

# ITERON

Inspired by: Robert Axelrod's Iterated Prisoner's Dilemma  
Tournament

**Organized by:**  
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February 21, 2026

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## Abstract

This document outlines the official rules, submission guidelines, and scoring criteria for the algorithmic game theory tournament. Participants are advised to read all sections carefully and follow the instructions.

## General Information

<b>Event Description:</b>	A round-robin computational tournament designed to evaluate strategies across a variety of strategic environments using cumulative payoffs.
<b>Medium:</b>	Online
<b>Eligibility:</b>	Open to all students (School, Undergraduate, Postgraduate, and PhD, associated with some university).

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# 1 Introduction

Welcome to the Iteron. This tournament is inspired by Axelrod's Iterated Prisoner's Dilemma tournament. Participants are required to submit code-based strategies to compete against one another. Unlike conventional tournaments, this event tests the robustness of strategies across varying environments.

## 2 Submission Guidelines

### 2.1 Strategy Originality And Structure

- All submitted strategies must be **original and unique**. Plagiarism of existing open-source strategies without significant modification or attribution is strictly prohibited.
- References will be provided by the organizers. Participants must ensure their strategies are distinct from these reference implementations.

### 2.2 Formatting and Templates

- Strategies must be submitted using the **official template** provided by the organizers.
- Submissions in any other format or structure will be rejected. Participants may be asked to resubmit in the correct format or face immediate disqualification.

### 2.3 Testing

- To prevent runtime errors during the actual tournament, the organizers will release a **Sample Strategy**.
- You are required to test your code against this sample strategy before submission.
- Detailed instructions on how to perform this pre-submission test will be issued shortly.

### 2.4 Technical Constraints

- **Machine Learning:** The use of Machine Learning (ML) within strategies is expected to be **limited**. Strategies relying heavily on computationally expensive models may be subject to review regarding time-complexity limits.

## 3 Tournament Mechanics

### 3.1 Structure

- The tournament will be conducted in a **Round Robin** format.
- Every submitted strategy will play against:

1. Every other opponent's strategy.
2. A copy of itself.

### 3.2 Match Duration

- To preserve the game-theoretic essence of the "Shadow of the Future," the exact number of rounds per match **will not be revealed** to the participants.
- Strategies should be designed to handle an indefinite time horizon.

### 3.3 Iteration

- The entire tournament will be iterated more than once. This is to ensure statistical significance, remove noise, and ensure fair observations of strategy performance.

## 4 The Multi-Environment System

**Note:** This is the defining feature of this tournament.

- Unlike the conventional Axelrod's tournament which uses a static payoff matrix, this tournament will be conducted across **multiple environments**.
- The organizers will systematically vary the payoff matrices (the rewards for Cooperation and Defection) between tournament runs.
- Strategies must be robust enough to adapt to changes in incentives, rather than being over-fitted to a single payoff structure.

## 5 Scoring and Ranking

### 5.1 Winner Determination

- The final winner will be determined based on the **highest average score**.
- This score is calculated by aggregating the points obtained across **all** the different payoff matrices and environments.

### 5.2 Aggregate Performance Rule

- **Consistency is key.** Even if a strategy places 1<sup>st</sup> in  $k$  out of  $n$  specific matrix environments, it will receive no special consideration if its overall average drops due to poor performance in other environments.
- Final ranking is based *solely* on the overall aggregated performance. No separate claims or titles will be awarded for individual sub-tournament wins.

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*The Turing Club reserves the right to modify these rules to ensure the smooth operation of the Science Fest event. Updates will be communicated via official channels.*