A person throwing frisbee into a robot

AI-generated content may be incorrect.**FRISBEE SHOWDOWN:**

**Human vs. Machine**

**Introduction**

Welcome to *Frisbee Showdown*, a fast-paced competition where engineering meets athleticism.  
In this challenge, a human player faces off against a robotic frisbee launcher in a three-minute battle of precision, speed, and endurance.

Each side competes to score as many points as possible by landing frisbees through a small rectangular goal.  
The robot’s mission is to demonstrate reliable autonomous targeting and firing — while the human player must rely on skill, timing, and aim.

The crowd gets to watch a live duel between mechanical consistency and human adaptability — and both sides have to work fast to stay in the game.

**Field Setup**

* **Goal:** A rectangular target cutout measuring approximately **24 inches wide by 12 inches tall**, mounted on a solid backboard (e.g., plywood).
* **Throw Line:** A line marked on the floor approximately **10–15 feet** from the goal.
  + All shots must be taken *from behind this line*.
* **Court:** The general play area should be about **20 feet long and 10 feet wide**, enough for retrieving frisbees without obstruction.
* **Out-of-Bounds Area:** Any frisbee landing outside the court is considered *out of bounds*.

**Equipment**

* **Frisbees:** Identical discs for both players; minimum of five in rotation.
* **Robot Competitor:** An autonomous or semi-autonomous launcher capable of detecting the goal, aligning, and firing on its own or with limited human input.
* **Human Competitor:** Any single participant throwing by hand.
* **Referee System (optional):** Buzzer, timer, and scoreboard to mark start, stop, and scoring events.

**Objective**

Score as many goals as possible in **3 minutes**.  
Each successful shot through the goal earns **1 point**.

**Gameplay**

**Starting the Match**

1. Both competitors begin *behind the throw line*, each holding one frisbee.
2. At the **buzzer**, the match timer starts and both may immediately attempt their first shot.

A blue robot with a black background

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**During Play**

* **Scoring:**
  + A frisbee that passes cleanly through the target frame counts as *1 point*.
  + A referee or automated sensor system confirms each score.
* **Re-loading:**
  + Upon scoring, a human assistant (or field volunteer) immediately hands the competitor another frisbee.
  + If a shot *misses*, the player must **retrieve their own disc** and return behind the line before taking another shot.
* **Out-of-Bounds Rule:**
  + If a frisbee leaves the court, a replacement frisbee is tossed back in at a neutral location for retrieval.
* **Crossing the Line:**
  + Shots taken with any part of the body or robot beyond the throw line are invalid.
  + Penalty: That frisbee is *forfeited* (no point, must reset).
* **Time Management:**
  + The clock runs continuously for 3 minutes.
  + Players may fire as many shots as possible within that time.

**Winning the Game**

* At the end of the 3-minute timer, the side with the **most points** wins.
* In the event of a tie, each side takes one **sudden-death shot** — first to score wins.

**Optional Variations**

* **Auto Aim Bonus:** Robot fires autonomously without human input = +1 bonus point per hit.
* **Consecutive Hit Bonus:** Three hits in a row without a miss = +2 bonus points.
* **Accuracy Mode:** Instead of total points, winner is determined by **hit percentage** after a fixed number of throws.
* **Difficulty Scaling:** Move the line back, shrink the goal, or introduce moving targets to push engineering challenges further.

**Technical Encouragement**

For robotics teams, *Frisbee Showdown* provides a fun and meaningful sandbox for:

* Developing computer vision and targeting algorithms.
* Integrating sensors for localization and line detection.
* Refining motor control, RPM stability, and firing precision.
* Collecting real-world performance data under competitive pressure.

Automation Layers:

* Level 1: Manual drive, manual aim, automatic launch when aligned.
* Level 2: Semi-autonomous — driver just positions roughly; robot self-aligns and fires.
* Level 3: Fully autonomous — robot identifies goal, navigates to line, aims, and shoots