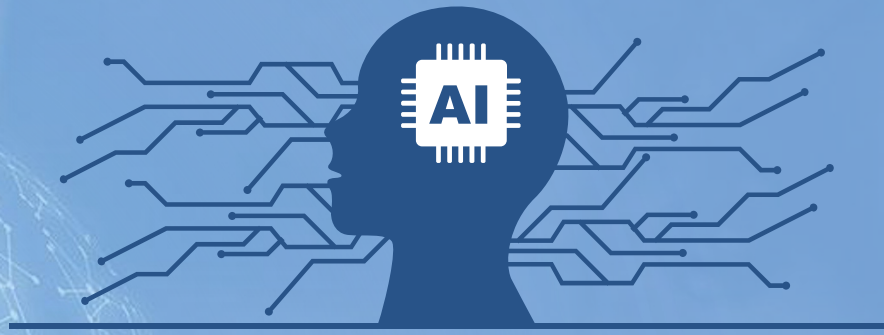
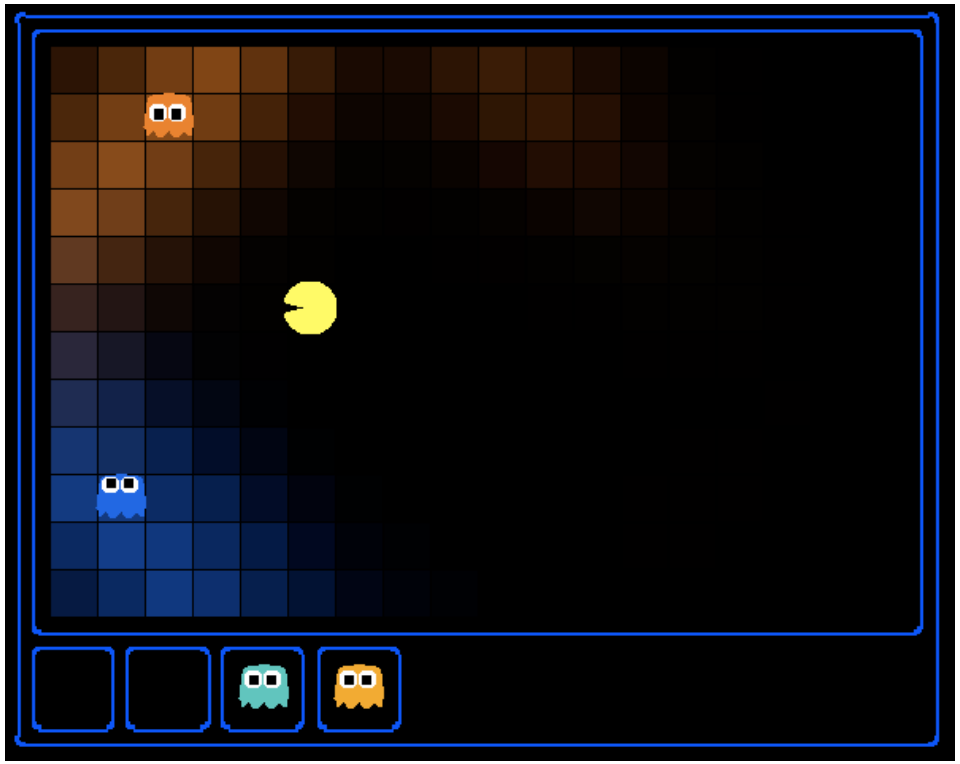
Artificial Intelligence



Homework #4
Ghostbusters

Objective

- **Ghostbusters Pacman:**
  - Q1. Bayes Net Structure
  - Q2. Join Factors
  - Q3. Eliminate (not ghosts yet)
  - Q4. Variable Elimination
  - Q5a. DiscreteDistribution Class
  - Q5b. Observation Probability
  - Q6. Exact Inference Observation
  - Q7. Exact Inference with Time Elapse
  - Q8. Exact Inference Full Test
  - Q9. Approximate Inference Initialization and Beliefs
  - Q10. Approximate Inference Observation
  - Q11. Approximate Inference with Time Elapse



Files in this Homework

Files you'll edit:	
`bustersAgents.py`	Agents for playing the Ghostbusters variant of Pacman.
`inference.py`	Code for tracking ghosts over time using their sounds.
`factorOperations.py`	Operations to compute new joint or magrinalized probability tables.
Files you might want to look at:	
`bayesNet.py`	The BayesNet and Factor classes.
Supporting files you can ignore:	
`busters.py`	The main entry to Ghostbusters (replacing Pacman.py).
`bustersGhostAgents.py`	New ghost agents for Ghostbusters.
`distanceCalculator.py`	Computes maze distances, caches results to avoid re-computing.
`game.py`	Inner workings and helper classes for Pacman.
`ghostAgents.py`	Agents to control ghosts.
`graphicsDisplay.py`	Graphics for Pacman.
`graphicsUtils.py`	Support for Pacman graphics.
`keyboardAgents.py`	Keyboard interfaces to control Pacman.
`layout.py`	Code for reading layout files and storing their contents.
`util.py`	Utility functions.

- The code for this project consists of several Python files, **some of which you will need to read and understand in order to complete the assignment**, and some of which you can ignore.
- You will fill in portions of **bustersAgents.py, inference.py, and factorOperation.py** during the assignment.
- Your code will be auto-graded for technical correctness. Please do not change the names of any provided functions or classes within the code, or you will wreak havoc on the autograder.

Details for problems are in README.md!

Report

- **Show your autograder results and describe the implementation details:**

  - Q1 (2 points)
  - Q2 (3 points)
  - Q3 (2 points)
  - Q4 (2 points)
  - Q5a Q5b (1 point)
  - Q6 (2 points)
  - Q7 (2 points)
  - Q8 (1 point)
  - Q9 (1 points)
  - Q10 (2 points)
  - Q11 (2 points)

Grading

- **Ghostbusters Pacman (80%)**
  - Q1. Bayes Net (8%)
  - Q2~3. Factor Operation (12%+8%)
  - Q4~5. Elimination and Observation (8%+4%)
  - Q6~8. Exact Inference (8%+8%+4%)
  - Q9~11. Approximate Inference (4%+8%+8%)
- **Report (20%)**
  - PDF format only

Submission

- Deadline: 2024/05/8 (Wed.) 23:59
- Zip all files as **hw4_<student_id>.zip**
- Submit to NTU COOL
- Your submission should include the following files:
  - hw4_<student_id>.pdf
  - AI2024-hw4
- Do not put report.pdf into AI2024-hw4 folder

Late Policy

- 所有同學一學期六次作業總共能遲交 72hr，而每次作業遲交的折扣如下表

<24hr	<48hr	<72hr
70%	50%	30%


Any
Question
ai.ta.2024.spring@gmail.com