



Pacman Project 4

PacmanCTF

【人工智慧概論】

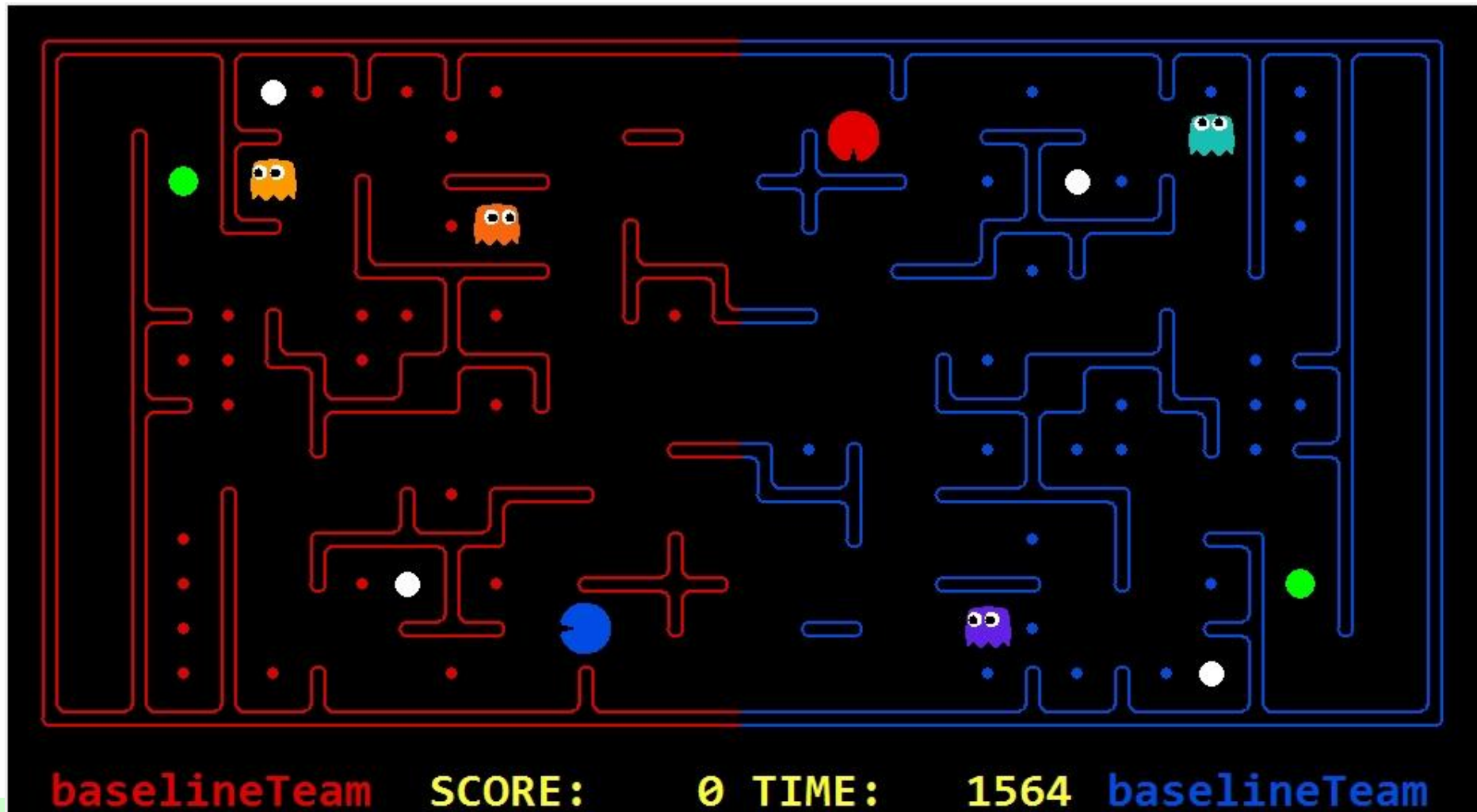
授課教師 / 孫春在

助教 / 蔣承翰、黃柏皓、呂學昱、
陳沛亘、呂冠霆

日期 / 2016.04.28

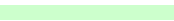


PacmanCTF



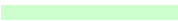


-
- **Game Rules**
