CS101 Homework #4

Korean Baseball League

Due date: Sunday, Jun. 7, 2015 (Until 23:59)

Delayed-due date: Tuesday, Jun. 9, 2015 (Until 23:59)

Please read the homework description carefully and make sure that your program meets all the requirements stated. The homework assignment is an individual task. You can discuss the problem with your friends but you should not program together. **You will get an F on the entire course if your homework includes any plagiarism.**

Goal

In this assignment, you will write a program that gathers statistics of Korean baseball teams from the Korean Baseball Organization (KBO) homepage. Your program reads three HTML files to gather game results in the last three months (March, April, and May). Then, the program should show three statistics to users; team-by-team results, all teams' statistics, and each team's home/away game results.

Description

A template code is given in 'HW4_template.py' file that includes two user-defined objects (**Game** and **Team**) and five functions with the main function. Please complete 'HW4_template.py', and rename it to 'HW4_yourid.py' (e.g., 'HW4_20151234.py'). Note that you do not allow to define new functions, methods, and new global variables.

1. User-defined objects

1) **Game** object

Table 1 Game object's attributes

Attributes	Type	Meaning
team1	String	The first team name of the game
team2	String	The second team name of the game
score	String	The score between two teams (ex. '6:3')
location	String	The location where the game has played

- You need to define a constructor of the **Game** object with four parameters.

2) Team object

Table 2 Team object's attributes

Attributes	Type	Meaning
name	String	The team name
location	String	The location of the team
win	Integer	The number of win games of the team
loss	Integer	The number of loss games of the team
draw	Integer	The number of draw games of the team
winning_rate	Float	The fraction of games the team has won, $winning\_rate = \frac{(win)}{(win + lose)}$
game_behind	Float	The gap between a leading team (A) and another team (B), $game\_behind = \frac{(A's\ win - B's\ win) + (B's\ loss - A's\ loss)}{2}$

- Define a constructor of the **Team** object with two parameters (name and location). The other five attributes (win, loss, draw, winning_rate, and game_behind) should be initialized to 0 in the constructor.
- You need to define a special method '**__cmp__**' to compare two teams' winning rate (return -1, 0, or 1). This method is used to sort teams in descending order of the winning rate.

2. Functions

- Please read the following function descriptions carefully, and complete the functions in the template code.

1) gather_game_results()

- Input : None
- Output : A list of **Game** objects
- Read the HTML files ('Mar.html', 'Apr.html', and 'May.html'), and make a list of **Game** objects of game results by using the constructor of the **Game** object.
- HTML source is a text file, so open the HTML files in a 'WordPad' to see the source code. Then, you can find text lines including the information (team names, score, and location) through a specific text. (Ex. the text line which includes the score will contain '**class="score_schedule">**'.)
- All games should be included in the list except exhibition games and postponed games.

2) show_team_by_team_results()

- Input : A list of **Game** objects *(gameList)*
- Output : None
- Print the team-by-team results by using the list of Game objects.
- The result in each cell includes win-loss-draw between two teams. For example, the red boxes in Figure 1 means 'NEXEN' wins two games and loses four games against 'DOOSAN'. (In other words, 'DOOSAN' wins four games and loses two games against 'NEXEN'.)
- You should print the total results of each team on the right as shown in Figure 1.
- Please use the formatting operator '%' to print the results, and you don't need to consider the text

alignment (left-align, right-align and center-align are permissible)

