Pacman Project 3

Multi-Agent Pacman

【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

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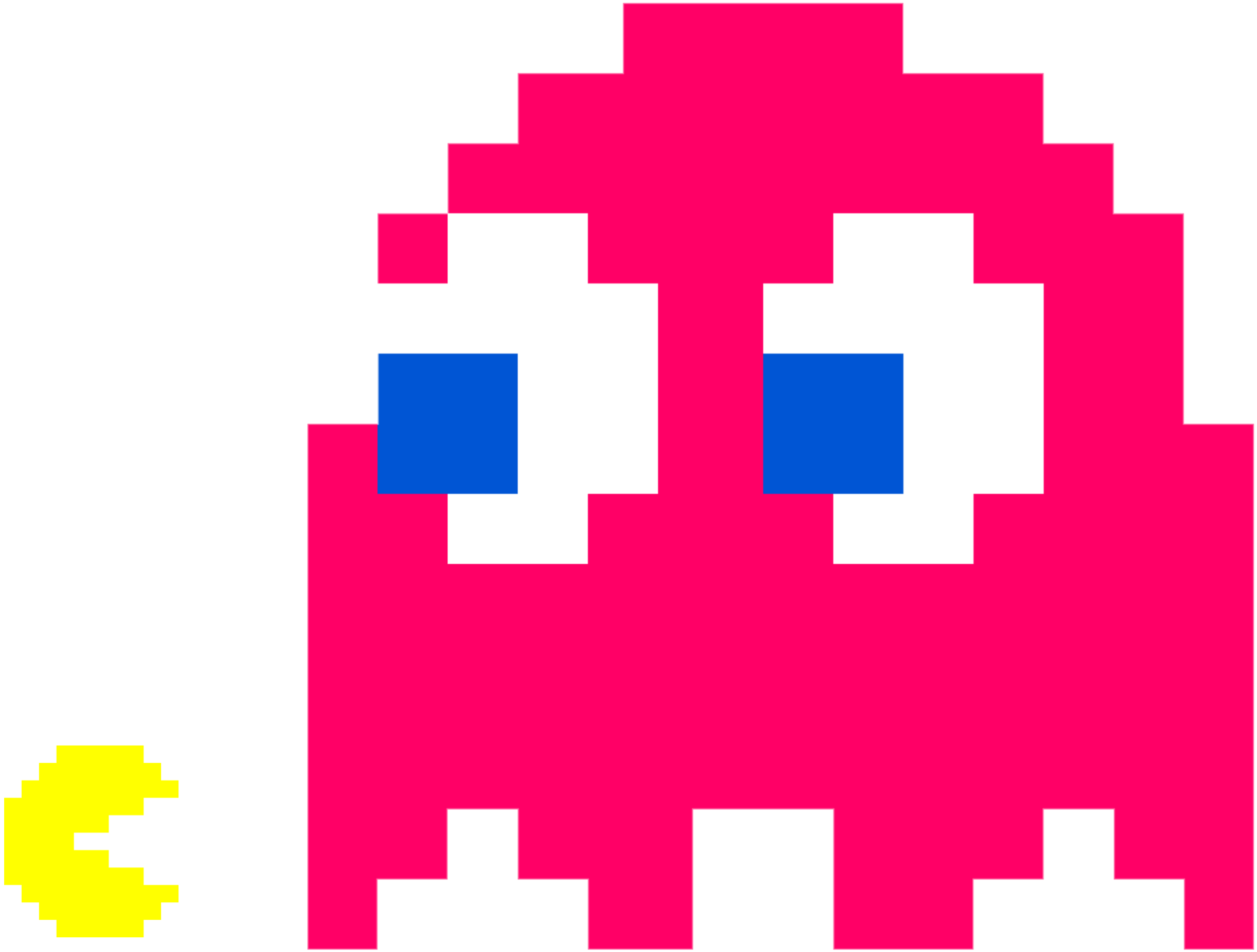
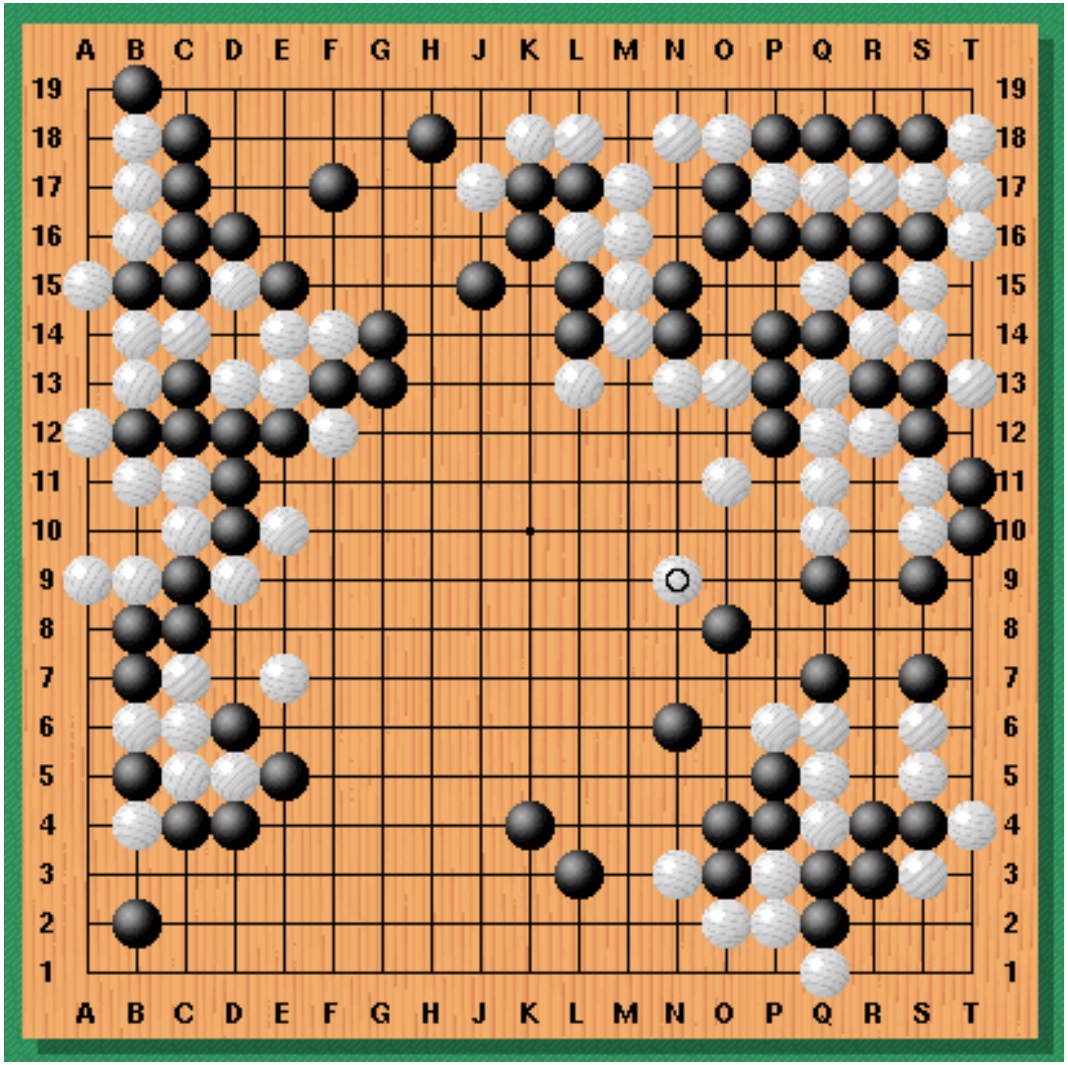


