# ROBOT CHASE
## L310 FINAL PROJECT

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# Problem Definition

- Two teams of robots, baddie and police
- Police chases and captures baddie, baddie avoids police
- Police knows the positions and velocities of all robots
- Baddie always faster than the police
- When a baddie is caught, it is then ignored for the rest of the game

# Simple Baddie Implementation

- Change direction every 3 seconds
- Knows the position of police robots but only for the purpose of calculating whether itself is captured
- Considered captured if it comes within a certain amount of distance from a police robot
- Once captured, stop moving for the rest of the game

# Simple Police Implementation

- Stay still until a baddie robot comes within a certain distance of itself
- It then became “activated”, and uses the baddie robot’s position and velocity to chase and capture it
- When chasing baddie robot, try to predict the baddie robot’s future position because the police robot is always slower than the baddie robot

# Complex Police Implementation

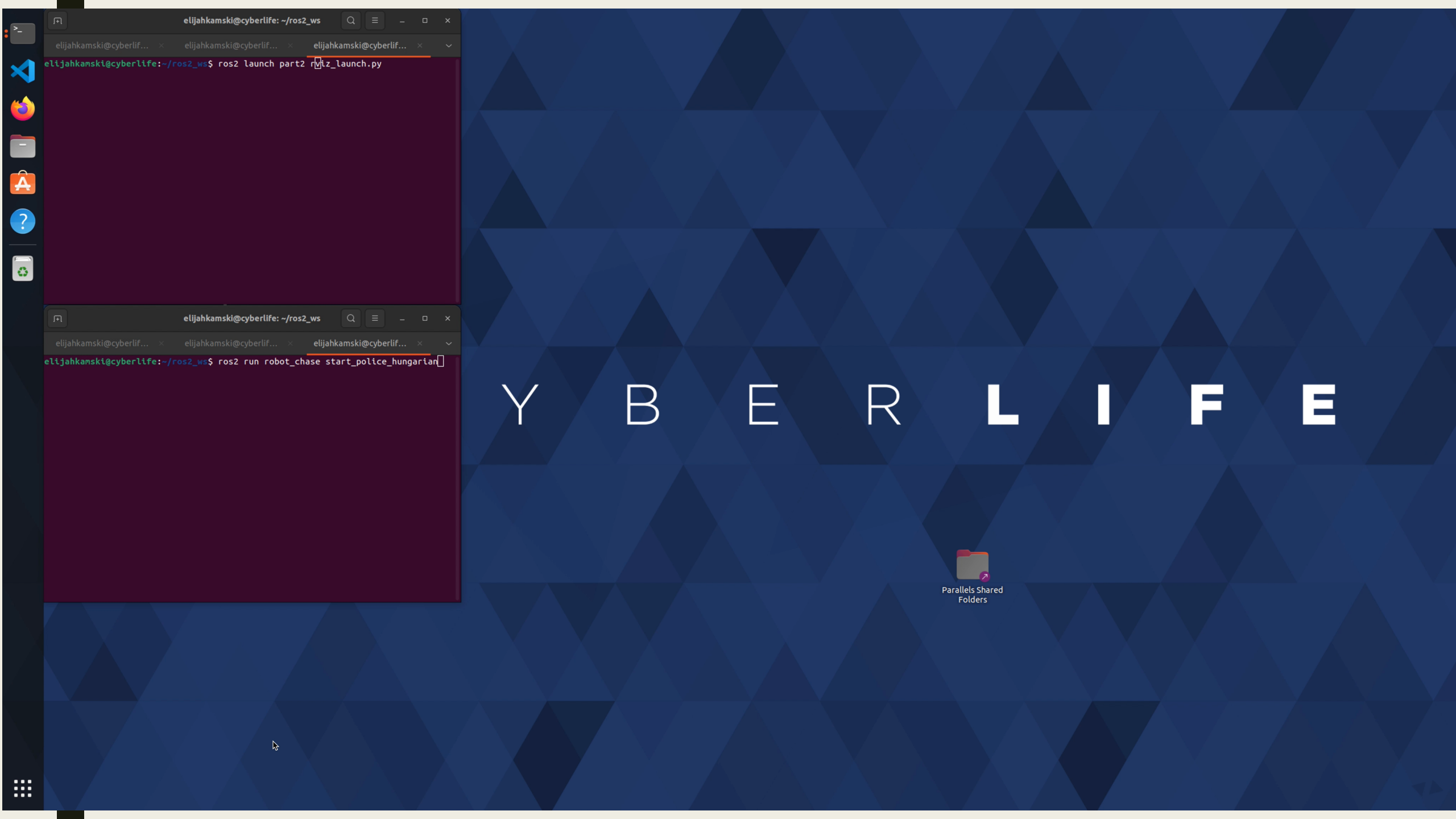
- Simple implementation not very lively, heavily depends on chance
- At the start of the game, calculate a cost matrix (distance between each pair of police robot and baddie robot)
- Use the Hungarian algorithm to determine the paring of police robot and baddie robot that minimizes the cost
- Police robot then chases and attempts to capture the allocated target baddie robot

# Experiment Results

TABLE I

AVERAGE TIME OF GAME COMPLETION WITH DIFFERENT BADDIE SPEED

| Police Speed(m/s) | Baddie Speed(m/s) | Average Time(s) |
|---|---|---|
| 0.1 | 0.12 | 32.48 |
| 0.1 | 0.13 | 38.57 |
| 0.1 | 0.14 | 41.80 |


elijahkamski@cyberlife: ~/ros2_ws
elijahkamski@cyberlif...
elijahkamski@cyberlif...
elijahkamski@cyberlif...
elijahkamski@cyberlife:~/ros2_ws$ ros2 launch part2 rviz_launch.py
elijahkamski@cyberlife: ~/ros2_ws
elijahkamski@cyberlif...
elijahkamski@cyberlif...
elijahkamski@cyberlif...
elijahkamski@cyberlife:~/ros2_ws$ ros2 run robot_chase start_police_hungarian
Parallels Shared Folders