 - **Preparation**
 - **Tournament**





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





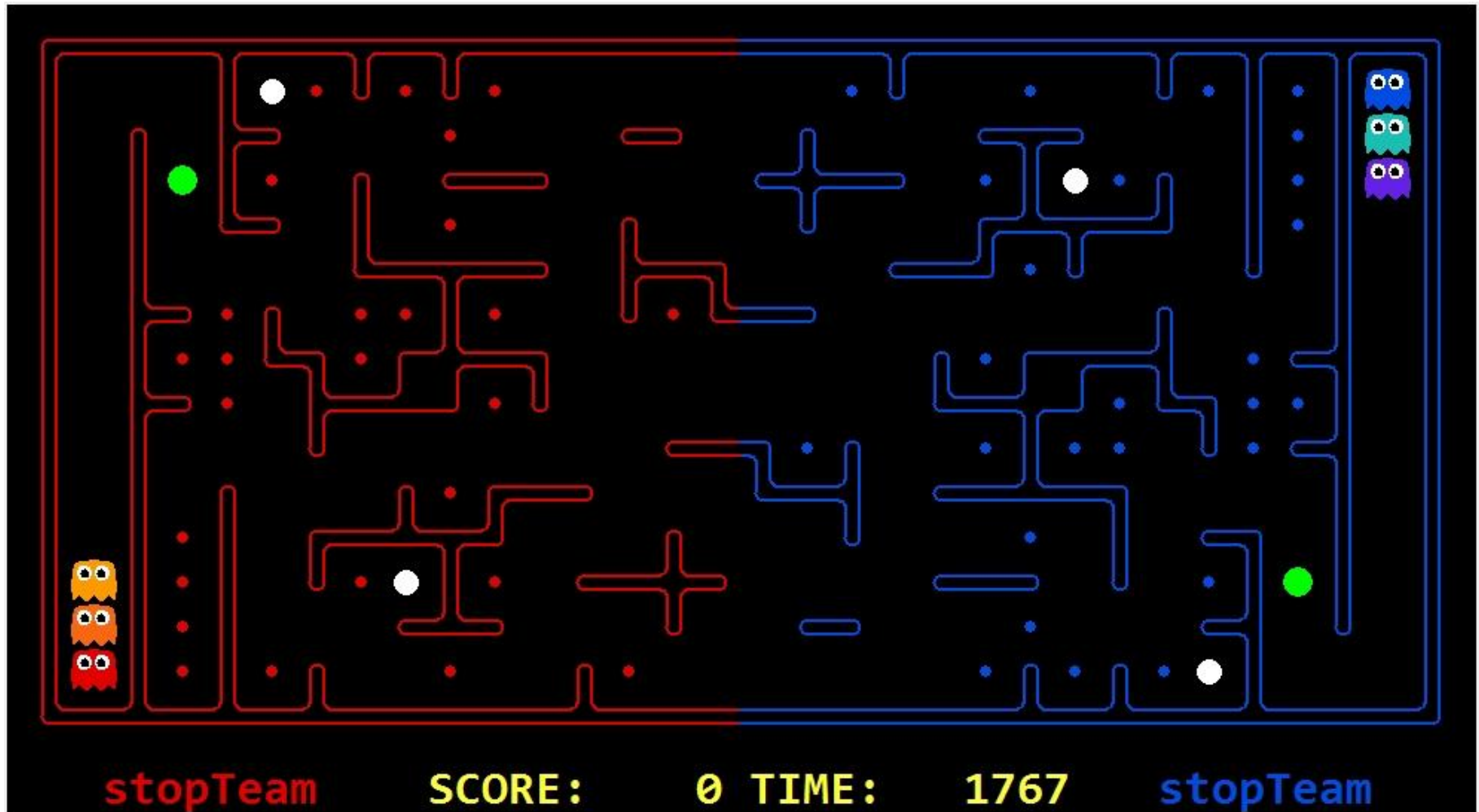
Game Rules (1/8)

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)

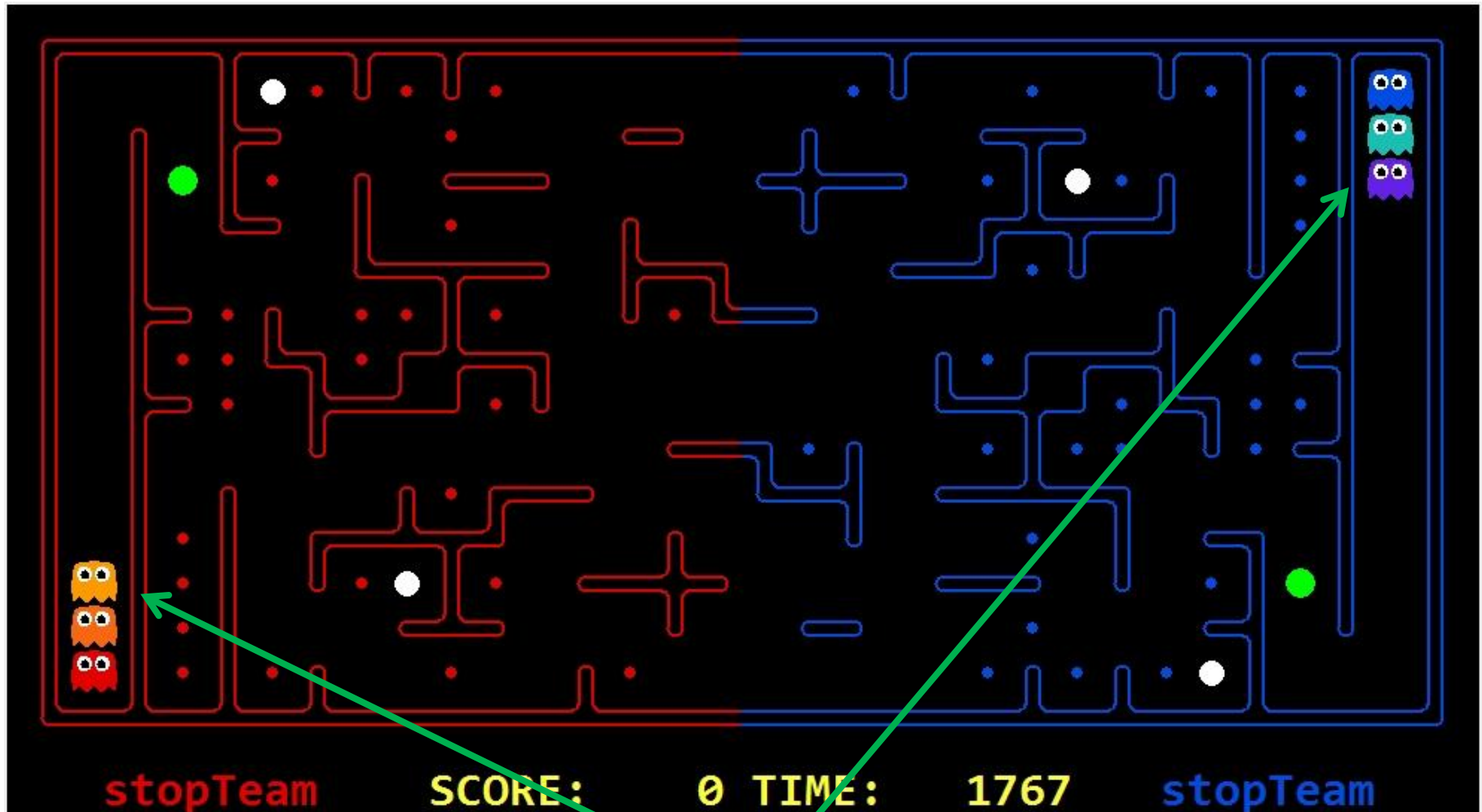
Game Rules (2/8)