- **Evaluation Function**
- **Adversarial Search**
  - **Minimax**
  - **Alpha-Beta Pruning**
- **Objectives**

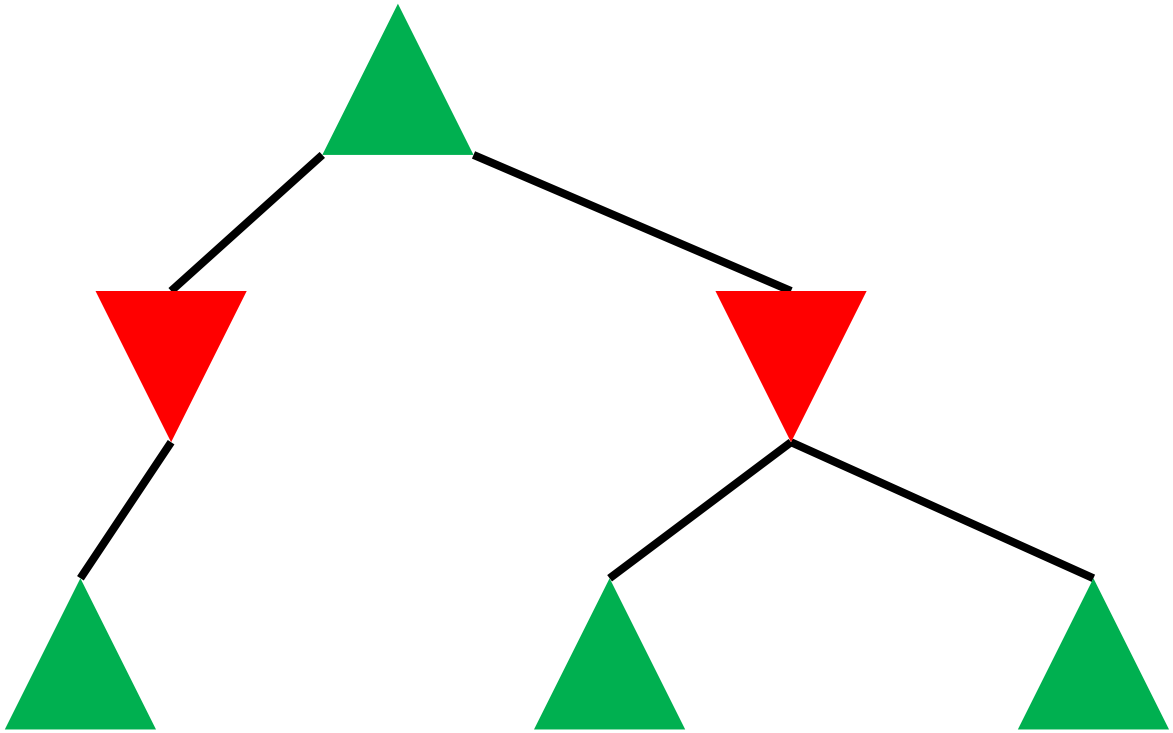
Evaluation Function



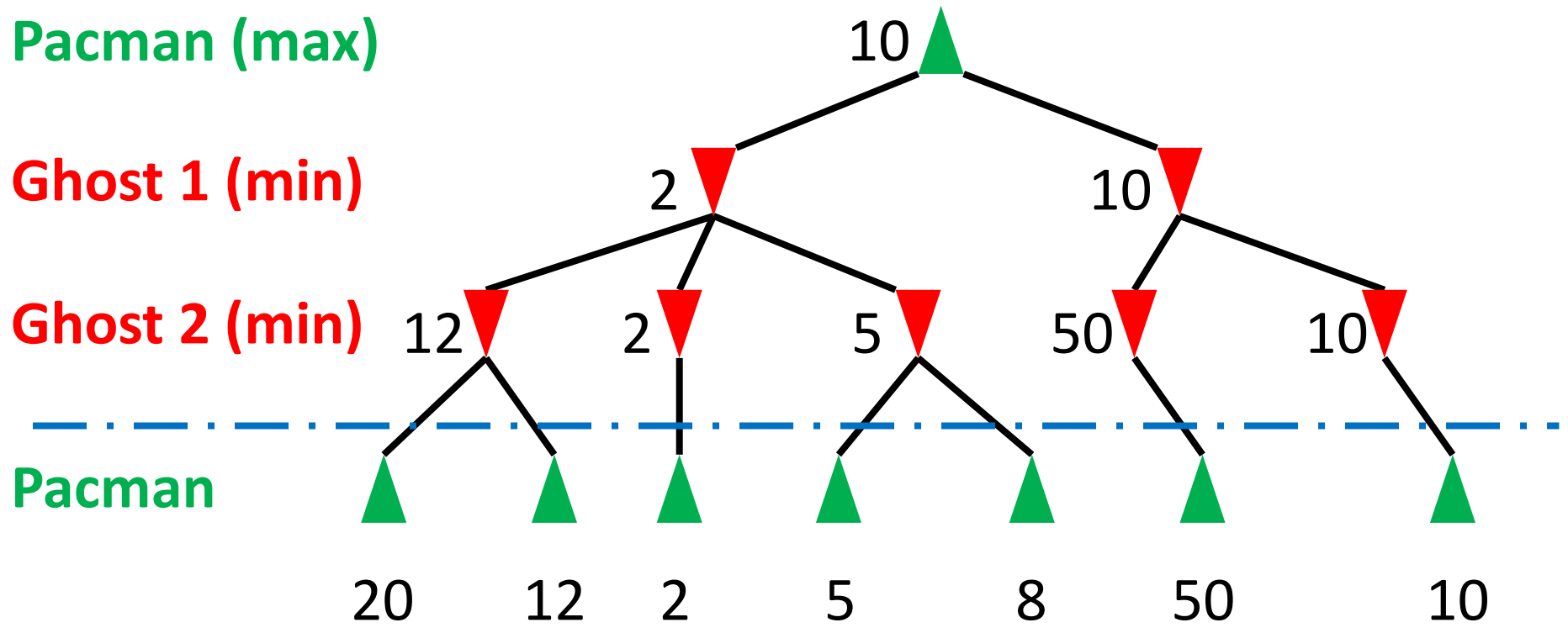
Evaluation Function

$$\text{eval(state)} = \text{Weight}_1 * \text{Feature}_1 + \text{Weight}_2 * \text{Feature}_2 + \text{Weight}_3 * \text{Feature}_3 + \ldots$$

