Pacman Project 3

Multi-Agent Pacman

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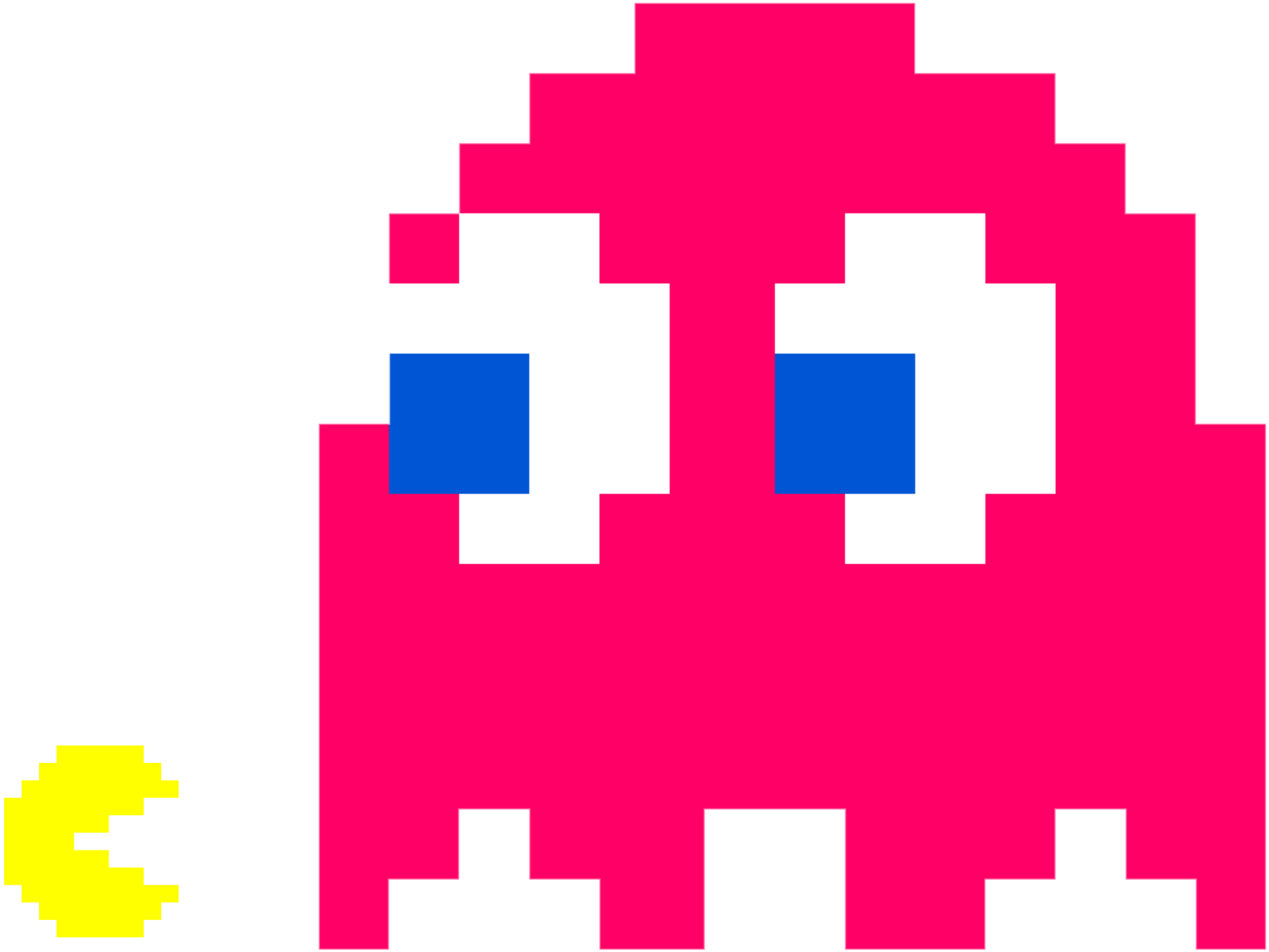