Layout



Game Rules (2/8)

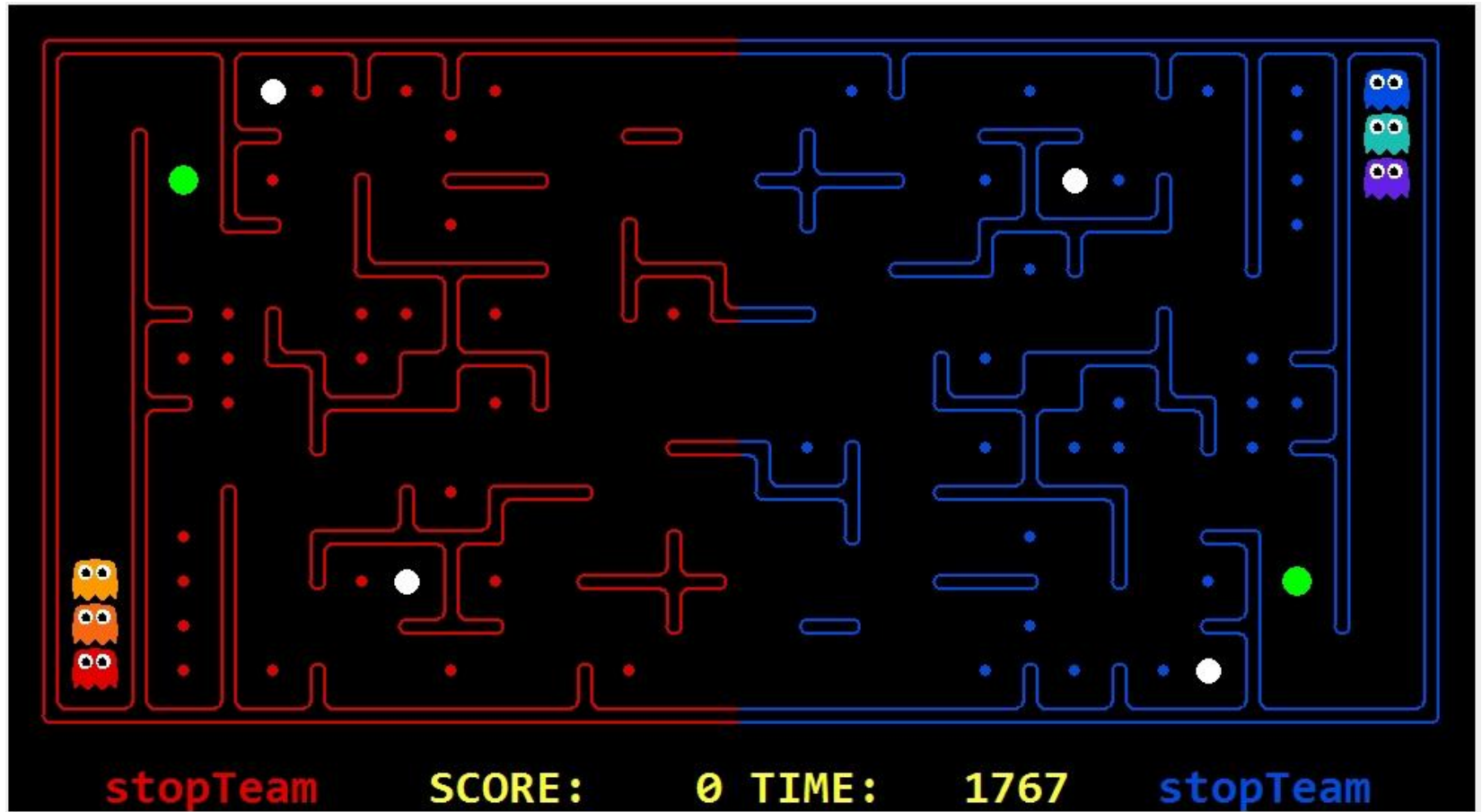
Layout



Respawn Points

Game Rules (2/8)