Team	SAMSUNG	NEXEN	NC	LG	SK	DOOSAN	LOTTE	KIA	HANWHA	kt	Total
SAMSUNG	******	0-0-0	3-0-0	3-3-0	1-1-0	0-0-0	3-3-0	2-1-0	1-1-0	4-0-0	17-9-0
NEXEN	0-0-0	******	0-1-0	0-0-0	2-3-0	2-4-0	1-1-0	3-0-0	1-1-0	4-2-0	13-12-0
NC	0-3-0	1-0-0	******	1-2-0	2-3-0	0-2-0	1-2-0	3-0-0	2-2-0	0-0-0	10-14-0
LG	3-3-0	0-0-0	2-1-0	******	1-1-0	2-1-0	1-1-0	1-3-0	3-3-0	0-0-0	13-13-0
SK	1-1-0	3-2-0	3-2-0	1-1-0	******	0-0-0	0-0-0	0-1-0	0-3-0	5-1-0	13-11-0
DOOSAN	0-0-0	4-2-0	2-0-0	1-2-0	0-0-0	******	2-2-0	2-1-0	1-1-0	4-0-0	16-8-0
LOTTE	3-3-0	1-1-0	2-1-0	1-1-0	0-0-0	2-2-0	******	1-2-0	2-1-0	2-0-0	14-11-0
KIA	1-2-0	0-3-0	0-3-0	3-1-0	1-0-0	1-2-0	2-1-0	******	1-1-0	3-0-0	12-13-0
HANWHA	1-1-0	1-1-0	2-2-0	3-3-0	3-0-0	1-1-0	1-2-0	1-1-0	******	0-0-0	13-11-0
kt	0-4-0	2-4-0	0-0-0	0-0-0	1-5-0	0-4-0	0-2-0	0-3-0	0-0-0	******	3-22-0

Figure 1 Example of team-by-team results

3) show_teams_statistics()

- Input : A list of **Game** objects *(gameList)*
- Output : None
- First, make a list of ten **Team** objects by using the constructor with team names and locations in Table 3. (Teams and Locations is given in the template code).

Table 3 Locations of each team

Teams	Locations
SAMSUNG	DAEGU
NEXEN	MOKDONG
NC	MASAN
LG	JAMSIL
SK	MUNHAK
DOOSAN	JAMSIL
LOTTE	SAJIK
KIA	GWANGJU
HANWHA	DAEJEON
kt	SUWON

- Use the *gameList* to update win, loss, draw, and winning_rate attributes of each team, and sort the list of the Team objects in descending order by using **sort()** method of the list. After that, calculate the game_behind attribute.
- Finally, print the teams' statistics by using the formatting operator '%' as shown in Figure 2.

Name	Location	Win	Lose	Draw	Winning Rate	Game Behind
DOOSAN	JAMSIL	16	8	0	0.67	0.00
SAMSUNG	DAEGU	17	9	0	0.65	0.00
LOTTE	SAJIK	14	11	0	0.56	2.50
SK	MUNHAK	13	11	0	0.54	3.00
HANWHA	DAEJEON	13	11	0	0.54	3.00
NEXEN	MOKDONG	13	12	0	0.52	3.50
LG	JAMSIL	13	13	0	0.50	4.00
KIA	GWANGJU	12	13	0	0.48	4.50
NC	MASAN	10	14	0	0.42	6.00
kt	SUWON	3	22	0	0.12	13.50

Figure 2 Example of all teams' statistics

4) home_away_game_result ( )

- Input : A list of **Game** objects and three strings *(gameList, team1, team2, location)*
- Output : None
- Print the game results between *team1* and *team2*. *team1* is a team name in the global variable Teams, and *team2* will be a team name in the global variable Teams or a string value **'All'**. If the *team2* is '**All**', you should collect the results of all games that the *team1* has played. (Otherwise, collect the game results between the *team1* and *team2*.)
- In addition, you need to check the *location* with Table 1.
  1) If the *location* is **'home'**, collect the results of games in the team1's location.
  2) Otherwise, if the location is **'away'**, collect the results of games not in the team1's location.