Objectives

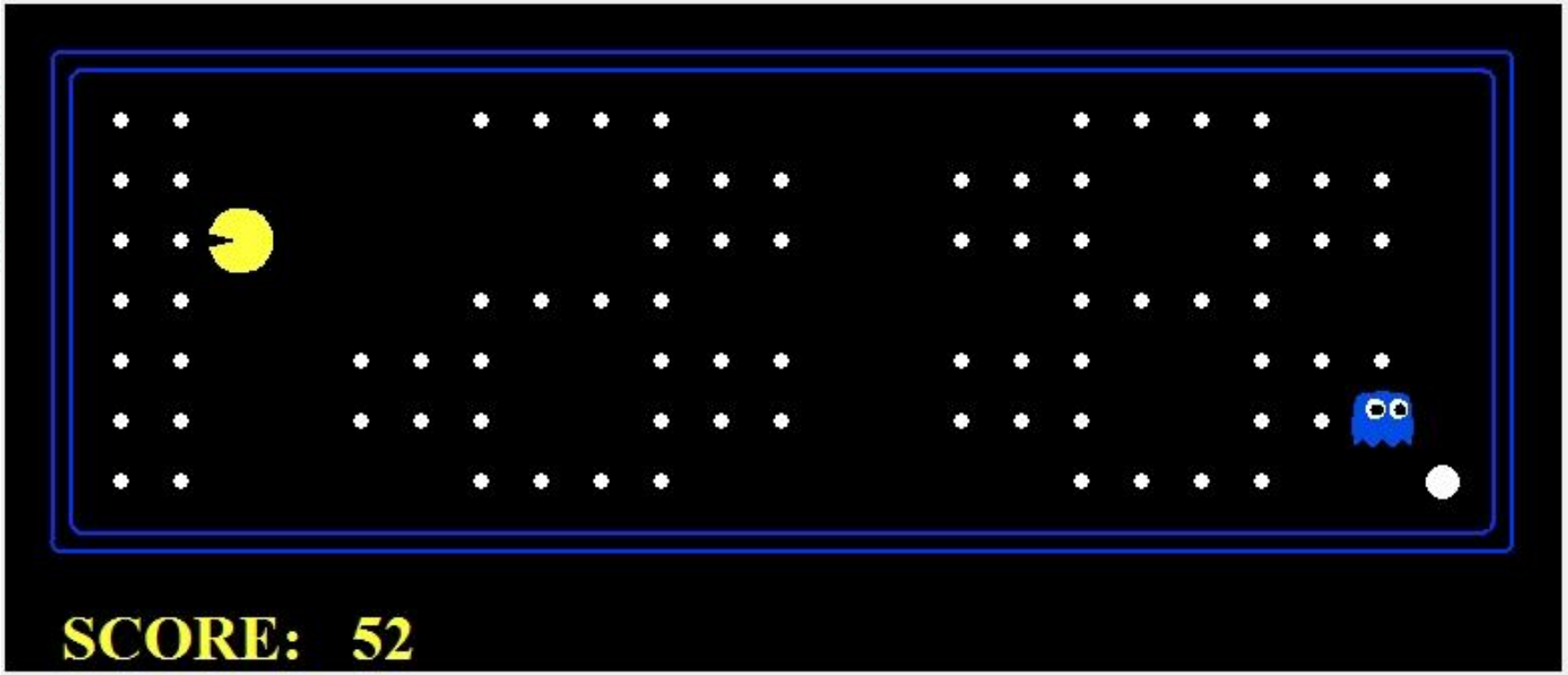
- P3-1 Reflex Agent (30%)
- P3-2 Minimax (25%)
- P3-3 Alpha-Beta Pruning (25%)
- P3-4 Evaluation Function (40%)

- Total Score: 120

Objectives (1/4)

Reflex Agent

- pacman.py -p ReflexAgent -l openClassic



Objectives (1/4)

Reflex Agent

- Simple Evaluation
  - eval(curState, action) = $w_1 f_1 + w_2 f_2 + \ldots$

- Grading
  - openClassic, 10 times
    - 5/10: +20
    - 10/10: +10

Objectives (2/4)