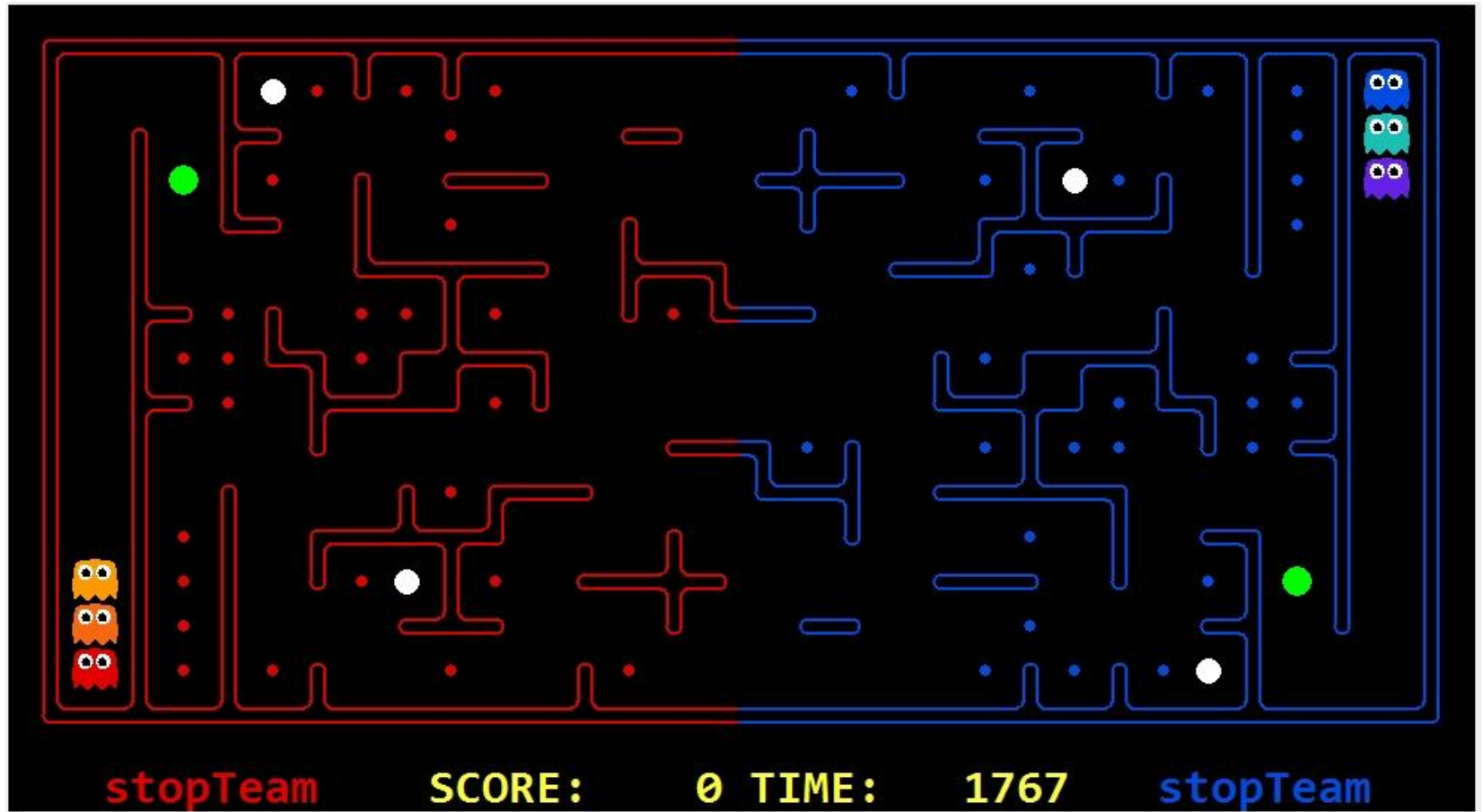
Layout



Team name

Game Rules (2/8)

