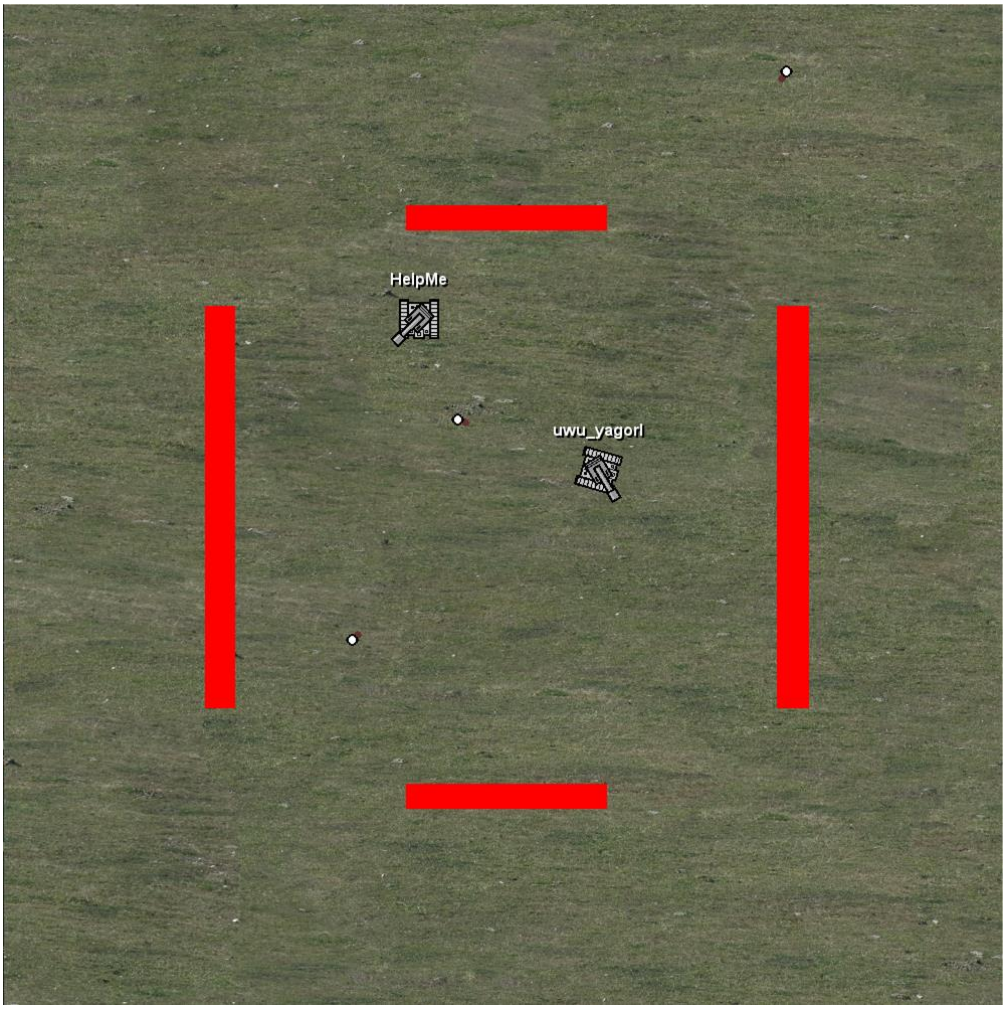
T4: Tanks IV (Salvation)

All Houses Tank Battle Royale 2025

Each participant in the tank battle will create a **Tank_AI** class, containing the participant's **name,** their optional affiliated **house** name, and the implementation code for a **make_move** method.

The board size is 1000 x 1000 and includes barriers as shown in the following image:



Board:

(0,0) is in the upper-left corner.
(999,999) is in the lower-right corner
The red bars are barriers and are positioned with the following corner coordinates:

Barrier 1 = (200,300),(230,700)
Barrier 2 = (800,300),(770,700)
Barrier 3 = (400,200),(600,225)
Barrier 4 = (400,775),(600,800)

Rules of Play:

Player tanks will spawn in a random location on the screen. The system will ensure that each tank's spawn location isn't too close to the competing tanks.

For each time-cycle of a battle, each participant will receive the current layout of the battle board. This includes the current position of the participant's tank, the name, house, and position of all the active tanks in the competition, and the location of all active bullets.

