

## CSE 2010, HW3

Due Tue Oct 8 at the start of your lab section; Submit Server: class = cse2010, assignment = hw3SxIndividual

Due Tue Oct 8 at the end of your lab section; Submit Server: class = cse2010, assignment = hw3SxGroupHelp  
*x* is 2, 3—your section number (or j for java).

Many entities, such as hurricanes, can be organized in a hierarchy. How would you design a system that stores the hierarchy and allow queries on the hierarchy?

The goal of HW3 is to build a tree from categories of hurricanes and answer queries on the tree. Your submission has a Tree class that has a linked structure of tree nodes and supports (at least) the following operations:

- addChild(parentNode, childNode) // to maintain alphabetical/lexicographical order of the children
- getChildren(node)
- getParent(node)

For each node, you may not assume it has a fixed or maximum number of children.

**Input:** Input is from the command-line arguments for hw3.c (HW3.java) in this order:

1. filename of the data—the first line has the top category, followed by its sub-categories; each of the following lines has a category, followed by its sub-categories.
2. filename of queries, each line has one of the following queries:
  - GetNamesByCategory *category*
  - GetNamesByState *state*
  - GetNamesByCategoryAndState *category state*
  - GetNamesWithMultipleStates
  - GetNamesWithMultipleCategories
  - GetCategory *name*
  - GetState *name*

You may assume each query is valid (*name*, *category*, and *state* exist in the data), but some queries do not have results. Sample input files are on the course website.

**Output:** Output goes to the standard output (screen), each line has an answer with the corresponding query:

- GetNamesByCategory *category name1 name2 ...*
- GetNamesByState *state name1 name2 ...*
- GetNamesByCategoryAndState *category state name1 name2 ...*
- GetNamesWithMultipleStates *name1 name2 ...*
- GetNamesWithMultipleCategories *name1 name2 ...*
- GetCategory *name category1 ...*
- GetState *name state1 ...*

Note that a hurricane can create hurricane conditions in more than one state in different categories, so GetState/GetCategory might have more than one state/category and getNames should not have duplicates. All results should be alphabetically/lexicographically ordered. Report “none” if there are no results.

**Submission:** Submit hw3.c (HW3.java) that has the main method, and other program files. Submissions for Individual and GroupHelp have the same guidelines as HW1.

Note the late penalty on the syllabus if you submit after the due date and time as specified at the top of the assignment.