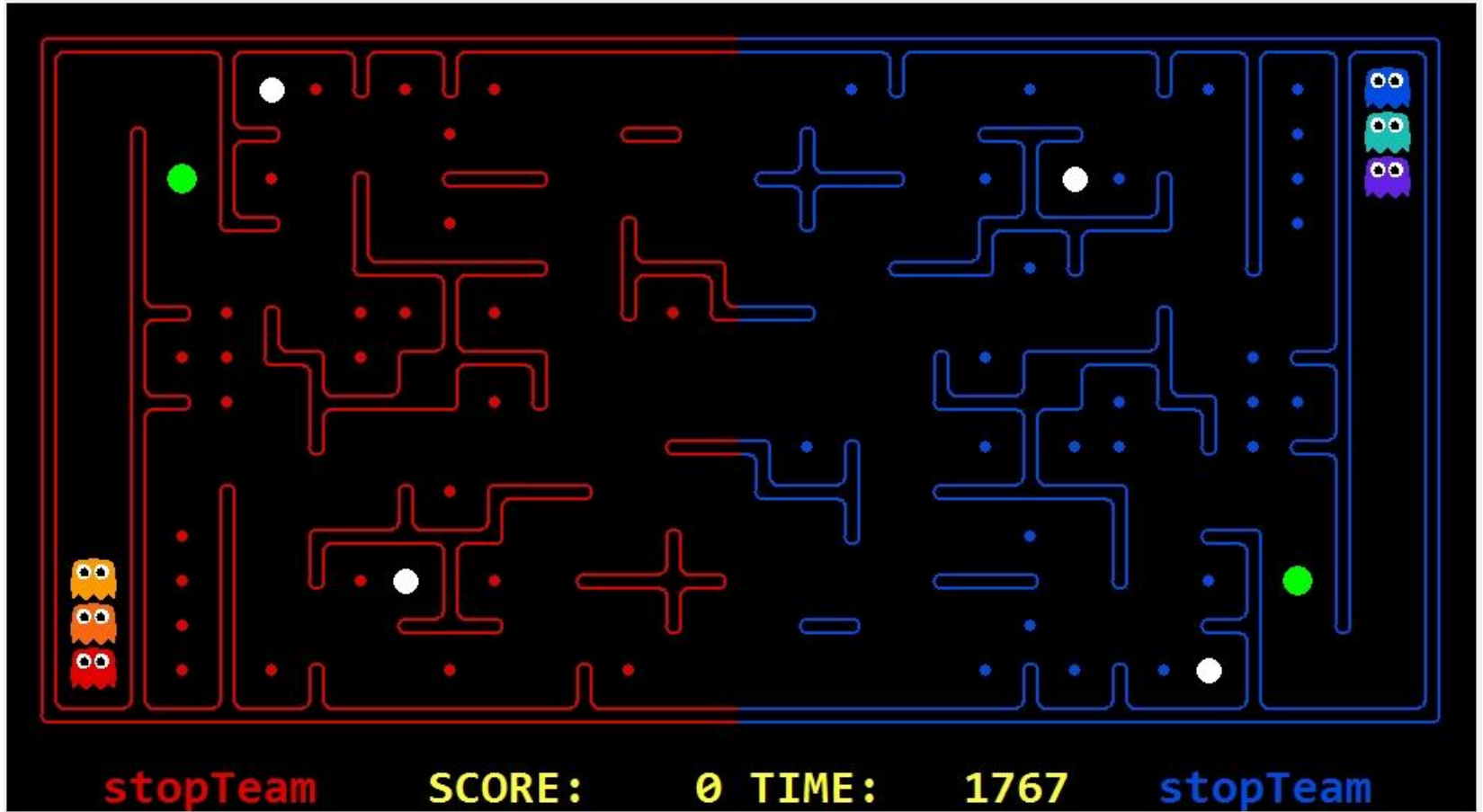
Layout



Remaining total actions

Game Rules (2/8)