Adversarial Search

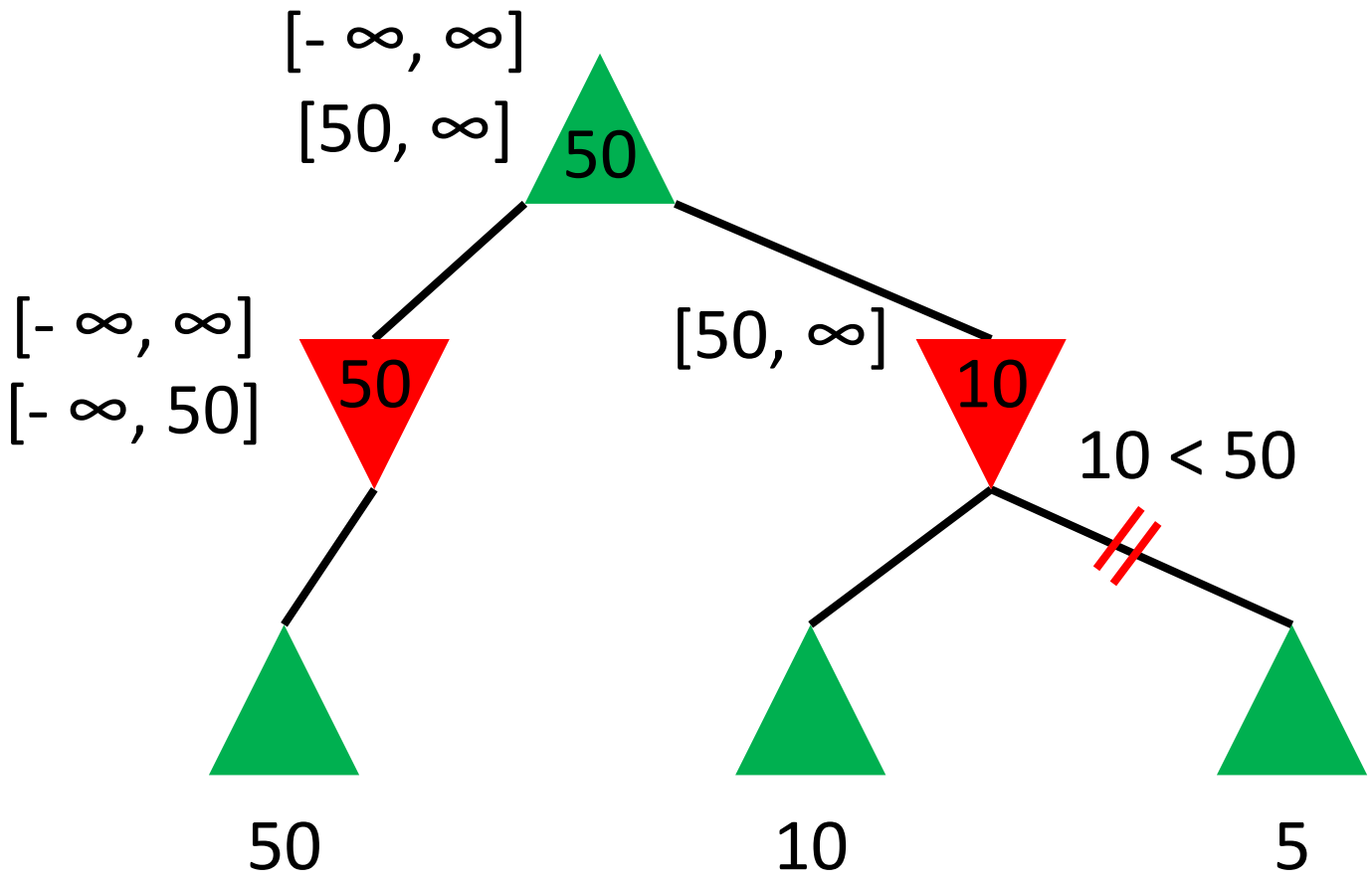


Adversarial Search
Minimax



Adversarial Search

Alpha-Beta Pruning



Adversarial Search

