

# Pacman Project

# PacmanCTF

授課教師 / 孫春在

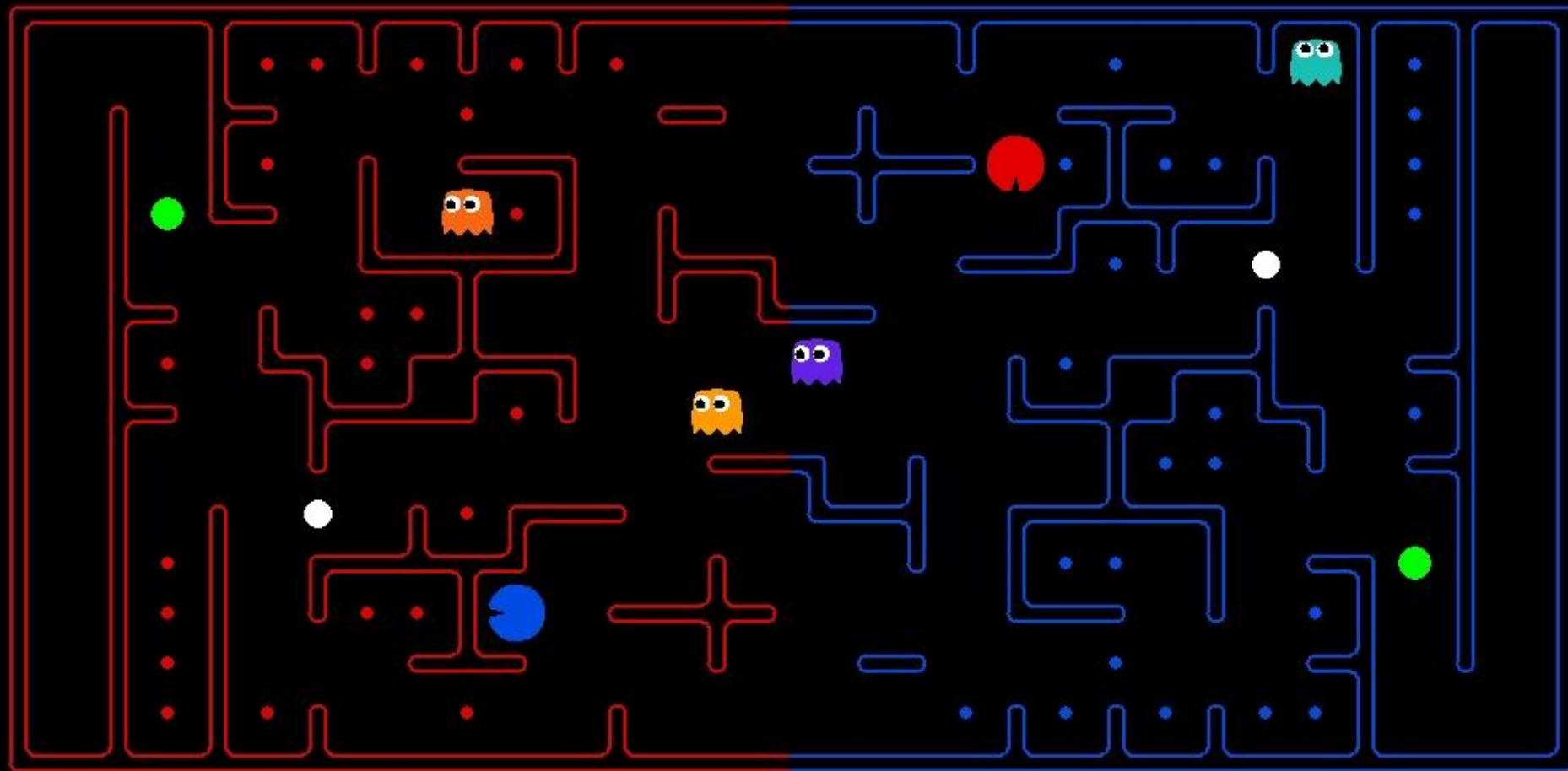
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# Acknowledge

