CS 314 EXAM ONE REVIEW — MAPS SHORT ANSWER

1. What is output by the method a?

   \{1=RAT, 2=FOX, 3=DOG, 4=CAT\}

2. What is output by the method b?

   null

3. What is output by the method c?

   \{1=4, 2=5, 3=8, 5=6\}

4. In what situations would we want to use a TreeMap instead of a HashMap?

   TreeMaps are best suited for when we want to have our keys in sorted order. (Or words to that effect) For example, in a dictionary where we map words to a definition, it may be very useful to keep the words in alphabetical order like in a real dictionary.

5. Why would want to use a HashMap instead of a TreeMap?

   HashMaps are faster than TreeMaps with O(1) operations as opposed to the TreeMap’s O(logN) operations.

6. Suppose I want a given key to map to multiple different values. Can I still use a map? If so, how? If not, what data structure should I use instead?

   You can still use a map, just map the keys to a list of values. For example, suppose we wanted to have a map which has English words as keys and their part of speech (noun, verb, etc.) as a value. Some words can have multiple parts of speec based on context, so we will store a list of these parts of speech.

   ```java
   TreeMap<String, ArrayList<String>> partsOfSpeech = new TreeMap<>();
   String word1 = "run";
   ArrayList<String> word1List = new ArrayList<>();
   word1List.add("VERB");
   word1List.add("NOUN");
   partsOfSpeech.put(word1, word1List);
   ```

7. What is output by method d?

   3

8. Is the error in the second line of method e a Syntax or Runtime error?

   Syntax Error. Java will check types at compile time even if using generics.
9. Does this method have a Syntax or a Runtime error?
Runtime Error. Object casts are done at runtime and in this case, trying to cast an Object with dynamic type of String to an Integer will result in a ClassCastException.

10. What is output by the method g?

BLUE, BLACK

11. What is output by the method h?
Output unkown: cannot assume the order of keys with a HashMap.

12. What is output by the method i?

{B=6, C=7, E=5}