BCS Takneek PS

Problem Statement

Neuroeconomics aims to explain human decision-making and the capacity to consider several options and follow a course of action. In this problem statement, you will analyze the effect of small individual decisions on something as massive as the population. But this analysis is set in a different dimension. Here the world is a grid, and its habitants are pacman-like creatures, lets's call them Macpan. A single grid-cell in this world can host any amount of Macpen. The Macpen has 4 possible movements - up, down, right, and left. In this grid world exist some canteens that give our Macpen(plural of Macpan) food necessary for reproduction. The positions of the canteens in the grid world are random(or whatever heuristic you want it to be). The goal of Macpen is to grow the population. Here, reproduction is simply doubling(1 macpen -> 2 macpen) with the amount of food equally distributed between the two. Once reproduced, they move on and again procure enough food for reproduction. Hence, the cycle should keep moving on. But this world, like ours, has a villain. It's called the ghost gang. The ghost gang takes away a certain amount of food from everybody(like KALA DAKU). And if the food level of any pacman falls below 0, it dies. The ghost gang arrives once every day. The macpen are of 3 types:

1. Helpful - If the pacman is in the same cell as another pacman and has excess food, they can give the food to the other individual.
2. Ungrateful - will not share food at all
3. Tit-for-tat - will share food with the other pacman based on their history with the grid community

What do you have to analyze?

The type-wise population development of the grid world.

Expected Deliverables

1. Detailed Documentation (pdf format)
2. Working Code: Repo

(readme that explains your approach, results, graphs & conclusion is mandatory)

Both of them need to be submitted by the submission deadline.

Evaluation Metric

1. Implementation of Environment in Python (tie-breakers, resource allocation, action decision, etc) (60%)
2. Implementation of the strategy & Graphical depiction of strategy-wise population development. (20%)
3. QnA based on the submitted documentation - (20%)
4. Bonus Point (10%)- (suggest a similar environment, will it give similar results? state your reasons)