Homework 2

100 Points

A Doubly Linked List of Rings

Using your favorite text editor, create a file which has names of national parks. A name of a national park is followed by an arbitrarily long list of computer names belonging to that park. The status of the computer is given immediately after the name: 1 means the computer is functioning ("up") and 0 means it is "down". The data in the input file is given on the last page. Here is an example:

```
Lasen Volcanic
Zelda 0 Flux 1 Hydra 0 Willow 1 Swift 1#
```

The program will build a sorted doubly-linked list of national park names. For each node in this list the program will build a doubly-linked ring of computer names and their status. The order of the computer names determines the order of computers in the ring network. The last computer is joined to the first. After all list and rings construction, the program will

1). Display of all park names in ascending order (A to Z).
2). Display of all park names in descending order (Z to A). This time include the computers they contain, including their status.
3). Repeatedly prompt the user for a park name and a computer name (until the user says "quit")
4). If the park and computer names exist, the program will return the nearest "up" computer to the left and right of the user-supplied computer.
5). If the user-supplied park and computer names do not exist, the program will display appropriate error messages.
6). If the computer has none or only one "up" neighbor, this fact should also be reported.

Extra Credit: A more challenging assignment – use programmer-controlled memory management.

Run the program once and save the output at the end of the source file as a comment. Compress the source files, input and output files (if any) and upload the compressed file: 26B_LastName_FirstName_H2.zip

NOTE: For all homework assignments assume the input file is valid. When reading data from a file, we assume data have been validated, therefore we may consider that the file is valid and correctly formatted. When reading data from the keyboard extensive validation is required.

Grading

1. Reading from file and build list and rings – 30
2. Display (A to Z) – 10
3. Display all (Z to A) – 30
4. Search – 30

CIS 26B
Advanced C
Programming Assignments

Additional specifications and requirements:

1. Use as default file name **`comprings.txt`**. Allow the user to enter the input file's name or use the default name (reuse code from homework #1).
2. Park name's size: 31; could be two or more words (letters only)
3. Computer name's size: 21; it is always one word (lowercase letters only)
4. Test your program using at least the following data:
   a. park name: **`Lasen Volcanic`** computer name: **`willow`** // found
   b. park name: **`Devils Postpile`** computer name: **`mercury`** // found
   c. park name: **`Redwood`** computer name: **`citadel`** // found
   d. park name: **`Death Valley`** computer name: **`dante`** // found
   e. park name: **`Point Reyes`** computer name: **`venus`** // found
   f. park name: **`Pinnacles`** computer name: **`mouse`**
      // park name found, computer name not found
   g. park name: **`Cupertino`** computer name: **`amethyst`**
      // park name not found
   h. park name: **`lasen volcanic`** computer name: **`Willow`** // found
   i. park name: **`BIG SUR`** computer name: **`rogue 123 tiger`**
      // found (read roque and discard the rest of the line)
   j. park name: **`BIG 123`** computer name: **`rogue`**
      // invalid: park name should not include digits
   k. park name: **`BIG SUR`** computer name: **`rogue007`**
      // invalid: computer name should not include digits

```
Lasen Volcanic
zelda 1 flux 1 hydra 1 willow 1 swift 1 aeon 1 neptune 1#
Devils Postpile
minotaur 1 enigma 1 ezra 0 nero 0 reflect 1 canary 1 thor 0 switch 0
mercury 1 loki 1#
Redwood
turbo 0 voyager 1 crypto 1 magnus 0 nero 0 galileo 0 citadel 1 odin 0
proton 0#
Death Valley
neo 0 thebe 0 titus 0 telescope 1 mosaic 0 zabrinski 0 dante 1 chaos 0
ego 0 vortex 0#
Big Basin
hamlet 0 river 1 moose 0 blaze 0 pluto 1 felix 0 genesis 0 amethyst 1#
Yosemite
caligula 1 theorem 1 star 1 catalyst 0 pixel 0 quantum 1 spock 0 son 0#
Big Sur
fusion 1 puma 0 tiger 0 lion 1 rogue 1 aurora 0 link 0#
Point Reyes
amber 0 zion 0 brice 0 oberon 0 cypher 0 venus 1 saturn 0 luna 0 merlin
0 mars 0#
Joshua Tree
golem 0 pyro 0 unity 0 tardis 0 hawk 0 pluto 0#
Kings Canyon
animus 1 xena 0 santiago 1 hex 0 laplace 1 mario 0#
Pinnacles
eniac 0 khan 1 hal 1 box 0 gizmo 1#
```