Alpha-Beta Pruning

- Step by Step: Alpha Beta Pruning

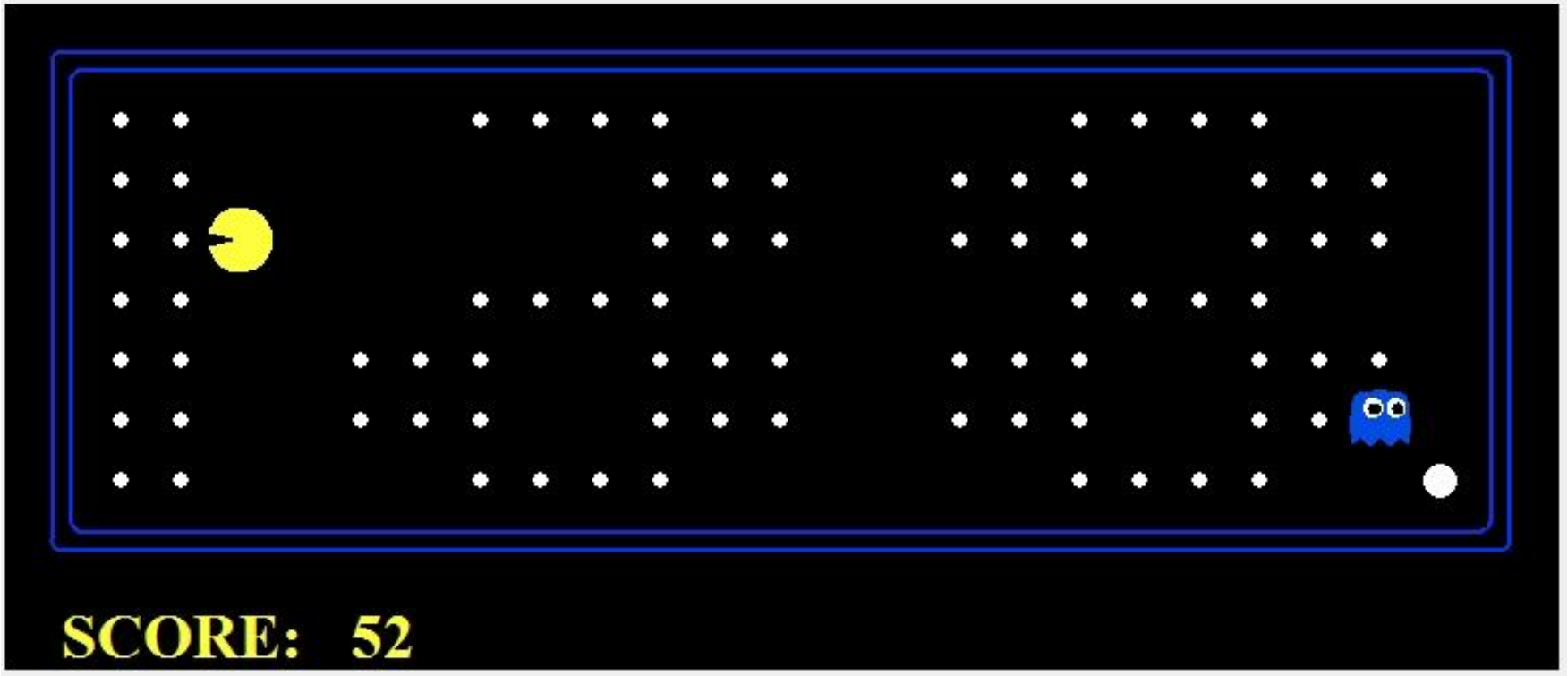
  https://www.youtube.com/watch?v=xBXHtz4Gbdo

