**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 its senses the surrounding environment.
* Initialization.
* 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.

**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.

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