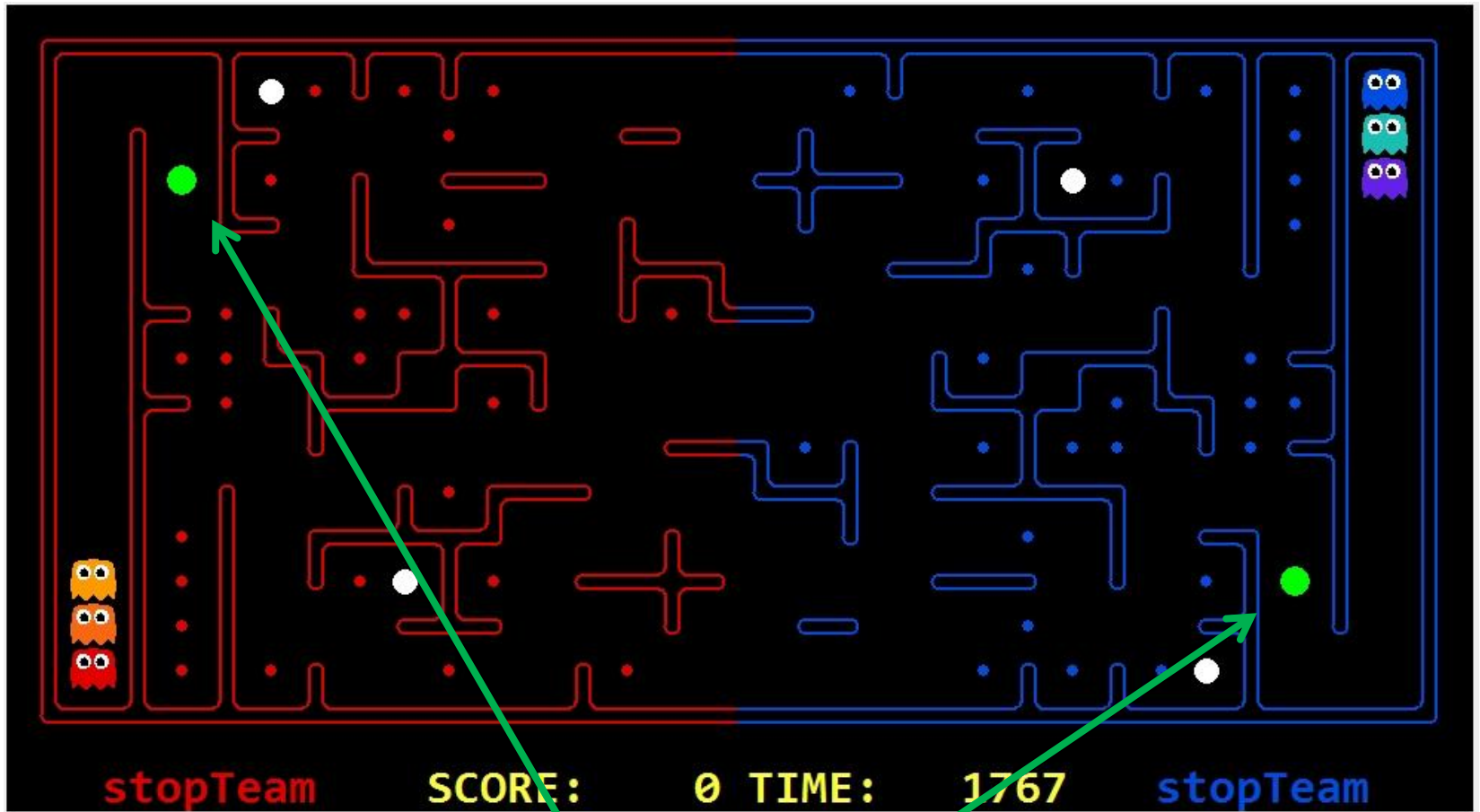
Layout



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

Game Rules (2/8)

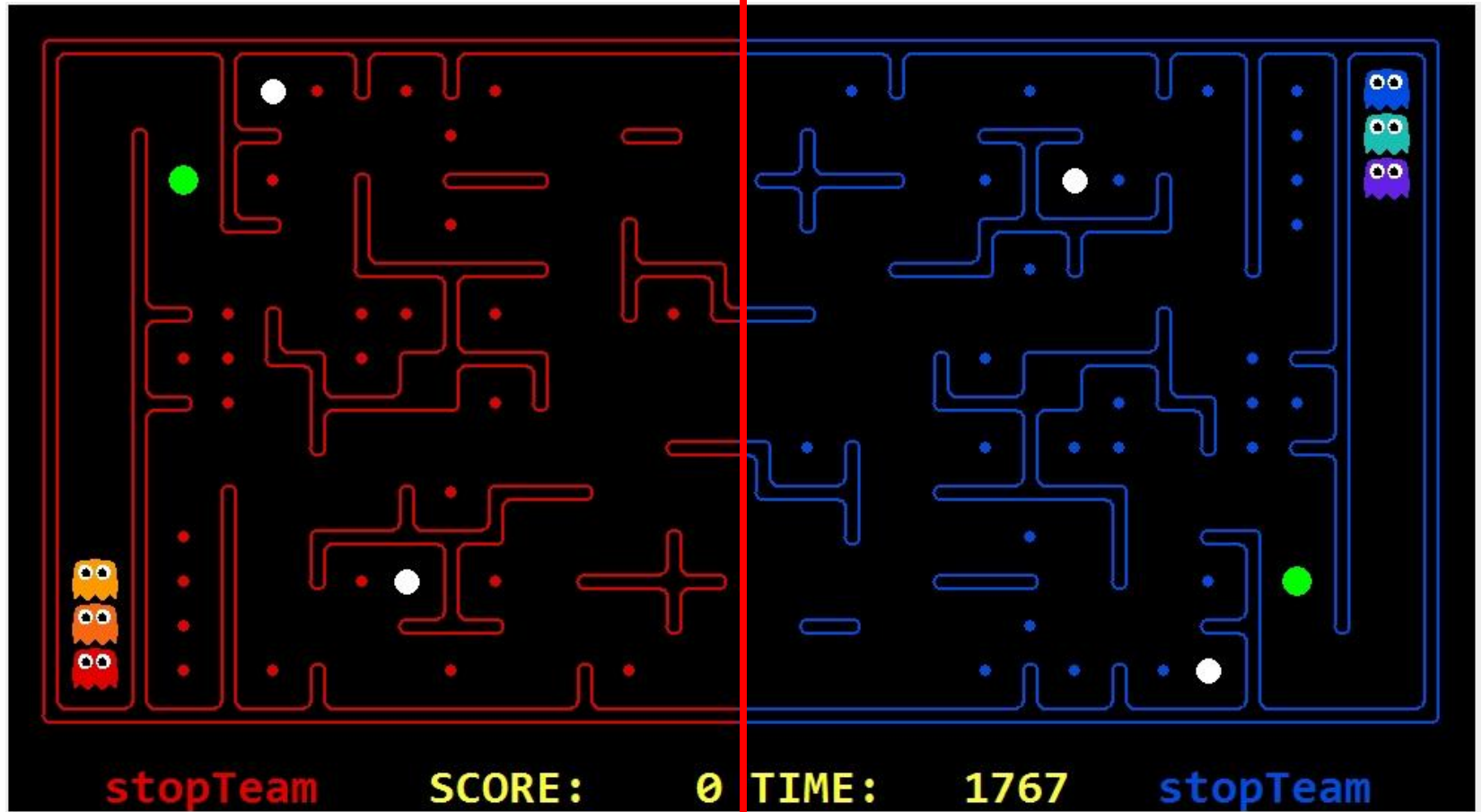
Layout



Flags

Game Rules (2/8)