- UC Berkeley - The Pacman Projects
- Team 25 - Specs and Ideas

# PacmanCTF



**baselineTeam**    **SCORE: -10**    **TIME: 1244**    **baselineTeam**

- 
- **Game Rules**
  - Preparation
  - Tournament
- 

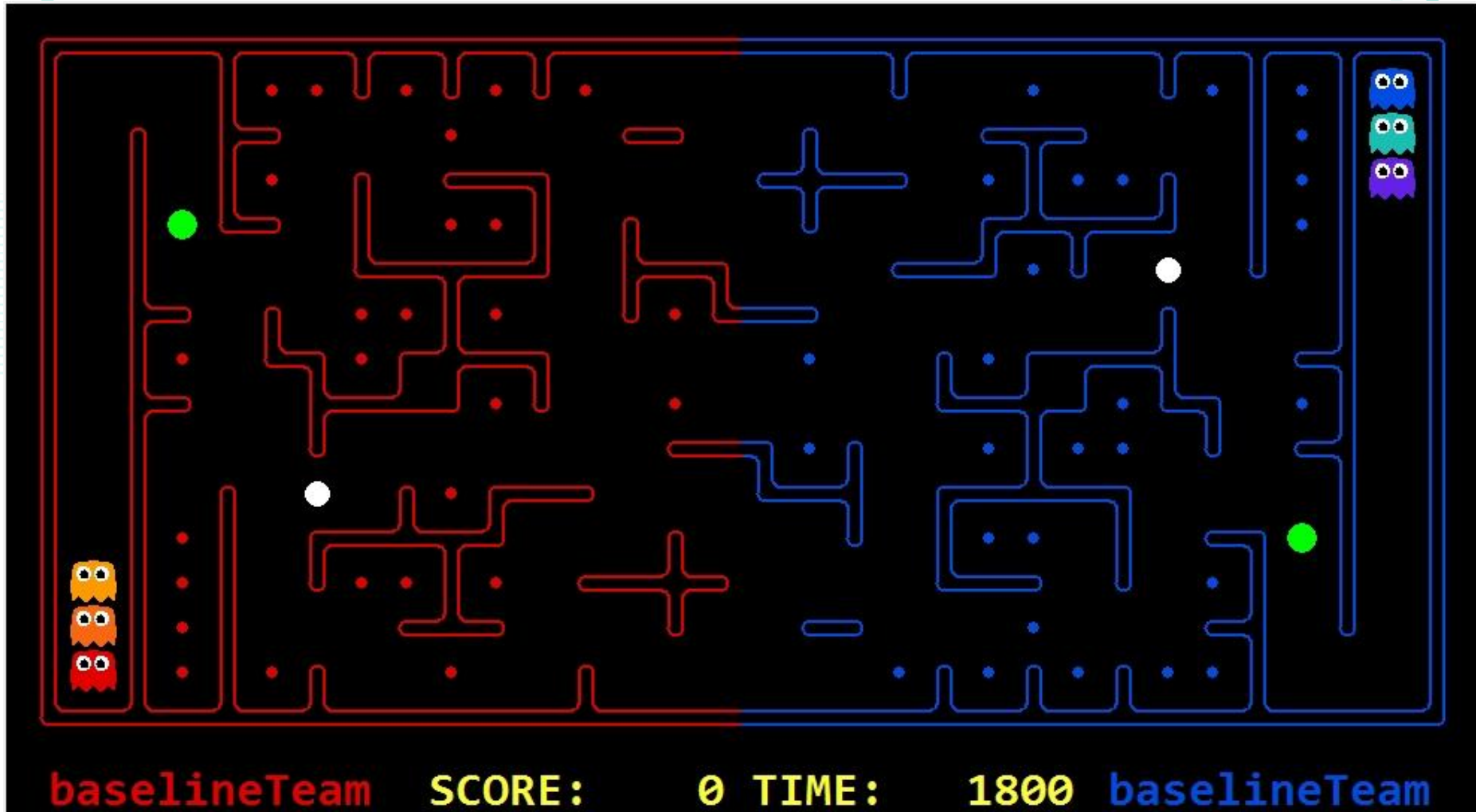
## Game Rules (1/8)

# Victory Condition

- Time Limit: **1800 actions** (300 per agent)
- As time's up, team with more **points** win.
  - Score: **Red** wins (+), **Blue** wins (-), Tie (0)

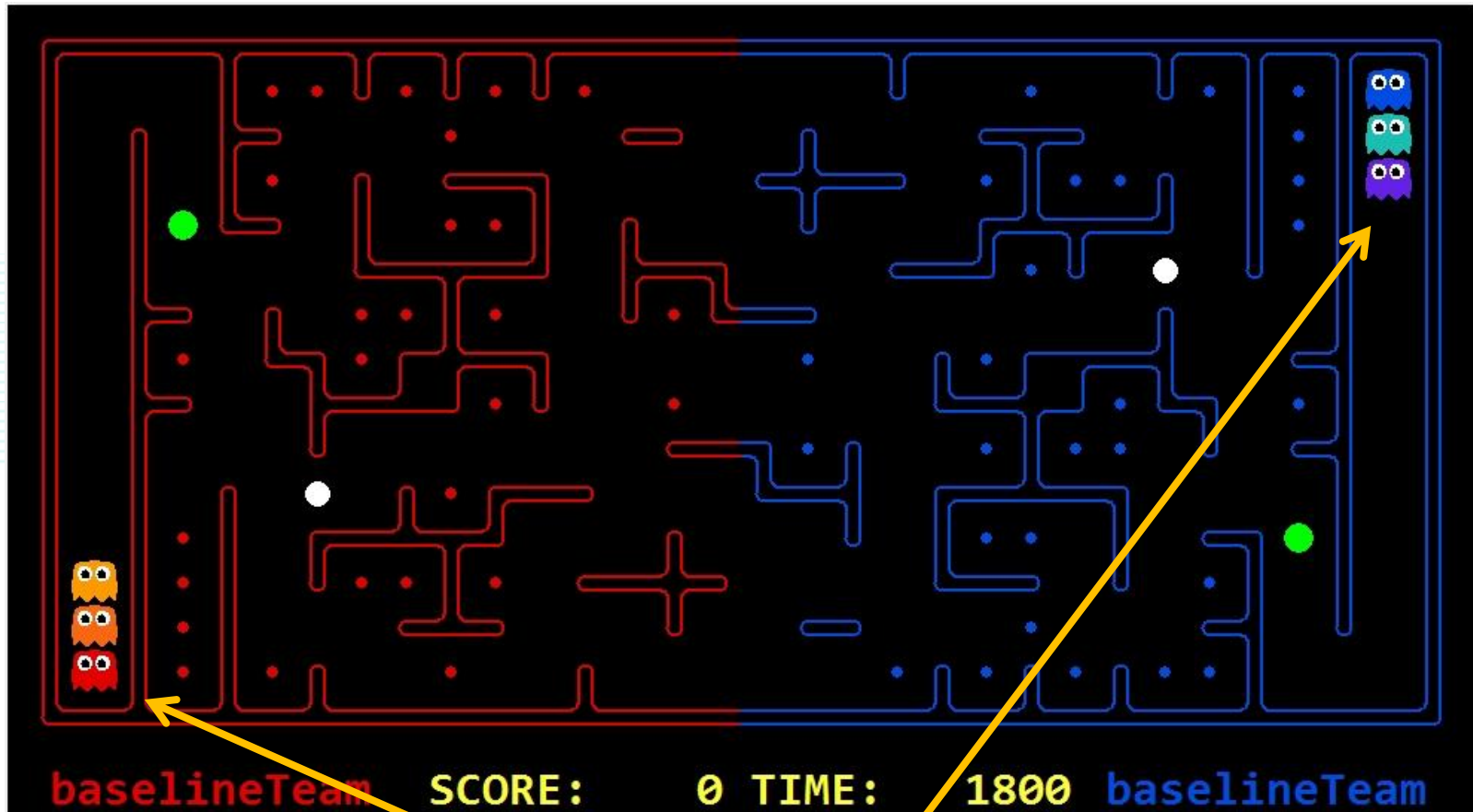
## Game Rules (2/8)

