

Team 6 (Larry Hui, Athul Krishnan, Eric Yamaguchi, Thomas Yu)  
ME 102B  
Prof. Lining Yao  
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### Deliverable 1: Collaborative Agreement

#### **Shop training**

Thomas: Etcheverry, Jacobs, personal 3D printer

Athul: Jacobs, personal 3D printer

Eric: Personal 3D printer

Larry: Jacobs

We all have access to CAD, and individually, we have enough shop experience that a lack of skill will not limit anyone from being involved in the project.

#### **Sourcing of parts**

Purchasing responsibilities will be distributed among all team members as needed. **Larry** will be the point person for borrowing parts from Tom.

#### **Deadlines and submissions**

In general, we will aim to complete work 1-2 days before the deadline. **Thomas** will submit all group assignments.

#### **Absences and teammate concerns**

To address this, we will follow the procedure outlined below if a member becomes **unresponsive, absent, or is consistently late** with work:

1. Initial check-in: one teammate will send a check-in message on Discord **within 24 hours**. It will basically ask if everything is okay and gently remind them of their pending tasks.
2. Follow-up: If there is no response after 48 hours, we should text or email them directly, stating which work/meeting they missed and any upcoming responsibilities.
  - a. If contact is made, we can then redistribute the tasks effectively, offer flexibility, or help and reassess our deadlines.
3. Escalation → if there is no response for **a week** and they continually miss commitments, we will notify the ME102B course staff, provide a summary of the situation, and ask for support.
4. Documentation → We will keep a record of what meetings are missed, reminder dates, and responses, just to ensure transparency and accountability.

### Deliverable 2: Project Opportunity

For **athletes** seeking **novel, non-repetitive ways to train their reflexes and hand-eye coordination**, this is a **high-performance air hockey-playing robot** that **returns shots** when it **detects puck motion**.

### Deliverable 3: Design Matrix

Brief descriptions of solution concepts:

- **Robot arm:** The air hockey mallet is held and moved around in a planar region in front of the goal by a 2 DoF robot arm.
- **CoreXY gantry:** self-explanatory.
- **1 DoF cable robot:** The air hockey mallet is moved back and forth in front of the goal (across the table, laterally) by one motor, foosball style.
- **2 DoF cable robot:** The air hockey mallet is held and moved around via 4 tensioned cables in a planar region in front of the goal. The DoF along the length of the table acts as the puck return mechanism, i.e. shot velocity can be generated by moving in that direction (this is not possible in the 1 DoF robot).

Category	Weight (pts)	Robot arm	CoreXY gantry	1 DoF (linear) cable robot	2 DoF (4-corner) cable robot
Performance/ Effectiveness (responsiveness, shot velocity, etc.)	4	2	2	1	4
Robustness/ reliability	2	2	3	4	3
Ease of hardware implementation	2	3	4	4	2
Ease of software implementation	2	2	4	5	3
Cost (lower score = more expensive)	2	2	3	4	2
Total (out of 50)	10	26	36	26	36

Based on our design matrix and our goal of maximizing performance, we will select the **2-DoF cable robot** as our solution. (We are **opting out** of optional funding.)