

Artificial and Computational Intelligence

Assignment 3

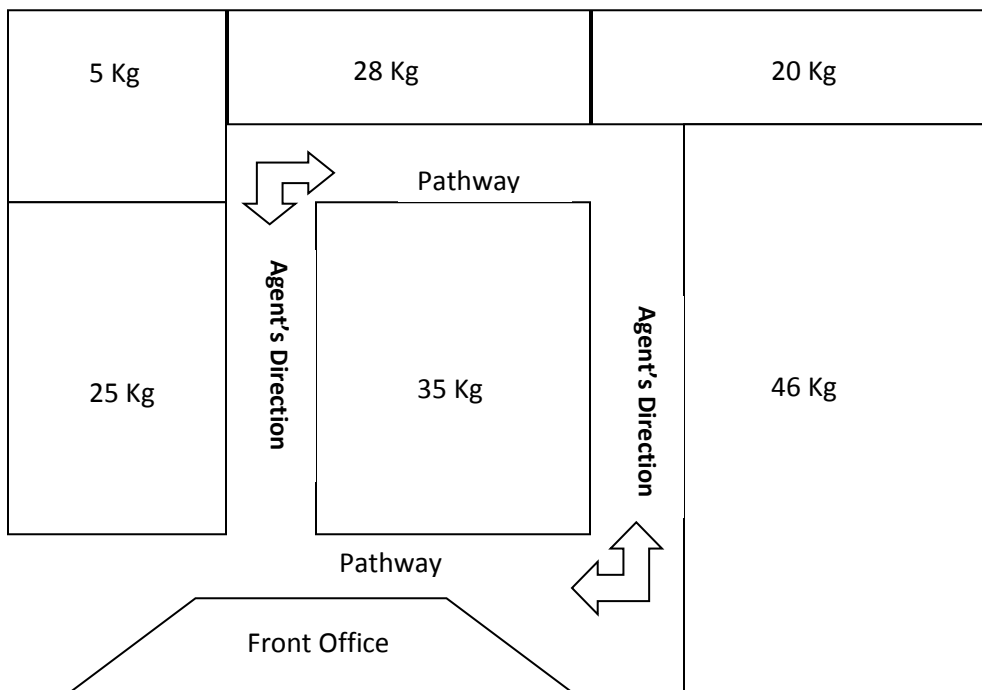
Packet delivery agent

Problem statement

Assume that you are in charge of an online e-commerce site which collects goods from vendors, stores them in godowns and later deliver them based on order placed. You have been assigned with robots that pick up packets from the front office and stores them in appropriate rooms. The packets are of different weights. The robot can carry 10 Kgs at a time. As in charge of the facility, you are required to give specific instructions to the robot to carry packets and store them in the rooms which are of different capacities.

The problem here is to find the correct combination of packets that can be carried by the robot so as to minimize the number of commutes by the robot to complete the job, the number of rooms used by the robot to store the contingency, and the remaining storage space.

The following figure gives the environment of the robot:



The below table gives the Packet weights and number of packets:

Packet weight (Kg)	No. of packets	Total Weight (Kg)
1	15	15
2	5	10
4	7	28
5	2	10
6	3	18
7	2	14
9	4	36
Total	38 packets	131 Kgs

1. Explain the heuristic that can be used to solve the problem? Justify your choice.
2. Explain the cost function associated with your search in reaching the goal.
3. Choose the correct algorithm suitable for this grid search.
4. Implement the algorithm in PYTHON
5. Print the number of commutes by the robot, the weight carried by the robot in each commute, the number of rooms used to store the contingency and the remaining space for the store keeper's reference.

The assignment will be evaluated on the following points

1. Explanation of the heuristic and algorithm chosen [20% weightage]
2. Representation of the environment, fringe and the data structures used [20% weightage]
3. Implementation of the algorithm in PYTHON [40% weightage]
4. The details given by the algorithm to the store keeper. [20% weightage]

Note:

1. Kindly avoid plagiarism
2. Use suitable data structures to represent the environment, the solution space and the solution.
3. Python template is provided for your reference.

Hint:

Represent the number of commutes, the weight carried by the robot at each commute and the available room capacity as an objective vector. Use these features to define your evaluation function. Find the optimum combination to reach the goal of storing the contingency with minimum number of commutes and less number of rooms.