CptS355 - Python Class Exercises

1) histo(s)

(a) Define a function, histo(s) computing the histogram of a given string. The histogram returned by the function is a list of characters in the input string s each paired with its frequency. Characters must appear in the list ordered from **most frequent to least frequent**. For example,

```
histo('implemented')
```

is

```
[('e',3), ('m',2), ('d',1),('i',1), ('l',1), ('n',1), ('p',1), ('t',1)]
```

(Characters with the same frequency must appear in increasing alphabetical order.)

```
def histo(s):
    #write your code here
    pass
```

(b) Re-write `histo(s)` function using list comprehension.

2) The following dictionary stores WSU's college football game scores for the past 4 years. In 2020, WSU played only 4 games due to pandemic.

```
wsu_games = {
    2018: { "WYO":(41,19), "SJSU":(31,0),  "EWU":(59,24),  "USC":(36,39), "UTAH":(28,24),
            "ORST":(56,37),  "ORE":(34,20), "STAN":(41,38), "CAL":(19,13), "COLO":(31,7),
            "ARIZ":(69,28), "WASH":(15,28), "ISU":(28,26)},
    2019: {"NMSU":(58,7),  "UNCO":(59,17), "HOU":(31,24), "UCLA":(63,67), "UTAH":(13,38),
             "ASU":(34,38), "COLO":(41,10), "ORE":(35,37),  "CAL":(20,33), "STAN":(49,22),
            "ORST":(54,53), "WASH":(13,31), "AFA":(21,31) },
    2020: {"ORST":(38,28),  "ORE":(29,43), "USC":(13,38), "UTAH":(28,45)},
    2021: { "USU":(23,26), "PORT ST.":(44,24), "USC":(14,45), "UTAH":(13,24), "CAL":(21,6),
            "ORST":(31,24), "STAN":(34,31), "BYU":(19,21),  "ASU":(34,21), "ORE":(24,38),
            "ARIZ":(44,18), "WASH":(40,13), "CMU":(21,24)} }
```

(a) game_scores

Write a Python function `game_scores` that takes the game list (similar to `wsu_games` above) and an opponent team name (e.g., "USC") as input and returns the list of the game scores that WSU played against the given opponent team.

Examples:

```
> game_scores(wsu_games,"USC")
[(36, 39), (13, 38), (14, 45)]
> game_scores(wsu_games,"ORST")
[(54,53),(38,28),(31,24)]
> game_scores(wsu_games,"YALE")
[ ]
```

(b) wins_by_year

Assume you would like to find the number of games WSU won each year. Write a function "wins_by_year" that takes the WSU game data as input, and it returns a list of tuples where each tuple includes the year and the number wins (of WSU team) in that year.

Example:

```
> wins_by_year(wsu_games)
[(2018, 11), (2019, 6), (2020, 1), (2021, 7)]
```