5) main ( )

- Input : None
- Output : None
- Ask the user to select a menu among team-by-team results, all teams' statistics, and each team's home/away game result.
- If the user select the 'each team's home/away result', you have to ask the user to enter two teams' name and a location ('home' or 'away'). At this time, the second inputted team name can be 'All'
- All inputs from the user should be case-sensitive, and you have to check wrong inputs such as a typing error. If user enters wrong inputs, ask again until the user has entered a correct input.

```
Select a menu
1. Show team-by-team results
2. Show all teams' statistics
3. Each team's home/away game results
0. Exit
=> 1
```

Team	SAMSUNG	NEXEN	NC	LG	SK	DOOSAN	LOTTE	KIA	HANWHA	kt	Total
SAMSUNG	******	0-0-0	3-0-0	3-3-0	1-1-0	0-0-0	3-3-0	2-1-0	1-1-0	4-0-0	17-9-0
NEXEN	0-0-0	******	0-1-0	0-0-0	2-3-0	2-4-0	1-1-0	3-0-0	1-1-0	4-2-0	13-12-0
NC	0-3-0	1-0-0	******	1-2-0	2-3-0	0-2-0	1-2-0	3-0-0	2-2-0	0-0-0	10-14-0
LG	3-3-0	0-0-0	2-1-0	******	1-1-0	2-1-0	1-1-0	1-3-0	3-3-0	0-0-0	13-13-0
SK	1-1-0	3-2-0	3-2-0	1-1-0	******	0-0-0	0-0-0	0-1-0	0-3-0	5-1-0	13-11-0
DOOSAN	0-0-0	4-2-0	2-0-0	1-2-0	0-0-0	******	2-2-0	2-1-0	1-1-0	4-0-0	16-8-0
LOTTE	3-3-0	1-1-0	2-1-0	1-1-0	0-0-0	2-2-0	******	1-2-0	2-1-0	2-0-0	14-11-0
KIA	1-2-0	0-3-0	0-3-0	3-1-0	1-0-0	1-2-0	2-1-0	******	1-1-0	3-0-0	12-13-0
HANWHA	1-1-0	1-1-0	2-2-0	3-3-0	3-0-0	1-1-0	1-2-0	1-1-0	******	0-0-0	13-11-0
kt	0-4-0	2-4-0	0-0-0	0-0-0	1-5-0	0-4-0	0-2-0	0-3-0	0-0-0	******	3-22-0

Figure 3 Example of the execution result - team-by-team results

```
Select a menu
1. Show team-by-team results
2. Show all teams' statistics
3. Each team's home/away game results
0. Exit
=> 2
   Name     Location    Win     Lose    Draw    Winning Rate    Game Behind
  DOOSAN      JAMSIL      16      8       0          0.67           0.00
 SAMSUNG      DAEGU       17      9       0          0.65           0.00
  LOTTE       SAJIK       14      11      0          0.56           2.50
    SK        MUNHAK      13      11      0          0.54           3.00
  HANWHA      DAEJEON     13      11      0          0.54           3.00
  NEXEN       MOKDONG     13      12      0          0.52           3.50
    LG        JAMSIL      13      13      0          0.50           4.00
   KIA        GWANGJU     12      13      0          0.48           4.50
    NC        MASAN       10      14      0          0.42           6.00
    kt        SUWON       3       22      0          0.12          13.50
```

Figure 4 Example of the execution result - all teams' statistics

```
Select a menu
1. Show team-by-team results
2. Show all teams' statistics
3. Each team's home/away game results
0. Exit
=> 3
Enter a team1 name : DOOSAN
Enter a team2 name (or 'All') : NEXEN
Enter a location ('home' or 'away') : away
DOOSAN vs. NEXEN in away games => Win : 2 Lose : 1 Draw : 0
```

Figure 5 Example of the execution result - home/away game result

Submission

You need to submit the followings:

- The program file: 'HW4_yourid.py' (e.g.) HW4_20151234.py
- The homework report: 'HW4_yourid.doc', 'HW4_yourid.docx', or 'HW4_yourid.pdf' (e.g., HW4_20151234.doc, HW4_20151234.docx, HW4_20151234.pdf)
- The source code should contain appropriate comments.
- In the report, you need to describe each function and show your results.

Please zip the source code and the report into 'HW4_yourid.zip' (e.g., HW4_20151234.zip), and submit the zipped via the CS101 homepage.

※ It is necessarily required that you download the zip file you've uploaded to double-check whether you've uploaded everything correctly after the submission. For your homework evaluation, there is no way to claim back your scores when you get zero or very low points due to wrong submission.