Based on the information received, each participant creates and implements an algorithm that takes the input and determines to either "move", "fire", or "shield" as well as an angle for the corresponding action. The "shield" command ignores the passed angle. All tanks move at the same speed (1 unit per move command) and the bullets move at a speed 8 times that of the tanks. The tanks have 40-unit diameter and the bullets have a 10-unit diameter. The simulation runs nominally at 60 update frames per second and when a bullet is fired there is a 15 frame reload time before the next bullet can be fired. Tanks cannot move through the barriers. Bullets that hit the barriers are absorbed and removed.

There will be no more than twenty competitors in each battle. The preliminary battles will match lowers (first-year students) against lowers, mids (second and third-year students) against mids, and uppers against uppers. The top four from each battle will continue to the championship battle.

At the start of each battle, all competing tanks are given 100 health and are assigned a random location on the board. All battles last 3 minutes with 10 points awarded for each tank you hit. If your tank is hit it will lose 10 health points. Deploying your shields will prevent damage to your tank but will use 2 health points for the shields to remain deployed for 2 seconds. Tanks cannot fire while shields are deployed. Once a tank's health reaches 0, the tank will be "dead" and disabled permanently.

The last tank surviving is declared the winner. In the event that there are multiple tanks surviving to the end of the round, the tank with the highest score of the surviving tanks is declared the winner.

The three highest finishers in each category earn House points and they, along with the fourth-place finisher, continue to the next round. House points for each round are +5 for winning, +3 for second place, and +1 for third place. Fourth place earns no house points but does continue to the next round.

In the championship battle, place is determined by score. In the case of a tie, the winner is whichever player is earlier in the academic program. If all tied players are at the same level in the program, then the winner is determined by the tank with the highest number of kills. If there is still a tie then the tied tanks will have a 3-minute play-off round with just those tanks. The overall winning House receives 10 points, second place receives 5 points, and third place receives 3 points.

This competition is intended to be an enjoyable activity. It is against the rules to purposefully hack or otherwise disrupt the competition via fork-bomb, denial of service, memory over-allocation, system modification, or any other hacking activity. ***Any person engaging in malicious or unsportsmanlike hacking attempts, whether successful or not, will cause their house to be disqualified from the entirety of the challenge.***

This competition is open to all students who would like to participate.

Details:

Template for your Tank_AI class:

```
#import the things you need here
import math
import random

class Tank_AI(object):
    def __init__(self):
        #required attributes
        self.name="HAL9000"   #your bot name here
        self.house="Yost" #your house. Use "Hudson", "Yost", "Witherell", "Lynn",
                          # "Skaggs", or "Unaffiliated"
        #optional attributes: your class variables can go here
        self.my_angle=0
        self.fire_countdown=0
    def make_move(self,your_location,tank_list,bullet_list):
        #pick a new angle every so often
        if random.randint(0,100)==0:
            self.my_angle=random.choice([90,180,270,0])
        #choose command to return
        if random.randint(0,10)==0:
            command=("fire",random.randint(0,359))
        else:
            command=("move",self.my_angle)
        #return the selected command
        return command
```

Examples of data passed to the make_move(your_location,tank_list,bullet_list) method:

your_location – a two element tuple of integers that signifies the center location of your tank. Note that your tank will also be listed in the tank_list.

```
Example value:  (585,420)
```

tank_list – a list of six element tuples organized as (name,house,x,y,health,score). Each entry represents a tank that is currently active.

```
Example value:  [ ('EDVAC', 'Witherell', 960, 87, 100, 50),
                  ('COLOSSUS', 'Yost', 585, 420, 85, 0),
                  ('ENIAC', 'Lynn', 620, 101, 48, 150),
                  ('ABC', 'Skaggs', 639, 911, 92, 15) ]
```

bullet_list – a list of two element tuples representing a bullet that is currently active on the screen in (x,y) format. Bullets that leave the board are removed. Bullets that hit a tank are removed.

```
Example value:  [ (465, 122), (29, 696), (347, 232), (348, 411),
                  (65, 131), (180, 753), (765, 802), (286, 369),
                  (336, 465), (89, 714), (15, 398), (909, 871) ]
```

Entry Submission:

- Name your source file as <*fname_lname*>.py where <*fname_lname*> is your human first and last name.
- Submit your entries by emailing a .zip file containing your python source file to your head of house or to one of the house professors. If the tank battle is a required assignment for one of your classes you may submit your bot on Blackboard.
- Entries are due to your head of house by the end of the day on Tuesday 2 December 2025.