# Layout



## Game Rules (2/8)

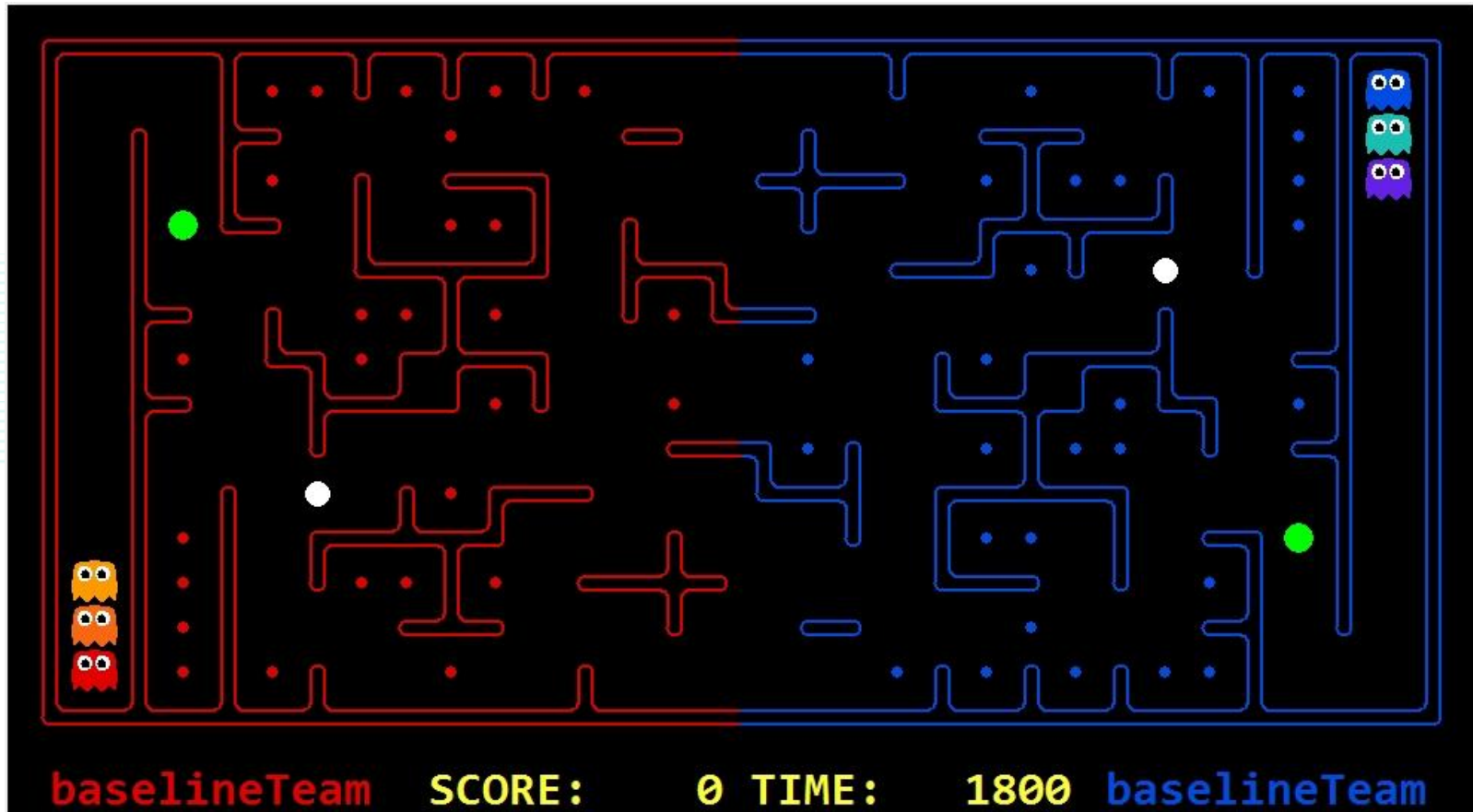
# Layout



Respawn Points

## Game Rules (2/8)

# Layout

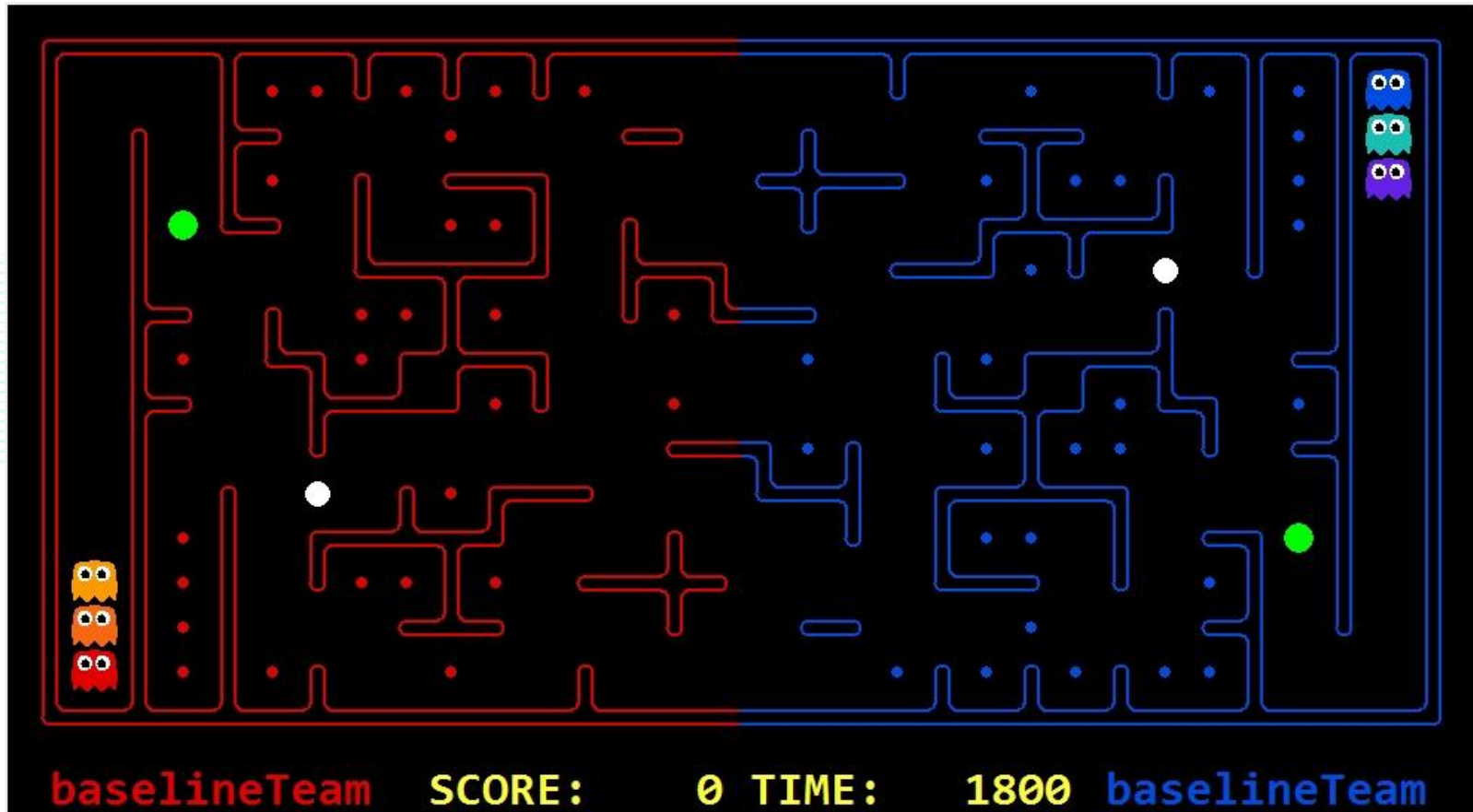


Team Name



## Game Rules (2/8)

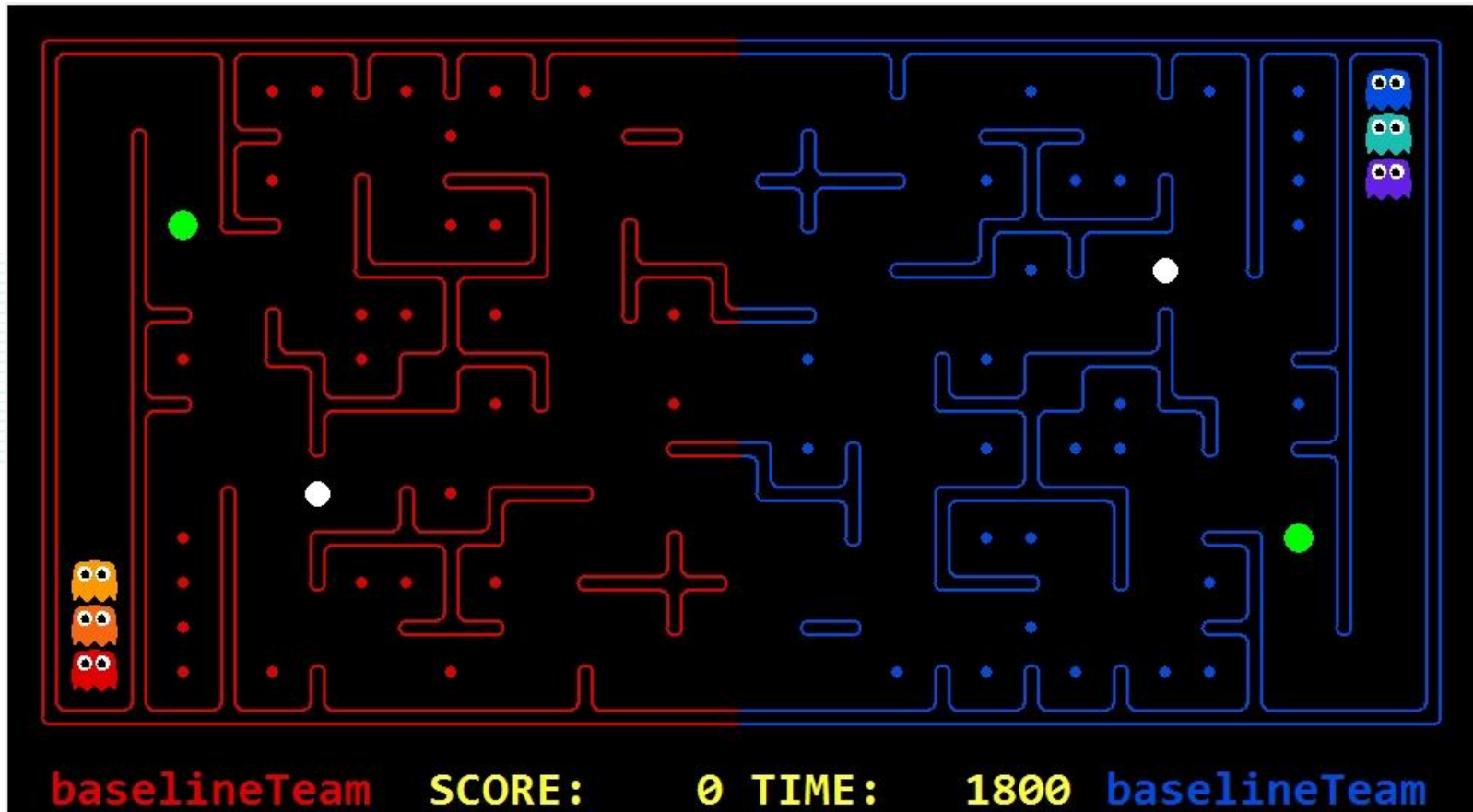
# Layout



↑  
Remaining Total Actions

## Game Rules (2/8)

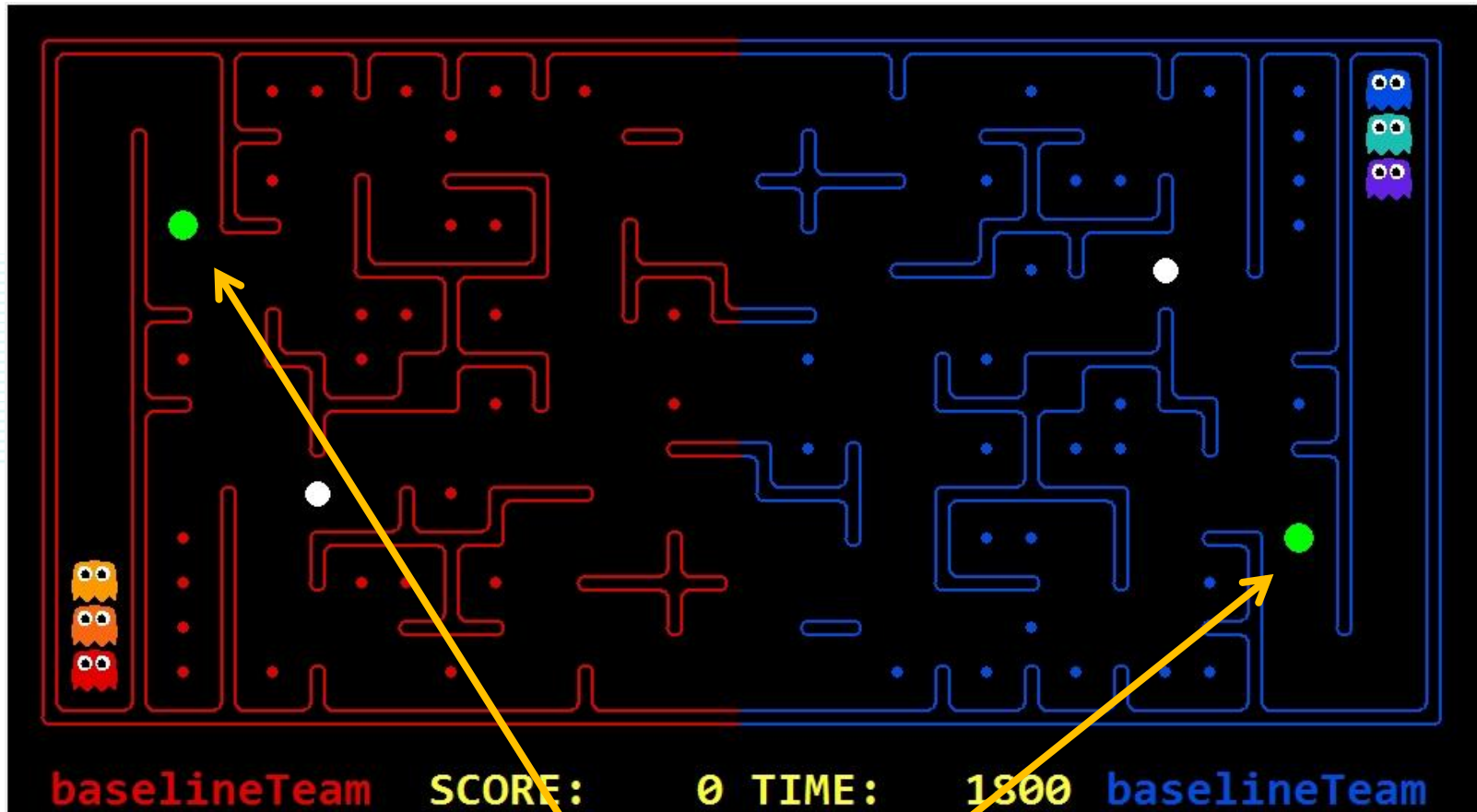
# Layout



Score: (+) for **Red**, (-) for **Blue**

## Game Rules (2/8)

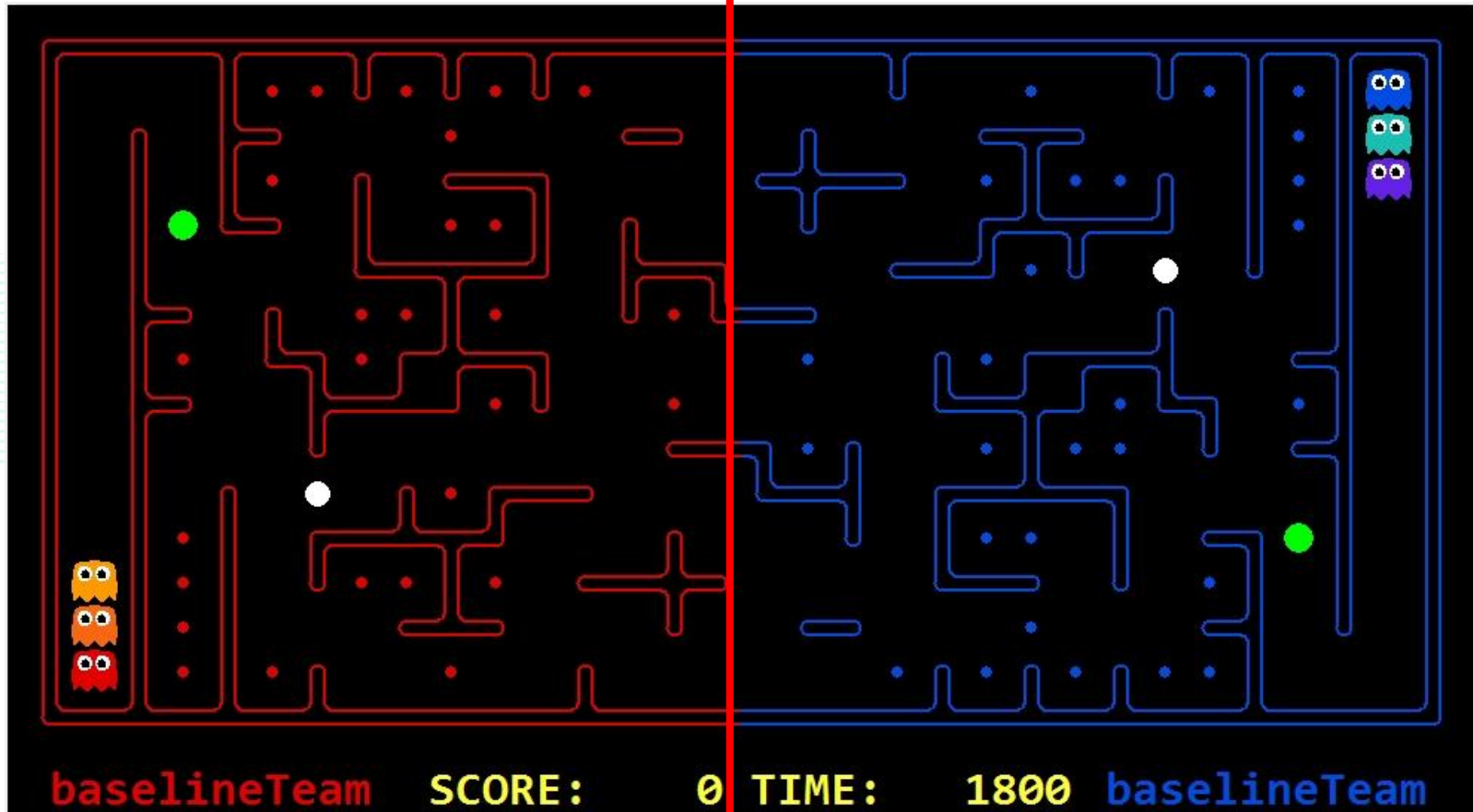
# Layout



Flags