Objectives

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

Objectives (1/4)
Reflex Agent

- pacman.py -p ReflexAgent -l openClassic



Objectives (1/4)

Reflex Agent

- Simple evaluation
  - eval(state, action) = $w_1 f_1 + w_2 f_2 + \ldots$
- Grading (30%)
  - 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

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

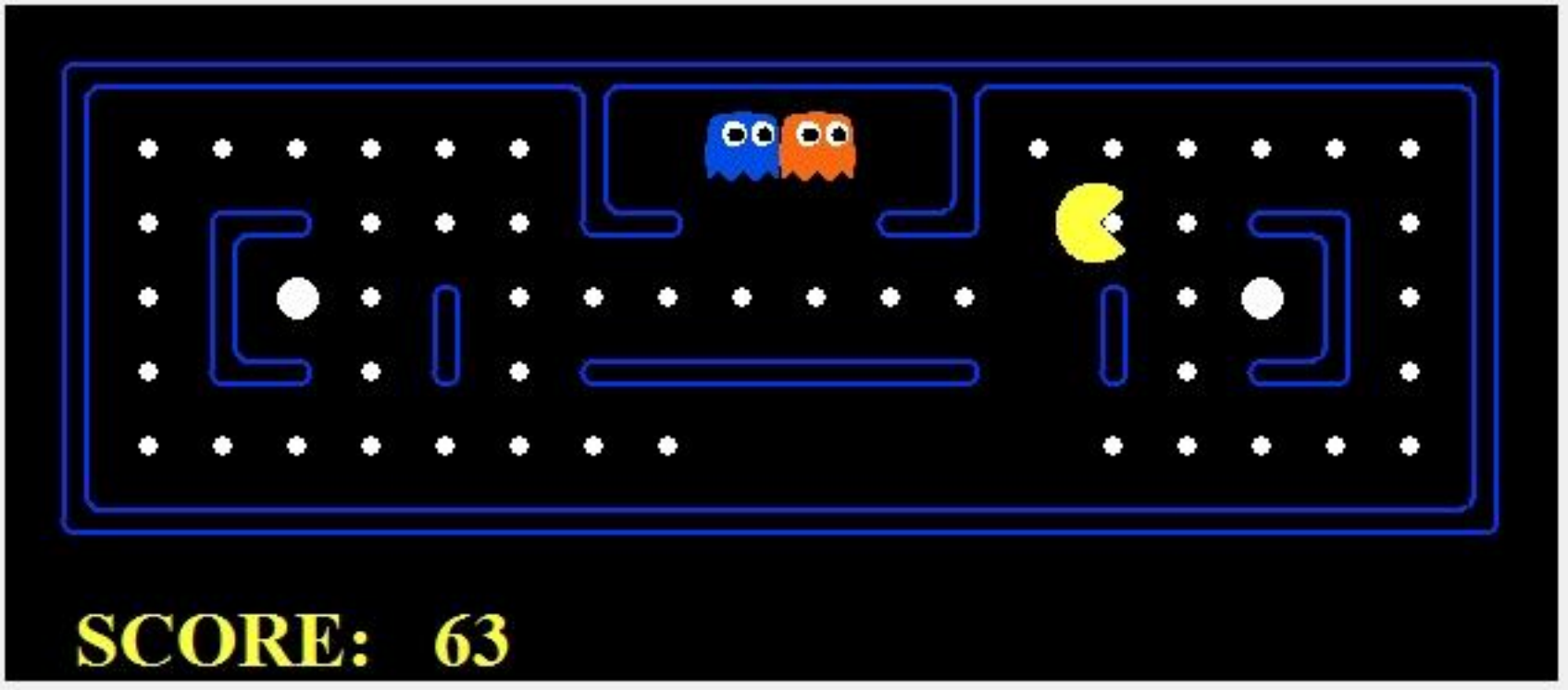
- Grading (25%)
  - autograder.py -q q2 --no-graphics

Objectives (3/4)

Alpha-Beta Pruning

- pacman.py -p AlphaBetaAgent

  -l smallClassic -a depth=3



Objectives (3/4)