Layout

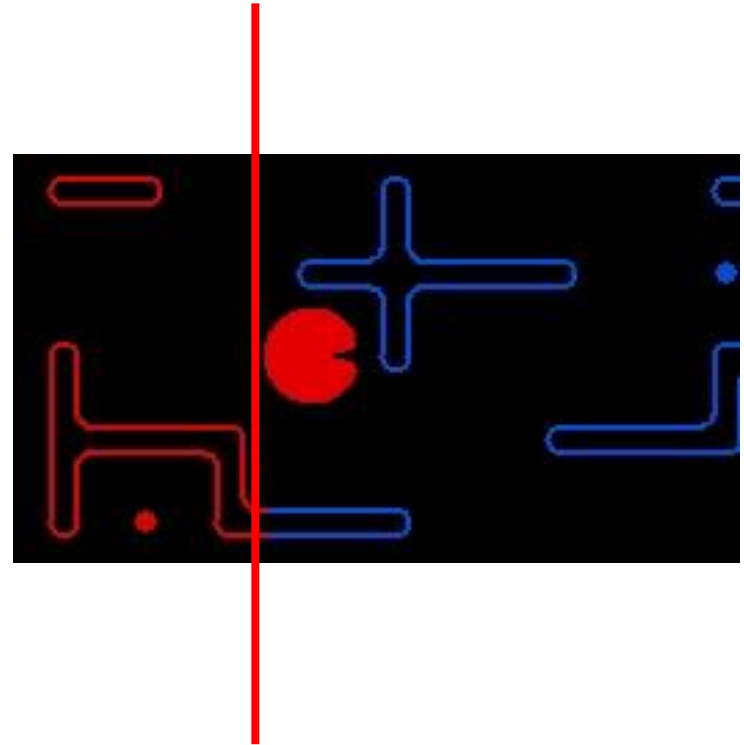
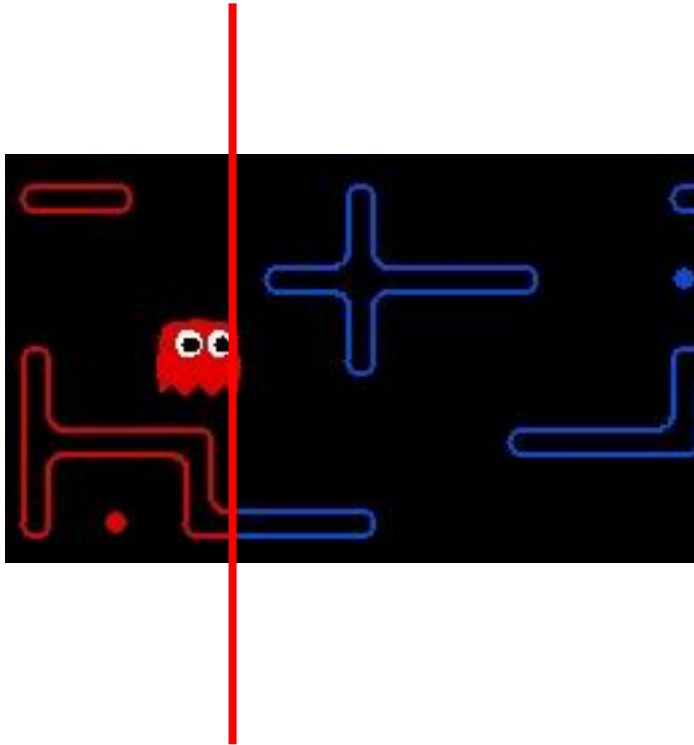


Red Side
(**Blue** can eat)

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)


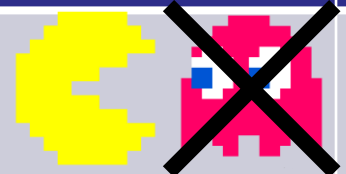
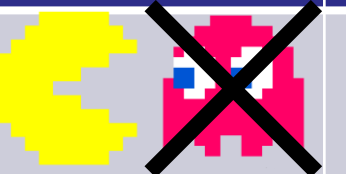
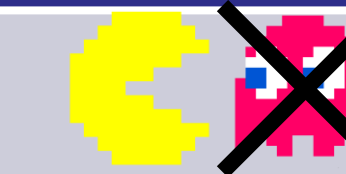
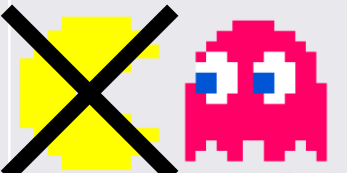
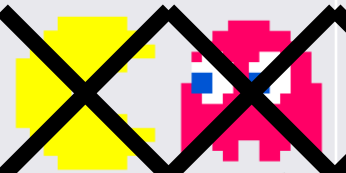
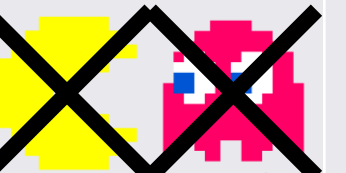
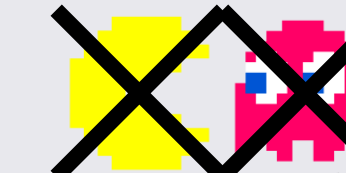
Game Rules (6/8)

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)				

Observations

- **Sight range:** 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]

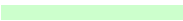
Game Rules (8/8)

Computation Time

- Limit for initialization
 - >15 sec: **Lose**
- Limit for actions
 - >1 sec: **Warning**
 - >3 sec: **Lose**
 - 3 **Warnings**: **Lose**
- Environment
 - Intel i5-4460 @ 3.2GHz
 - 8G RAM



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





Preparation (1/4)

Restrictions

- Restrictions
 - 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.

