**Project 1**

**Artificial Intelligence**

**CSCE 5210 – Fall 2021**

**Distributed: Tuesday, August 31**

**Due: Tuesday September 21**

**Approach:**

Given variables:

* The map of a ware house can vary. However, it should be a 2d array list. Specifically, our team chooses a 2d numpy array because of the convenience in accesssing 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 of dict of dict.
  + The first layer of dict of which
    - Key: The name of the shelf
    - Value: All items that can be found in the shelf
      * Key: The code of the item
      * Value: The quantity of the item

Class Robot:

Attributes:

* The map of the warehouse
* Order: The leftover of an order the robot needs to proceed
* Items: Items the robots 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 ware house
* Not\_passed: It represents the grid squares that the robot has not passed

Methods:

* Initialization
* go west / east / north / south and update the robot’s position after each move
* peak around for shelves
* get\_items when the robot gets to the shelf included in the order
* proceed\_order: The algorithm of the robot’s processsing phases

**Report:**

1. The average score after 1000 episodes:
2. The shortest path and the min score:
3. The longest path and the max score:
4. Demonstration: It is included in the approach part
5. Reason 1: The difference between the map of a ware house 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