**CS 209 Spring 2018**

**Week Seven/Eight Lesson Outline**

**Set and Map Tracing**

**Recall**

**Interface Set**

**Set** interfaces, subinterface **SortedSet**

Implementing classes: HashSet and TreeSet

(The internal structure of a TreeSet is a red-black tree)

**Interface Map**

**Map** interfaces (NOT a collection), subinterface **SortedMap**

Initialization of objects of map type

(Details in Note 5)

**Set Tracing Example**

The list object yodaList consists of words

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A client program has following code.

**TreeSet<String> yodaSet = new TreeSet<String>(yodaList);**

**System.out.println(“size is ” + yodaSet.size());**

**for (String x : yodaSet) System.out.println(x);**

**Collections.reverse(yodaList);**

**String word = “”;**

**for (String y : yodaList) word = word + y;**

**Set<String> singleLetter = new HashSet<String>();**

**for (int i; i < word.length(); i++)**

**singleLetter.add(word.substring(i, i+1);**

**System.out.println(“number of letters are ”**

**+ singleletter.size());**

**for (String z : singleLetter) System.out.print(z);**

What is the content of these data structures after this is done? What are the output results? What is the value of **word**?

**Map Tracing Example**

The list object wList consists of words (of single letters)

G, O, O, D, B, Y, E, B, A, B, Y

Given code,

**Set<String> wSet = new HashSet<String>(wList);**

**Map<Integer, String> iMap = new HashMap<Integer, String>();**

**for (int k=0; k < 11; k++)**

**iMap.put(k\*100, wList.get(k));**

**for (String s : wSet)**

**System.out.println(s + iMap.get(500));**

What are the final content of data structures involved? What is the output?

**HW6**

1. Initialize objects

a) a HashMap object, stMap, that the key set is a set of String objects and the value set is a set of Student objects.

b) a TreeMap object, cardValue, that the key set is a set of Card objects and the value set is a set of Integer objects.

2. True or false?

a) The key set of a TreeMap object is sorted.

b) The key set of a HashMap object is sorted.

c) The value set of a HashMap object cannot have duplicated elements.

3.(Optional) What is the correct way to make a new List object that contains all elements of values of stMap of #1, duplicates allowed (to reflect multiple mappings)?

**LAB 4**

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**Parsing Large Text File, Creating a Map**

File input and output is used to handle large sets. Knowledge of processing string object can be learned from the sample codes and API documents.

1. Download and unzip the file **weather\_report.txt**. You may want to shorten the name for your coding continence. This will be your input file.

2. Your first task is to print out ONLY the list of locations of this weather report, without duplication.

3. Your second task is to print out the pairs of location and the temperature. The list should be in order of a pair of lowest temperature comes first. Note: The temperature readings are two digits, characters at index 25 and 26.

4. Your third task is to find all locations (no duplicate) of condition Sunny. Note: The condition values start from index 15. The list should be in location’s alphabetical order.

**Instruction**: While task 1 can be done using a simple data structure of String objects, task 2 and 3 are best done by using a customized class containing three pieces information: location, condition, and temperature.