Camp Posanivee (45 points)

Due Wednesday, 6 December 2017

The director of Camp Posanivee is quite frustrated. Campers are enrolling and withdrawing more quickly than her Excel Spreadsheet can handle, and /the lunch line is always a mess, with campers cutting in line and preventing an orderly meal. She has hired you to solve these problems, and you have been offered free meals at the mess hall for your work.

Your program will use a binary search tree (BST) to maintain the set of campers currently enrolled, and a Queue to keep track of the lunch line. Your program should not be case sensitive.

Your program must implement the following commands, given below. It should provide a command line utility to manually enter commands, as well as a function to Read commands from a text file. Furthermore, you must implement a Write function, which will write the currently enrolled campers to the specified text file, in a preorder listing. Note that this function must write the text file in a way that can later be read by the Read command.

For the lunch line queue, the time is given in minutes past opening, not absolute time. For example, "3" would represent 3 minutes after opening, not 3:00 PM.

You may work in groups of 2 for this project. You only need to turn in 1 copy of your code, but make sure that it includes everyone's names in the comments.

Commands

- H — Help: print a list of the available commands.
- R *file* — Read: specify a text file to read commands from. Inform the user if the given file does not exist.
- W *file* — Write: specify a text file to write the currently enrolled campers to, in a format that can then be read using the Read command (preorder listing).
- Q — Quit: a sentinel event indicating the end of the input file.
- E *name age gender* — Enroll a new camper with the given attributes.
- D *name* — Drop: withdraw the specified camper.
- A — Print the average age of all the campers.
- L *name* — List: print the attributes of the specified camper.
- G — Gender: print the number of male and female campers.

- P *order* — Print all the currently enrolled campers with the specified order (pre, in, post).
- A *time number name* — Arrival: the named party with the specified number of people has arrived in the mess hall at the specified time, to wait for their table.
- T *time* — A table is open for the party which is first in the queue, at the specified time.
- C — Close: the mess hall is no longer serving food after this command is read.

Note that there are two commands that can be activated by "A". Your program will need to tell the difference between the one without arguments and the one with three arguments. Furthermore, you may assume that any name given is either a single word or is surrounded by quotation marks, if it is multiple words (first name and a last name).

After reading in a "C", your program must also print the average wait-time for the mess hall, and list any parties that were not seated before closing time.

Extra Credit

- (5 pts) Modify the Arrival command to accept an optional fourth argument, "bribe". By bribing the lunch staff, a party is able to cut in line before anyone with a bribe of lesser value. If no "bribe" argument is given, it should default to 0. Negative bribes should not be accepted.

  NOTE this will involve modifying the code for Queue fairly significantly.

Hand-in and Notes

Remember to include comments at the top of your program and 1-2 lines for each function/method.

You are expected to use the Python Binary Search Tree and Queue code from class. You will not need to modify either of them, unless you do the extra credit, in which case you will have to modify the Queue code. Make sure to check special cases! Your program should not crash if you try to compute the average age with no campers enrolled, for example, and a file specified to be read in could contain another "read" command.

Remember that a Python Dictionary can return a function!

Start right away, and good luck!