# CS350 – Introduction to Software Engineering

## - Spring 2022 -

## Practice Assignment #2

### Due Date: May 18, 2022

### Readings:

[PrMa20] Roger S. Pressman, and Bruce R. Maxim, *Software Engineering – A Practitioner's Approach*, 9th Ed., Mc Graw Hill, 2020 (ISBN-13: 978-1259872976) – Chapter 19

### Goal:

Generate and execute test cases for a given Python code and description to find errors in the code. Analyze the effectiveness of your test cases.

### Suggested outline of the homework report:

1. Give a description of how you generated the test cases considering the functional requirements of the given code (see the following page)
2. Identify the errors found by your test cases and include possible modification of the source code to correct the errors
3. Analyze the results

### Submission:

- Submit your test case python file and report in PDF format via KLMS by 1:00PM May 18, 2022

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## Soccer Players

* Note: this assignment is adapted from the CS101 course. DO NOT redistribute this assignment, or you may face failure in the course and or expulsion from the university.

**Description:**
The dataset contains a list of soccer players and their information, including name, age, country, overall rating, and position. The source code retrieves relevant information from this dataset.

The positions of the soccer players can be largely categorized into 4 positions: goalkeeper, defender, midfielder, and forward. These positions can further be broken down into sub positions according to the table below.

| Main position | Detailed Position |
|---|---|
| Goalkeeper | GK |
| Defender | LB, LCB, CB, RCB, RB, LWB, RWB |
| Midfielder | LDM, CDM, RDM, LM, LCM, CM, RCM, RM, LAM, CAM, RAM |
| Forward | LW, RW, LS, ST, RS, LF, CF, RF |

The requirements listed below were used to generate the provided source code. Read the requirements **carefully** to generate unit test cases to reveal bugs in the source code.

----------Class Country----------

**Class Country**

- Country class contains the country name and a list of player objects for this country.
  - The player objects are of class Player.
- It should implement the functions described below.

get_best_player_and _number_of_world_classes

- A world class player is defined as players with an overall score greater than or equal to 80.
- It should return the name of the best player out of the world class players and the number of world class players in a given country.
  - Best player is the player who has the highest overall score.
  - If there's a tie on the highest overall rating, it should return the name of the best player who appears first in the list.
- If there is no world class player, it should return a string, 'No world class'.

get_best_player_for_position

- It should be able to return a list of the top n number of players from the country, given a position and the number of players to retrieve.
  - The input position is the main position from the positions table
  - The best player(s) indicates the ones with highest ratings
    - If multiple players have the same overall ratings, younger players are favored.
  - If there aren't enough number of players for a given position to fill the list of n players, the list of players for the given position should still be returned
    - In this case, the length of the returned list should simply be the number of players with specified position

get_best_players_for_each_position

- It should be able to get the best players for each of the 4 positions, goalkeeper, defender, midfielder, and forward, from the country.

    - The best player(s) indicates the ones with highest ratings
        - If multiple players have the same overall ratings, younger players are favored.

get_best_formation

- It should return a list of best players, including the goalkeeper, for a given formation.
    - The input formation is a - separated string for the number of players in the Defender-Midfielder-Attacker formation (e.g. '4-3-3' for a formation of 4 defenders, 3 midfielders, and 3 attackers)
        - If the input formation does not conform to the Defender-Midfielder-Attacker formation (e.g. '3-2-3-2' formation), it should return 'Wrong formation'
    - The sum of players in the formation should be 11 (e.g. '4-3-3' formation has 10 field players and a goalkeeper).
        - If the input formation does not have 11 players (e.g. '3-3-3' formation has a total of 10 players, 9 field players and a goalkeeper), it should return 'Wrong formation'
    - The position used in this function is the main position from the above table.
    - If there are not enough players to fill the position, it should return a string, 'Not enough players'

----------End of Class Country----------

----------Class Player----------

**Class Player**

- Player class contains the information of the player, including name, age, nationality, overall rating, and position, obtained from the player dataset.
    - The player's name is a string.
    - The player's age is an integer.
    - The player's country is a string.
    - The player's overall rating is an integer.
    - The player's position is a string that should match one of the detailed positions from the positions table.
- It should implement the functions described below

__gt__

- It should compare the player against another player by using the overall rating first and then their ages.
    - If the two players have the same overall rating, then their ages should be compared to favor the younger player.

__str__

- It should return the name of the player

__repr__

- It should return the string of the players name, position. (e.g., 'H. Son, LM')

----------End of Class Player----------

convert_csv_file_to_object

- This method should open a 'data.csv' file and return a list of country objects.
    - The country objects are of class Country.

get_country_object_by_country_name

- It should be able to return the country object who has the same country_name class variable with the given country name from a list of country objects
    - If there is no such country, it should return a string 'No such country'