Programming Fundamentals Using Python

2018

Problem Set 15

Most recent updated: July 18, 2018

Objectives

1. Files I/O
2. Exception

Note: Solve the programming problems listed using your favorite text editor. Make sure you save your programs in files with suitably chosen names, **and try as much as possible to write your code with good style (see the style guide for python code)**. In each problem find out a way to test the correctness of your program. After writing each program, test it, debug it if the program is incorrect, correct it, and repeat this process until you have a fully working program. Show your working program to one of the cohort instructors.

Problems: Cohort sessions

1. *File I/O* Write a function called `get_nodes(fid)` which takes in a file object as its input arguments and outputs a list of tuples. Each tuple shows a friend connection between two users and each user is represented by an integer. A sample of the text file can be seen below:

```
#extract of book1.txt
0   1
0   2
0   3
1   48
1   53
```

The first three lines of the above text file means that user 0 is a friend of user 1, 2, and 3. The last two lines means that user 1 is a friend of user 48 and 53.

```
Test code:
f=open( book1.txt , r )
result=get_nodes(f)
print result
```

Expected output:

```
[(0,1),(0,2),(0,3),(1,48),(1,53)]
```

2. *File I/O* Write a function `read_stations(f)`: This function takes in a file object and returns a dictionary. The dictionary has the MRT lines as its keys. The value of each key is a list of stations in that MRT line. A sample text input is shown below.

```
-- start of the shorter text file --
=EastWestLine (EW)=
Pasir Ris, Tampines, Simei, Tanah Merah, Bedok, Kembangan, Eunos,
    Paya Lebar, Aljuned, Kallang, Lavender, Bugis, City Hall, Raffles
     Place, Tanjong Pagar, Outram Park, Tiong Bahru, Redhill,
    Queenstown, Commonwealth, Buona Vista, Dover, Clementi, Jurong
    East, Chinese Garden, Lakeside, Boon Lay, Pioneer, Joo Koon, Gul
    Circle, Tuas Crescent, Tuas West Road, Tuas Link
=EastWestLine (CG)=
Tanah Merah, Expo, Changi Airport
=NorthSouthLine=
Jurong East, Bukit Batok, Bukit Gombak, Choa Chu Kang, Yew Tee,
    Kranji, Marsiling, Woodlands, Admiralty, Sembawang, Canberra,
    Yishun, Khatib, Yio Chu Kang, Ang Mo Kio, Bishan, Braddell, Toa
    Payoh, Novena, Newton, Orchard, Somerset, Dhoby Ghaut, City Hall,
     Raffles Place, Marina Bay, Marina South Pier
-- end of text file
```

The output of the function returns a dictionary as follows:

```
{'EastWestLine (EW)': ['Pasir Ris', 'Tampines', 'Simei', 'Tanah
    Merah', 'Bedok', 'Kembangan', 'Eunos', 'Paya Lebar', 'Aljuned', '
    Kallang', 'Lavender', 'Bugis', 'City Hall', 'Raffles Place', '
    Tanjong Pagar', 'Outram Park', 'Tion Bahru', 'Redhill', '
    Queenstown', 'Commonwealth', 'Buona Vista', 'Dover', 'Clementi',
    'Jurong East', 'Chinese Garden', 'Lakeside', 'Boon Lay', 'Pioneer
    ', 'Joo Koon', 'Gul Circle', 'Tuas Crescent', 'Tuas West Road', '
    Tuas Link'],
```

```
'NorthSouthLine': ['Jurong East', 'Bukit Batok', 'Bukit Gombak', '
    Choa Chu Kang', 'Yew Tee', 'Kranji', 'Marsiling', 'Woodlands', '
    Admiralty', 'Sembawang', 'Canberra', 'Yishun', 'Khatib', 'Yio Chu
     Kang', 'Ang Mo Kio', 'Bishan', 'Braddell', 'Toa Payoh', 'Novena'
    , 'Newton', 'Orchard', 'Somerset', 'Dhoby Ghaut', 'City Hall', '
    Raffles Place', 'Marina Bay', 'Marina South Pier']}
Hint: Notice that the station names have no leading or trailing
    white spaces and you need to use the str.strip() method to ensure
     this.
```

3. *Exception* Modify your code for `get_nodes(fid)` to handle exception if there is non-readable node id.

4. *Exception* Modify your code for `read_stations(fid)` to raise an exception if there are non-letters in the station name.

5. *Raising Exception*

End of Problem Set 15.