**Group Assignment 2**

**Member:**

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**Title:** Predict the best team for Fantasy Premier League (FPL) 2018-2019

**Dataset:**

Source from <https://www.kaggle.com/delayedkarma/fantasy-premier-league-20182019/downloads/fantasy-premier-league-20182019.zip/6>

There will be 21 columns/variable and around 500 rows (depend on which week we choose) inside the dataset. For simplicity we will just choose 8 columns and week 0 (FPL\_2018\_19\_Wk0.csv) for this assignment. Below are the first 10 samples.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | Name | Team | Position | Cost | Yellow\_cards | Red\_cards | Bonus | Points |
| 0 | Adam Smith | BOU | DEF | 45 | 6 | 0 | 3 | 56 |
| 1 | Adrian | WHU | GKP | 45 | 2 | 0 | 5 | 72 |
| 2 | Aguero | MCI | FWD | 110 | 2 | 0 | 22 | 169 |
| 3 | Ake | BOU | DEF | 50 | 5 | 0 | 8 | 102 |
| 4 | Albrighton | LEI | MID | 55 | 5 | 1 | 12 | 107 |
| 5 | Alderweireld | TOT | DEF | 60 | 3 | 0 | 3 | 43 |
| 6 | Alexander-Arnold | LIV | DEF | 50 | 3 | 0 | 10 | 83 |
| 7 | Alisson | LIV | GKP | 55 | 0 | 0 | 0 | 0 |
| 8 | Alli | TOT | MID | 90 | 7 | 0 | 12 | 175 |

**Objective:**

Given a budget (total cost) 1000 and 15 players (2GKP, 5DEF, 5FWD, 3FWD) for each team constraints, we want to maximize the point earn by using Constrain Optimization (Linear Optimization) algorithm.

**Constraints Algorithm:**

Each player/row will be different variable.

Maximize the point => 56\*x0 + 72\*x1 + 169\*x2 + 102\*x3 + … Points\*xn

Subject to:

Cash constrain => 45\*x0 + 45\*x1 + 110\*x2 + 50\*x3 + … Cost\*xn = 1000

GKP Player Position => x1 + x30 + x38 + x48 + … xn (GKP position ONLY) = 2

DEF Player Position => x0 + x3 + x5 + x6 + … xn (DEF position ONLY) = 5

MID Player Position => x4 + x8 + x10 + x11 + … xn (MID position ONLY) = 5

FWD Player Position => x2 + x12 + x15 + x18 + … xn (FWD position ONLY) = 3

Player with yellow card constrain => x0 < 2, x1 < 2, x2 < 2 … xn <2

Player with minutes played constrain => x0 < 1315, x1 < 1315, x2 < 1315 … xn <1315

Variables:

0 <= x0 <= 1

0 <= x1 <= 1

0 <= x2 <= 1

0 <= x3 <= 1

…

0 <= xn <= 1

Introduction

Fantasy football is a game in which the participants serve as the general managers of virtual professional gridiron football teams. The competitors choose their team rosters by participating in a draft in which all players of a real football league are available. Points are based on the actual performances of the players in the real-world competition. Once you register yourself for this you are provided with virtual money which you need to spend on selecting 15 players from the 20 teams who are in the Premier League.

Dataset

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Objective Function

Given a budget (total cost) 1000 and 15 players for each team constraints, we want to maximize the point earn by using Constrain Optimization (Linear Optimization) algorithm. The 15 players should be divided into below criteria: (2GKP, 5DEF, 5MID, 3FWD)

* 2 x Goal Keeper position (GKP)
* 5 x Defender position (DEF)
* 5 x Mid field position (MID)
* 3 x Forward position (FWD)

By representing each player/row into different variable we can derive point maximizing using below

56\*x0 + 72\*x1 + 169\*x2 + 102\*x3 + … Points\*xn

Constraints

Cash constrain => 45\*x0 + 45\*x1 + 110\*x2 + 50\*x3 + … Cost\*xn = 1000

GKP Player Position => x1 + x30 + x38 + x48 + … xn (GKP position ONLY) = 2

DEF Player Position => x0 + x3 + x5 + x6 + … xn (DEF position ONLY) = 5

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Player with minutes played constrain => x0 < 1315, x1 < 1315, x2 < 1315 … xn <1315

Python

Justification

Conclusion