**CME 2204 Dynamic Programming Assignment – Football Club Budget Problem**

**Güney Söğüt 2020510066**

The aim of the assignment is to create a dynamic programming algorithm that calculates the minimum budget for the given years with respect to the given values which are n: year, p: max player to be promoted, c: coach cost.

What is Dynamic Programming?

Dynamic programming is a computer programming technique where an algorithmic problem is first broken down into sub-problems, the results are saved, and then the sub-problems are optimized to find the overall solution — which usually has to do with finding the maximum and minimum range of the algorithmic query.

In order to complete this assignment, a 2-dimensional dynamic programming array is needed in order to store and use the values before the current year. This is the real problem that an option involves in different and different scenarios. In order to complete that, your algorithm should satisfy the previous data and work properly.

When we look at the DP array in my implementation, the first row of the array stores the salaries. The column size of the array is the number of total demands in n years. Then, we have 2 options: if the demand is greater than the max players to be promoted or less than the max players to be promoted. Then, the algorithm checks all the possibilities of each scenario by checking the previous year and calculating the required players for each scenario. Then, find the minimum value and insert it to the array.

The time complexity of the algorithm is O(n3) because we have 3 nested loops.

The space complexity of the algorithm is O(1).