## Game Rules (2/8)

# Layout

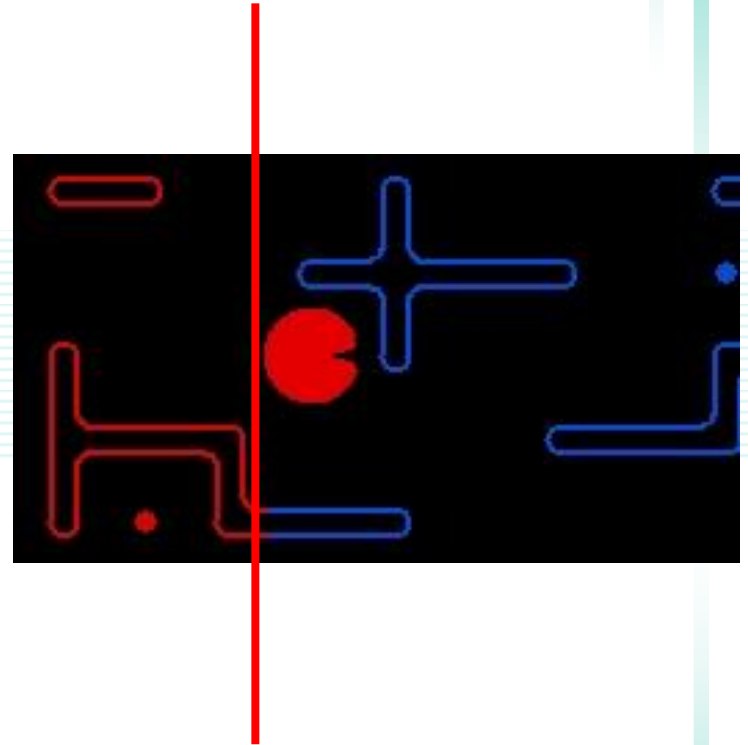
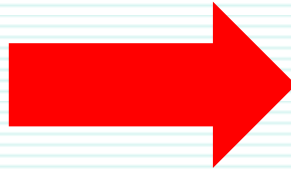
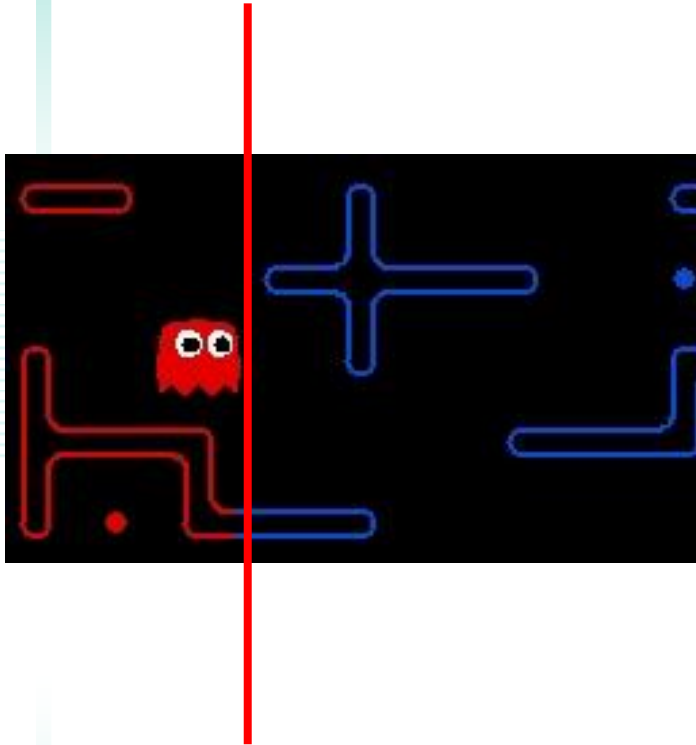


**Red Side**  
(**Blue** can eat)

**Blue Side**  
(**Red** can eat)

## Game Rules (3/8)

# Transform



## Game Rules (4/8)

# Moving Order

- Red/Blue team moves first at **random**.
- Order: **0**, **1**, **2**, **3**, **4**, **5**

## Game Rules (5/8)

# Scoring

- Dot: **10**
- Pacman: **25**
- Ghost: **50**
- Flag: **2 per action** ( $2 \times 6 = 12$  per round)

