Homework 5

Moodle Submission Deadline: 2018/1/6 (Sunday) 23:59

[Bring the printed papers to the class on **1/8** (Tue)]

Problem: Kobe Shot Analysis [hw5.py]

Kobe Bryant marked his retirement from the NBA by scoring 60 points in his final game as a Los Angeles Laker on Wednesday, April 12, 2016. Drafted into the NBA at the age of 17, Kobe earned the sport's highest accolades throughout his long career. Using 20 years of data on Kobe's swishes and misses, many people like to analyze how his shots find the bottom of the net.

In this homework, based on the data we provided you "**kobe.csv**", you can try to be the Kobe shot data analyst. You will practice string, loops, file processing, function, and the data structures of list and dictionary. You are asked to **write a function for each of the following question**.

(1) 請問 Kobe 最常在距離籃框多遠的地方出手投籃?
Hint: shot_distance

(2) 請問 Kobe 在哪個區域出手命中率最高?
Hint: shot_zone_area, shot_made_flag

(3) 請計算 Kobe 對戰馬刺隊(SAS)的平均兩分球與三分球命中率。
Hint: opponent, shot_type, shot_made_flag

(4) 請列出 Kobe 對戰次數最多次的前五支球隊，並顯示對戰次數。
Hint: opponent

(5) 請列出 Kobe 對戰過的球隊中，使得 Kobe 平均得分最高的前五支球隊，並顯示平均得分。
Hint: opponent, shot_made_flag, shot_type

(6) 請找出 Kobe 在比賽最後 3 分鐘內得分最高的前五場球賽，並顯示其得分。
Hint: opponent, shot_made_flag, shot_type, minutes_remaining

(7) 請計算並逐年(按照年份)列出 Kobe 在正規賽中，
Kobe 在比賽最後 30 秒內的 Jump Shot 命中率。
Hint: action_type, playoffs, game_date, seconds_remaining, shot_made_flag, shot_type

(8) 請列出 Kobe 在季後賽兩分球命中率比正規賽兩分球命中率還高的對戰球隊，並依此「季後賽兩分球命中率 – 正規賽兩分球命中率」之值由大到小排序，同時顯示此差距值。
Hint: playoffs, shot_type, shot_made_flag, opponent

(9) 請計算並計算 Kobe 得分 25 分以上的最長連續場數前 3 名，顯示場數以及起訖日期。
Hint: game_date, shot_type, shot_made_flag

(10) 請分別計算並列出 Kobe 在正規賽與季後賽中，各種出手投籃類型的平均得分，並依據平均得分值由大到小排序、分成正規賽與季後賽，共有 12 個表格請列出。
Hint: combined_shot_type, playoffs, shot_type, shot_made_flag

Sample input & output

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D:\0碩二上\計概\hw5>python hw5.py

(1) ANS: 0

(2) ANS: Center(C)

(3) ANS:
2PT Field Goal: 0.384
3PT Field Goal: 0.256

(4) ANS:
SAS : 91
PHX : 87
UTA : 84
DEN : 83
POR : 81

(5) ANS:
1  PHX 17.71
2  MEM 17.43
3  SAC 17.36
4  NYK 17.21
5  GSW 17.13

(6) ANS:
id =  20900706 , vs. MEM : 19
id =  40500156 , vs. PHX : 18
id =  21200906 , vs. NOH : 18
id =  21400056 , vs. PHX : 17
id =  49900074 , vs. POR : 17
id =  20500471 , vs. PHI : 17
(7) ANS:
1996 : 0.429
1997 : 0.240
1998 : 0.171
1999 : 0.232
2000 : 0.211
2001 : 0.190
2002 : 0.186
2003 : 0.163
2004 : 0.181
2005 : 0.216
2006 : 0.183
2007 : 0.284
2008 : 0.130
2009 : 0.148
2010 : 0.188
2011 : 0.109
2012 : 0.217
2013 : 0.196
2014 : 0.038
2015 : 0.176
2016 : 0.059

(8) ANS:
NJN : 0.0544
SAS : 0.0442
UTA : 0.0327
OKC : 0.0209
DAL : 0.0183
PHX : 0.0157
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(9) ANS:
 5 2007/03/16 ~ 2007/03/25
 5 2006/03/31 ~ 2006/04/09
 5 2003/02/14 ~ 2003/02/21

(10) ANS:
  Regular + Tip Shot |  Regular + Jump Shot |  Regular + Hook Shot
       NOH     2.0000 |       NOP    13.0625 |       NOH     2.0000
       BOS     2.0000 |       NYK    12.8529 |       MEM     2.0000
       BKN     2.0000 |       HOU    12.5410 |       BKN     2.0000
       NOP     2.0000 |       POR    12.0492 |       NOP     2.0000
       POR     1.3333 |       SEA    11.8810 |       HOU     2.0000
-------------------------------------------------------------------
       Regular + Dunk |       Regular + Layup |  Regular + Bank Shot
       BKN     4.0000 |       POR     4.5517 |       WAS     3.0000
       TOR     3.7333 |       MEM     4.2128 |       ORL     2.0000
       DET     3.2000 |       ATL     4.1600 |       NOH     2.0000
       MEM     3.1429 |       GSW     4.1212 |       BOS     2.0000
       CHI     3.1250 |       PHX     4.1053 |       NOP     2.0000
-------------------------------------------------------------------
  Playoff + Tip Shot |  Playoff + Jump Shot |  Playoff + Hook Shot
       POR     2.0000 |       ORL    17.4000 |       SAS     4.0000
       PHI     2.0000 |       DAL    15.2500 |       POR     2.0000
       PHX     2.0000 |       PHX    14.3043 |       DEN     2.0000
       HOU     2.0000 |       BOS    14.0000 |       NOH     2.0000
       IND     1.0000 |       SAC    13.6875 |       SAC     2.0000
-------------------------------------------------------------------
     Playoff + Layup |       Playoff + Dunk |  Playoff + Bank Shot
       SAS     4.9655 |       OKC     6.0000 |       HOU     4.0000
       SAC     4.2500 |       DET     3.5000 |       BOS     3.0000
       DEN     4.1176 |       SAS     3.0588 |       DEN     2.5000
       PHX     4.0000 |       MIN     2.8571 |       PHX     2.0000
       MIN     4.0000 |       NOH     2.6667 |       NOH     2.0000
-------------------------------------------------------------------
```

Important Notes

This is a homework for each **team**. Please submit your homework **by one team member. You are asked to write comments to describe the meaning of each part in hw5.py.**

How to Submit Your Homework? [Both (1) and (2) need to be done!]

(1) Submission in NCKU Moodle

Before submitting your homework, please zip the files (**hw5.py**) in a zip file, and name the file as "學號 1_學號 2_hw3.zip". For example, if your 學號 of your team are H12345678 and H87654321, then your file name is:

"H12345678_H87654321_hw**5**.zip" or "H87654321_H12345678_hw**5**.rar"

When you zip your files, please follow the instructions provided by TA's slides to submit your file using NCKU Moodle platform http://moodle.ncku.edu.tw .

(2) Print out Your Codes and Files

Please print out your files (**hw5.py**) using A4 papers, clearly highlight which papers belong to which problems, and staple and nail these papers together. Then **bring your printed-and-nailed papers to the class on 1/8**. Please make sure your printed version is exactly the same as the submitted version in Moodle.

Have Questions about This Homework?

Please feel free to visit TAs, and ask/discuss any questions in their office hours. We will be more than happy to help you.