Minimax

- pacman.py

  -p MinimaxAgent

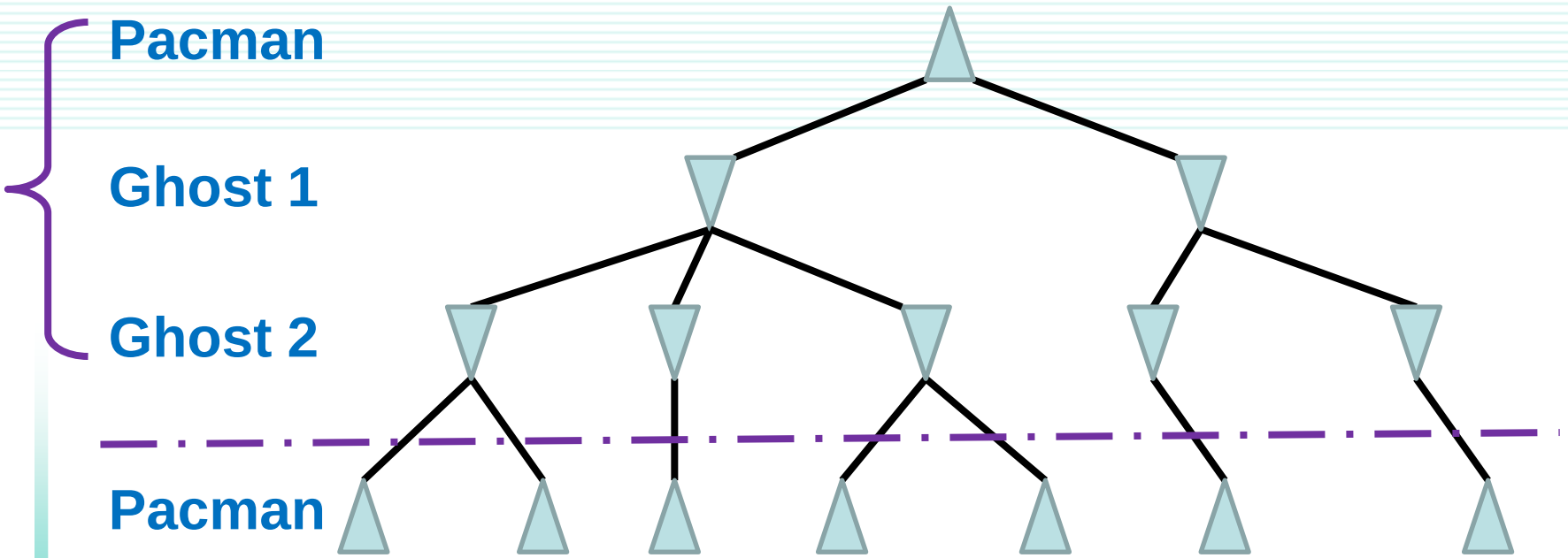
  -l minimaxClassic

  -a depth=4

Objectives (2/4)

Minimax

- Warning: Multiple min layers detected!
  - getNumAgents()



Objectives (2/4)
Minimax

- Must using
  - self.depth()
  - self.evaluationFunction()
    - default: scoreEvaluationFunction()

- Grading
  - Test the number of states explored on minimaxClassic.

Objectives (2/4)

Minimax

- Hints (minimaxClassic)
  - 665/1000 (for us)
  - Values of initial state for depths 1 to 4:

