

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 $O(\log N)$ 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 speech based on context, so we will store a list of these parts of speech.

```
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 unknown: cannot assume the order of keys with a HashMap.

12. What is output by the method i?

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