**Task 1**

Initially, I wanted to store the dot grid as a single array, but then I chose to store the “dot” grid as a matrix as it was easier to visualize and to solve. Then, I implemented the depth-first search algorithm as we are trying to get the possible combinations. The conditions that check if the path can be further searched is split into different function for easier readability and makes it easier to solve. Once the algorithm is created, all I had to do was create a function named “listPatterns” that checks the first character of the string as well as the third character of the string, as well as using regular expression to find second character in the string.

Task 2

Objective 1

In order to solve the objective 1, I analyzed the output of the sample\_python.py. It seemed to run normally, which made me suspect that there is an issue with how the total cost is handled. So, I added a print function for total\_cost variable in calc\_function() of MVPGeneticAlgorithm and found that the cost sometimes increases its value. I then analyzed the get\_sol() function, where I found it was returning the highest fitness correctly. This leads me to believe that solve() function was having an issue since solve() function is the only function that uses get\_sol() function.