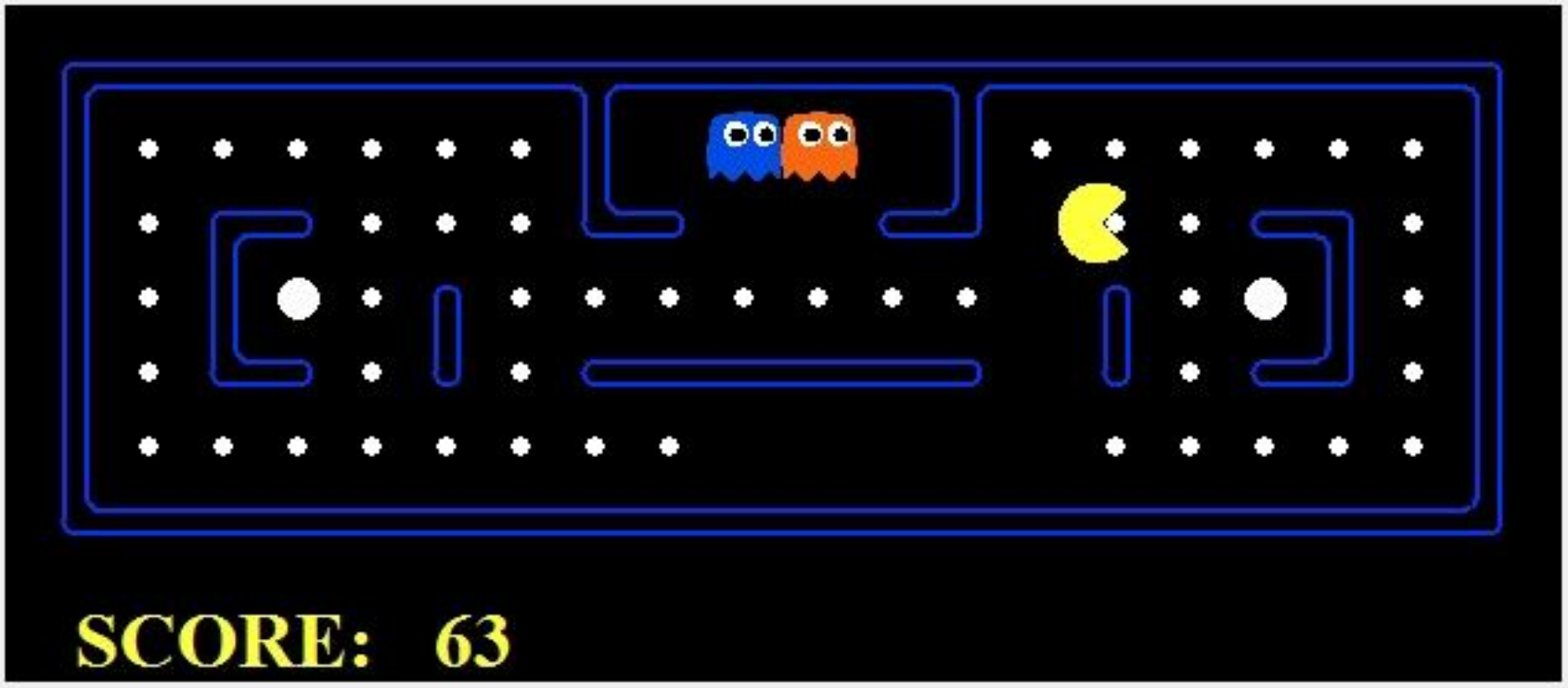
Depth	1	2	3	4
Value	9	8	7	-492

- “My pacman suicided, why?”
  - It found that it’s the best way to end this game.

Objectives (3/4)

Alpha-Beta Pruning

- pacman.py -p AlphaBetaAgent
  -l smallClassic -a depth=3



Objectives (3/4)

Alpha-Beta Pruning

- It's similar to minimax, but faster.
- Notice: Do not prune on equality!
  - Or your code would fail on our grading tool.

- Grading
  - Test the number of states explored on smallClassic.

Objectives (3/4)

