and simulate balance movements.

- **Rollers/Wheels or PVC Pipe:** Attach small caster wheels or a PVC pipe underneath the board to allow for movement and simulate balance challenges.

- **Prototype Materials (Cardboard, Foam, etc.):** These will help you mockup rough pieces of the balance board, such as cushioning or sensor locations.

- **Weights:** Use small dumbbells or bags of sand to simulate different user weights on the board.

- **Measurement Tools (Protractor, Ruler):** To track the angle of tilt and how much balance adjustment is needed.

Prototyping Ideas

- **Roller Test:** Attach the caster wheels or PVC pipe underneath the board and simulate balance movements. You can test how the board reacts to shifts in weight and how much movement is possible without losing balance.

- **Play-Act Machine Behavior:** Act as the "smart" element by manually testing how difficult it is to stay balanced, using your body to adjust and record observations on balance behavior.

- **Simulate Smart Features:** Use markers or foam to represent where sensors or stabilization mechanisms would be placed on the final product. Test their potential effectiveness by identifying where your body weight naturally shifts.

- Force/Weight Distribution: Observe how much pressure you need to apply on different parts of the board to maintain balance. This will help design the placement of future sensors.

- **Balance Challenges:** Play-act how the smart system would adjust balance by manually shifting your stance and noting which areas are most difficult to control.

- **Effectiveness of Rollers:** Test the ability to move freely with the rollers or pipe and record how difficult or easy it is to stay balanced.