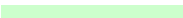




Preparation (2/4)

APIs

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

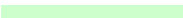




Preparation (2/4)

APIs


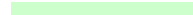
- class GameState
 - getAgentState()
 - return **None** for agents can't be seen
 - getAgentPosition()
 - return **None** for agents can't be seen
 - getAgentDistances()
 - return a list of **noisy distances** to each agent (including our agents and agents in sight)





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**
- 
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Preparation (3/4)

Options

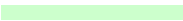
- `python capture.py`
 - `-r [##_TeamName]`: Load the **red** team
 - `-b [##_TeamName]`: Load the **blue** team
 - `-l [Layout]`: Load another layout
 - `-c`: Catch exceptions and enforce time limits
 - `-n #`: Play # games
 - `-q`: quiet mode, no graphics
 - `--record`
 - `--replay [*].prp]`
 - `--keys0`: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

Testing

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

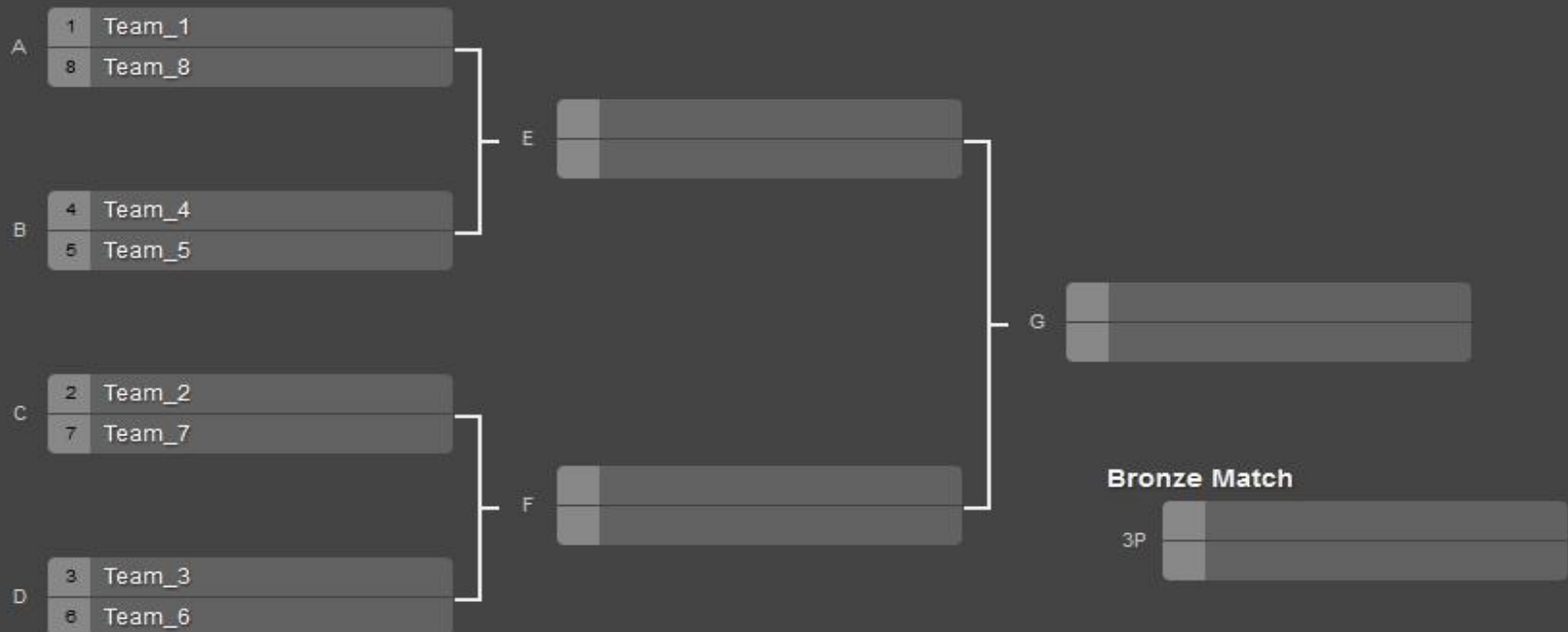


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Tournament Bracket

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



Tournament Schedule


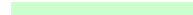
- Submit (**5/20** 23:59)
- Round-Robin Qualifiers (5/21 - 5/25)
- Top 8: Single Elimination (**5/26**, in class)

Tournament Arena

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



Grading

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

Submit

- Upload **##_TeamName.py** to e3
- Deadline: **5/20** 23:59 (3 weeks)
- Late Policy: **0%**