6.147 MIT Battlecode
IAP 2022 — Syllabus

Welcome to Battlecode 2022! We're really excited to have you on board.

This document details how Battlecode 2022 is organized and administered. It describes how you will be graded, as well as the prizes and tournament structure. You should read it carefully to maximize your Battlecode experience, as well as your chance at a prize!

Contents

1   Course objectives

In Battlecode, you will be creating an Artificial Intelligence algorithm to play a complex strategy game. Each year, we bring to you a new game, with new opportunities for creative and exciting approaches to gameplay.

Many decision-making problems in the real world require you to act with limited information, in limited time. Just like the real world, the Battlecode environment is "partially observable", meaning you can only see parts of the game state at a time, and your robots must act within their budgeted computation allotment. Additionally, your individual robots must learn to cooperate in order to behave as a team, with coordinated offensive and defensive strategies.

Crafting a successful Battlecode robot is a demonstration of your tremendous skill and dedication. To help you, the competition is accompanied by a series of lectures, covering topics in the Java programming language, software engineering best practices, and algorithms for AI decision-making. Your robot will be a culmination of the techniques you have learned, combined with your creativity and ingenuity.

We are look forwarding to seeing your robots in the tournaments. Good luck!

2 Sponsors

Battlecode 2022 is made possible by the tremendous support from our generous sponsors, without whom this event would never have been possible. We are very grateful for their support in making Battlecode 2022 a reality.

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3   Administrative information

Battlecode is a 6-unit class (2-0-4 credits) under the course number 6.147, graded P/D/F. MIT students must register on WebSIS in order to receive credit.

All participants, whether or not for credit, must register an account on the competition dashboard at `https://play.battlecode.org/`.

There are no formal prerequisites for participating in Battlecode. However, we recommend some programming experience, to the level of either 6.0001 or AP Computer Science. Absolutely no prior experience in AI is expected.

For any requests to Add or Drop, please email directly to Jerry Mao, including your student ID number and Kerberos username. **Standard Add/Drop forms may be ignored and should not be submitted.**

4   Course staff

Battlecode is run by *Teh Devs*, a team of dedicated undergraduate devs who have invested significant time into making Battlecode 2022 an unforgettable experience.

Name	Role	Kerberos email	Discord
Jerry Mao	*President*	`jerrym`	jez # 7882
Elizabeth Zou	*Engine lead*	`ezou`	wflms20110333 # 5818
Gaurav Arya	*Client lead*	`aryag`	tictaccat # 6819
Nathaniel Kim	*Backend lead*	`nkim8`	eluxivae # 6552
Arvid Lunnemark	*Infrastructure lead*	`arvid`	arvid220u # 7245
Pranali Vani	Engine	`pvani`	pv246 # 5702
Andy Wang	Engine	`wangandy`	andywang # 4342
Nicole Wong	Engine	`wongn`	wongn # 1414
Mark Jabbour	Client	`mjabbour`	123mark123 # 1643
Fareed Sheriff	Client	`fareeds`	MineEnim # 6279
Aidan Blum Levine	Client	`azb`	Aidanzev # 5336
Ophelia Zhu	Backend	`opheliaz`	opheez # 1052
Brian Zhu	Backend	`haozh`	Oasisks # 8366
Serena Li	Infrastructure	`seren`	acrantel # 6801
Stephanie Fu	Infrastructure	`fus`	stephanie # 4927
Ivy Wang	Design	`ivyw`	spam musubi # 1810

If you have any questions, please feel free to reach out to any of Teh Devs. However, quite often somebody else might also have the same question, so we strongly encourage you to ask your questions on Discord! That way, everyone can benefit from the answer.

For any logistical or administrative questions, you can also reach the entire course staff at battlecode@mit.edu, or the executive team at battlecode-exec@mit.edu.

5 Resources

There are several online resources which you may find useful throughout the course. We have listed the key resources that we will use below.

- The Battlecode competitor dashboard: `https://play.battlecode.org/`
  All Battlecode 2022 documentation and technical resources will be posted here. This is also where you can upload your bot, and play and view matches against other teams.

- Canvas: `https://canvas.mit.edu/courses/12415`
  All important course announcements will be posted here. Registered students will also be able to see their progress on the course requirements.

- Twitch: `https://www.twitch.tv/mitbattlecode`
  All lectures and tournaments will be live-streamed to our Twitch channel.

- Discord: `https://discord.gg/s7JPDxcPtn`
  This is our active worldwide community of Battlecode competitors and alumni. All announcements will be hosted here, and this is also one of the best places to find help, and also to socialize!