## Game Rules (6/8)


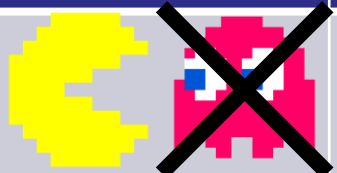
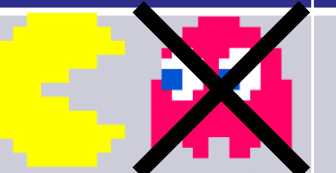
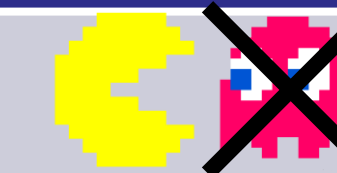
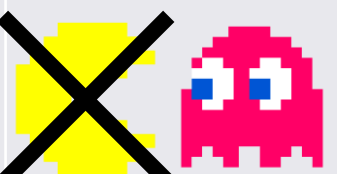
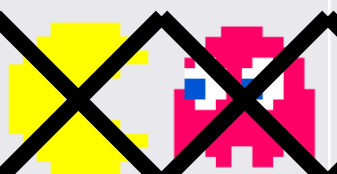
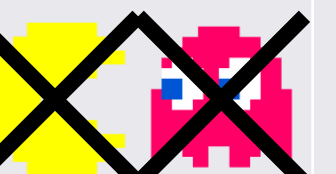

# Flags

- Get **2 points per action**
- Flag makes the agent **vulnerable**.
- Once the agent dies, the flag is lost forever.



## Game Rules (6/8)

# Flags

	Ghost	Ghost (scared)	Ghost (flag)	Ghost (scared, flag)
Pacman				
Pacman (flag)				

## Game Rules (7/8)

# Observations

- Agents can only get the **positions** and **directions** of opponents within **3**.
- Sonar: return **noisy distances**
  - A value within real distance **[-3, +3]**
  - e.g. if real distance is 9,  
return a value within [6, 12]

## Game Rules (8/8)

# Computation Time

- Limit for initialization
  - >15 sec: **Lose**
- Limit for actions
  - >1 sec: **Warning**
  - >3 sec: **Lose**
  - 3 **Warnings**: **Lose**
- Environment
  - Intel i5-430M (2.26GHz, 3MB L3 cache)
  - 6G RAM

- 
- Game Rules
  - **Preparation**
  - Tournament
- 

# Preparation (1/4)

## Rules

- Rules
  - Rename the **00\_myTeam.py** to **##\_TeamName.py**
    - e.g. 40\_TaipeiAssassins
  - Your agent must inherit **CaptureAgent**
    - registerInitialState()
    - chooseAction()
  - Assign **3** agents to **createTeam()**
  - You can design any amount of agents
  - No multi-threading
  - Turn off all outputs
- Refer to **baselineTeam.py** for more information.

