

Project 1
Artificial Intelligence
CSCE 5210 – Fall 2021
Distributed: Tuesday, August 31
Due: Tuesday September 21

Approach:

Given variables:

- The map of a warehouse can vary. However, it should be a 2d array list. Specifically, our team chooses a 2D numpy array because of the convenience in accessing a grid square, even though the benefit is not so clear compared with a general list when it is mixed between int and string.
- The order: We assume that it is a list.
 - Data structure: list of tuples.
 - Shelf: The name of the shelf.
 - Details: It contains all items that can be found in the specific shelf

Each tuple has:

- 🚚 Code of the item.
- 🚚 Quantity of the item.

Class Robot:

Attributes and methods:

- The map of the warehouse.
- Order: The leftover of an order that the robot needs to proceed.
- Items: Items the robot has collected so far.
- Around: This shows the respective directions of the robot's immediate neighbor grid squares (west / east / north / south) that have the shelf which is included in the order. (0 = No, 1 = Yes)
- X and Y positions of the robot in the warehouse.
- Sensor: It is used to represent the 80% accuracy of the robot when it senses the surrounding environment.
- Initialization.

Commented [DN1]: Any structure of ware house's surface can be represented by a 2d graph → Generic

Commented [DN2]: This data structure makes sure the robot visits any shelf only once for the best movement techniques

Commented [DN3]: The robot is supposed to have a map in its memory

Commented [DN4]: It can be updated since it will be used in a condition to verify if the robot's job is done.

Commented [DN5]: For the purpose of analysis

Commented [DN6]: To determine the randomness of the robot's next direction

Commented [DN7]: It is similar to the dot "You are here" in a map

Nghia Dang 11504520
Phongsiri Nirachornkul 11125038

- The robot can go west, east, north, and south direction, as well as update the robot's position after each move.
- The robot can peak around the shelves.
- get_items when the robot gets to the shelf included in the order.
- proceed_order: The algorithm of the robot's processing the phases.

Commented [DN8]: Help make a decision where to go next

Report:

Assumption:

- The robot's capacity is unlimited, so it can collect all items in an order without going back to the starting point after picking items from one shelf.
- The robot will complete one order before handling another.
- For simplicity, we assume there is only one shelf that the robot needs to go to in one order.

1. The average score is -17.523

2. The max score is 2

3. The min score is -304

4. Demonstration: It is included in the approach part.

5. Reason 1: The difference between the map of a warehouse to another. You can finish the job if all the shelves in the order are clustered close to the point P if you are lucky enough.

Reason 2: The randomness of the robot's choice when there is more than one neighboring shelf or no shelf.

6. Data structure: It is included in the approach part.