- GitHub: `https://github.com/battlecode/battlecode22-scaffold`
  This is a quickstart template repository for beginning your Battlecode 2022 bot.

6 Lectures

Lectures run every weekday evening starting 7pm ET. The lecture series covers introductory topics to get your team started with your bot, as well as intermediate and more advanced topics that can help your bot perform more complex behaviors. The schedule of lecture topics is as below.

All lectures will be livestreamed to Twitch, with questions being accepted on Twitch and Discord. Additionally, office hours will run on Discord after every lecture.

Date	Lecture topic
Monday, January 3	Kickoff
Tuesday, January 4	Setup and introduction to Java
Wednesday, January 5	Getting started with your bot
Thursday, January 6	Introduction git
Friday, January 7	Pathfinding techniques
Monday, January 10	*No lecture — open office hours*
Tuesday, January 11	*Sprint Tournament I*
Wednesday, January 12	Communication strategies
Thursday, January 13	Distributed algorithms
Friday, January 14	Advanced topics (to be announced)

7 Tournaments

Tournaments are spectacular events in which your bots compete for a stake in glory, eternal fame, and prizemoney. Teams will be automatically entered into tournaments as long as they are eligible and have a valid code submission. Tournament rounds will be live-streamed on Twitch.

For-credit students may be interested to know that tournaments do not factor into your grade.

All tournaments are run in a double-elimination format, except for the Sprint tournaments which are single-elimination. Tournaments may be seeded by your scrimmage Elo rank (see below), or by some other equitable metric.

Tournament	Stream date	Submission deadline
Sprint Tournament I	Tuesday, 1/11	Monday, 1/10 at 7pm ET
Sprint Tournament II	Tuesday, 1/18	Monday, 1/17 at 7pm ET
International Qualifying Tournament	Sunday, 1/23	Saturday, 1/22 at 7pm ET
US Qualifying Tournament	Tuesday, 1/25	Monday, 1/24 at 7pm ET
Newbie Tournament	Thursday, 1/27	Wednesday, 1/26 at 7pm ET
High School Tournament	Thursday, 1/27	Wednesday, 1/26 at 7pm ET
Final Tournament	Saturday, 1/29	Thursday, 1/27 at 7pm ET

To prepare for tournaments, your team should make ample use of the *scrimmages* feature. Scrimmages are friendly matches between teams; they allow you to see your robot in action, and evaluate how your strategy stacks up against other teams. We also offer *ranked scrimmages*, in which you can stake some Elo points on the outcome of the match.

If the status quo doesn't change, the Final Tournament will be an in-person showcase hosted on-campus in 32-123. All Battlecode competitors and MIT community members are invited to attend! There will be opportunities to meet sponsors, take lots of swag, and have ample fun.

8 Grading and late policy

For registered students, there are two different ways to pass the class: you must either defeat a *reference player* in at least 8 out of any 10 consecutive scrimmages, or submit a team strategy report of approximately two pages detailing your approach and analysis of the game.

The reference player is an AI written by Teh Devs, released approximately one-to-two weeks before the end of IAP. It will have some intelligent behavior, but should not be too difficult to defeat with a well-planned strategy.

You should complete these requirements by the end of IAP, by 11:59 PM on January 28. We may be able to grant short extensions to this deadline upon request. Progress against the reference player will be updated on Canvas approximately daily.

On the other hand, tournaments are run on a tight schedule, so we cannot accept late code submissions for any code deadline barring extreme extenuating circumstances. In general, you should expect tournament brackets to have been drawn as soon as the deadline passes.

9 Prizes

The total prize pool for Battlecode 2022 is over $30,000. Additional money may sporadically appear as anomalies occur over time. Prizes are generally won in tournament events, and the prize categories are as below:

- **Finalists.** Awarded to the top 16 teams in the Final Tournament. Finalist teams receive prizes ranging from hundreds, up to several thousands of dollars.
  Eligibility: teams consisting entirely of full-time college or graduate students.

- **Newbies.** Awarded to the top 2 teams in the Newbie Tournament.
  Eligibility: teams consisting entirely of first-time MIT students.

- **High schoolers.** Awarded to the top 2 teams in the High School Tournament.
  Eligibility: teams consisting entirely of high school students.

- **Sprint.** Awarded to the first-placed team in each Sprint tournament.
  Eligibility: open.

- **Bonus categories.** Awarded to the team(s) selected by the universe.
  Eligibility: ???

10 Lingering questions

If you have any lingering questions about how Battlecode will be run, please feel free to email the Battlecode team at battlecode@mit.edu, or to send them in Discord.

We hope you have a great IAP and we're looking forward to seeing you in-person and online!