Alpha-Beta Pruning

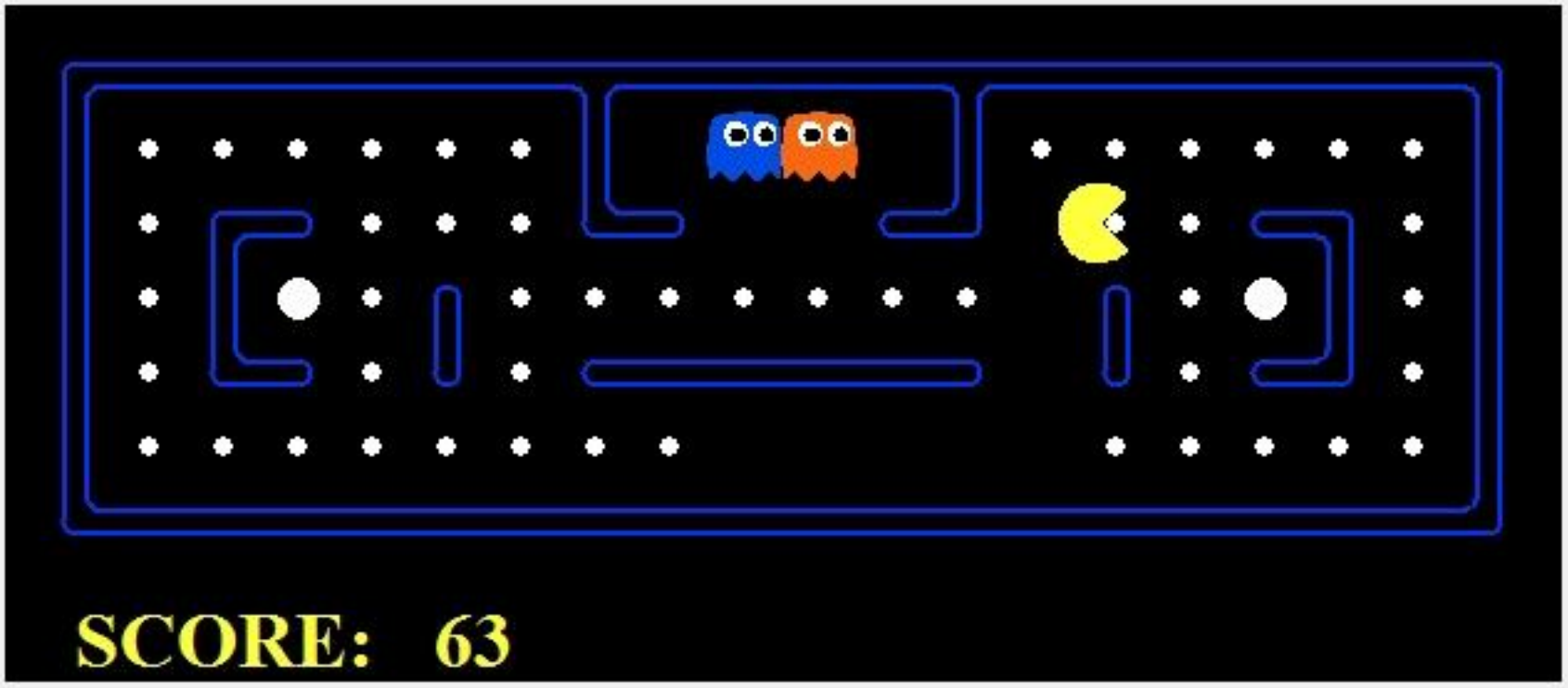
- Hints (minimaxClassic)
  - 665/1000 (for us)
  - Values of initial state for depths 1 to 4:

Depth	1	2	3	4
Value	9	8	7	-492

Objectives (4/4)

Evaluation Function

- pacman.py -p AlphaBetaAgent
  -l smallClassic -a depth=3 evalFn=better



Objectives (4/4)

Evaluation Function

- Strong Evaluation
  - eval(state) = $w_1f_1 + w_2f_2 + \ldots$
  - Describe your evaluation in the comments.

- Grading
  - smallClassic, Alpha-Beta, depth=3, 10 times
    - 5/10: +10
    - 10/10: +10
    - avg > 500: +10
    - avg > 1000: +10

Objectives (4/4)

Evaluation Function

- Side Mission (optional)
  - Expectimax
    - Strong against probabilistic behaviors.
    - If you're using this, please describe in comments.

Useful Options

- More layouts in the “/Pac-Man/layouts”
- Options:
  - **-z** 0.5 (zoom 0.5)
  - **-g DirectionalGhost** (change the ghosts)
  - **-k #** (number of ghosts = #)
  - **-f** (fixed random seed; line 533, pacman.py)
  - **-n #** (play # times)
  - **-q** (quiet mode, no graphics)
  - **--frameTime 0** (no frame time)

Submit

- Edit and upload multiAgents.py (P3_##.zip)
- Search for “[Project 3] YOUR CODE HERE”
- Deadline: 5/18 23:59 (2 weeks)
- Late Policy: 80%

Contacts

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