Alpha-Beta Pruning

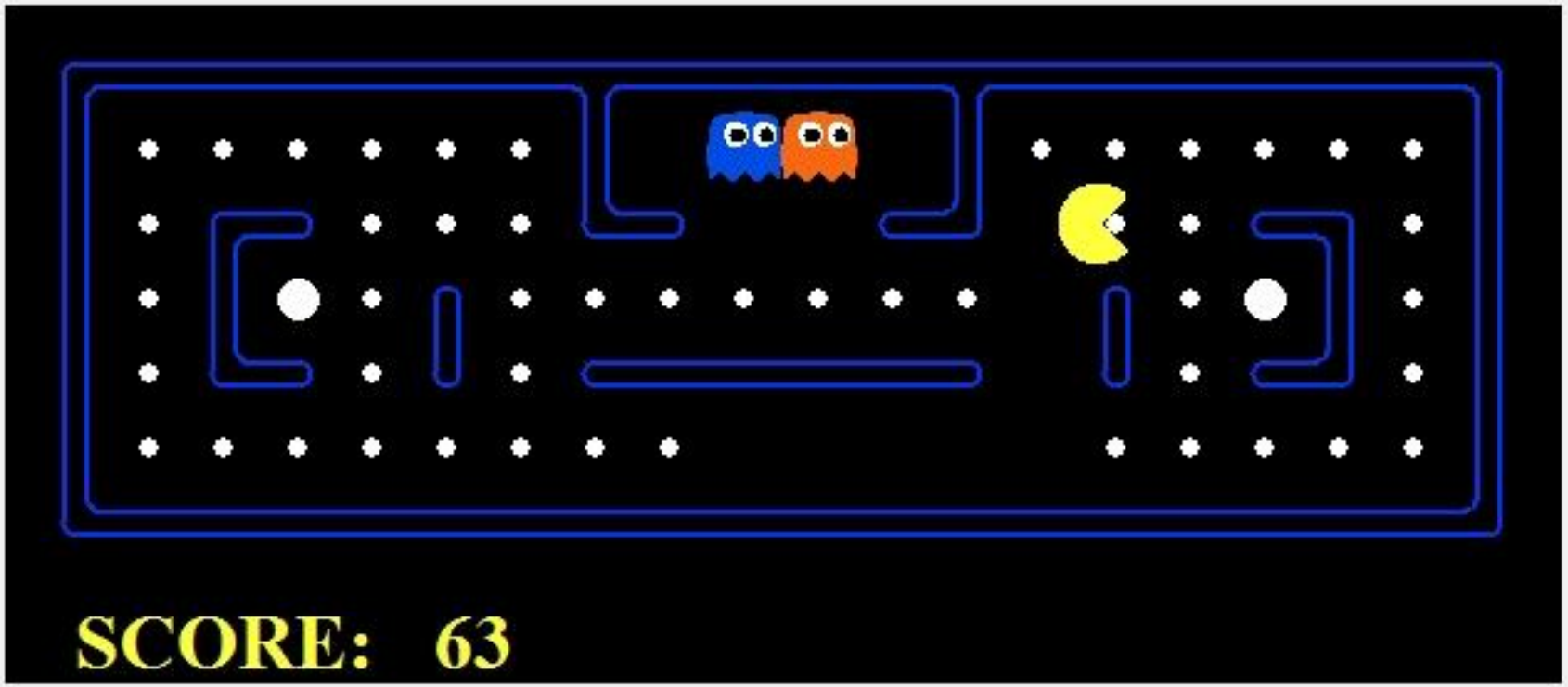
- Do not prune on equality!

- Grading (25%)
  - autograder.py -q q3 --no-graphics

Objectives (4/4)

Better Evaluation

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



Objectives (4/4)

Better Evaluation

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

- Grading (40%)
  - smallClassic, Alpha-Beta, depth=3, 10 times
    - 5/10: +10
    - 10/10: +10
    - avg > 500: +10
    - avg > 1000: +10

Options

-z 0.5	0.5x window size
-n #	Play # times
-q	Quiet mode, no graphics
-g DirectionalGhost	Using directional ghost
-k #	Number of ghosts = #
-f	Fixed random seed; line 533, pacman.py
--frameTime 0	No frame time

Submit

- Edit and upload multiAgents.py to e3
- Search for “[Project 3] YOUR CODE HERE”
- Deadline: 4/21 23:59 (3 weeks)
- Late policy: 80%
- No plagiarism