## Preparation (2/4)

# APIs

- class
  - **GameState** (capture.py)
  - **CaptureAgent** (captureAgents.py)

## Preparation (2/4)

# APIs

- class GameState
  - getAgentState()
    - return **None** for agents can't be seen
  - getAgentPosition()
    - return **None** for agents can't be seen
  - getAgentDistances()
    - return a list of **noisy distances** to each agent (including our agents and agents in sight)

## Preparation (2/4)

# APIs

- class CaptureAgent
  - isPacman
  - getTeam()
    - return the agent indices of **your team**
  - getOpponents()
    - return the agent indices of **opponent team**
  - getFood()
    - return a boolean matrix of foods **you can eat**
  - getFoodYouAreDefending()
    - return a boolean matrix of foods **opponents can eat**



## Preparation (3/4)

# Options

- `python capture.py`
  - `-r [##_TeamName]`: Load the **red** team
  - `-b [##_TeamName]`: Load the **blue** team
  - `-l [Layout]`: Load another layout
  - `-c`: Catch exceptions and enforce time limits
  - `-n #`: Play # games
  - `-q`: quiet mode, no graphics
  - `--record`
  - `--replay [*].prp`
  - `--keys0`: control the first agent of **red** with keyboard
  - `--keys2`: control the first agent of **blue** with keyboard
    - First: WASD, Second: IJKL

## Preparation (4/4)

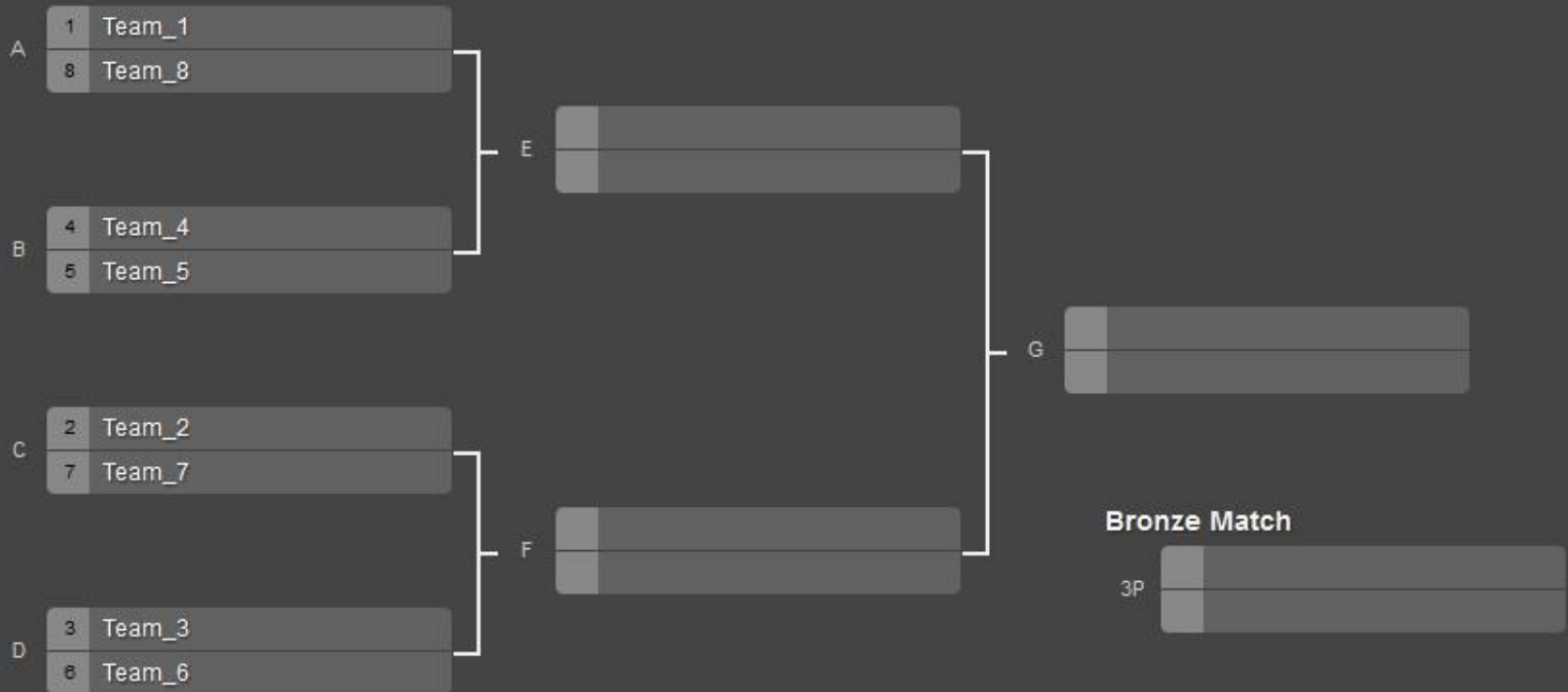
# Testing

- Layouts
  - defaultCapture (default)
  - tinyCapture
  - laneCapture
- Teams
  - baselineTeam (default)
  - stopTeam
  - eastOnlyTeam
  - westOnlyTeam

- 
- Game Rules
  - Preparation
  - **Tournament**
- 

# Tournament Bracket

- Round-Robin Qualifiers (offline)
- Top 8: Single Elimination (in class)



# Tournament Schedule

- Submit (**6/15** 23:59)
- Round-Robin Qualifiers (6/16 - 6/17)
- Top 8: Single Elimination (**6/18**, in class)

# Tournament Arena

- Looking for opponents?
  - <https://goo.gl/BWgs3a>

# Grading

- According to your final result:
  - Crashed: 0
  - Can run: 60
  - Beat baselineTeam: 90
  - Top 8: 100
  - 4<sup>th</sup>: 105
  - 3<sup>rd</sup>: 110
  - 2<sup>nd</sup>: 115
  - 1<sup>st</sup>: 120

# Submit

- Upload **##\_TeamName.py** to e3
- Deadline: **6/15** 23:59 (2 weeks)
- Late Policy: **0%**



# Contacts

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