

Project Stage 11: Second Bible Implementation

You must work *by yourself* on this stage. Implement *TreeMapBible*. This has the same functionality as *ArrayListBible* (since they both implement the *Bible* interface), but should be implemented using a *TreeMap* instead of an *ArrayList*. You won't make any changes to the application this time.

1. Implement all of the methods in *TreeMapBible*.
2. Obtain and run the Stage 11 tests.
3. Create **MyGrade_P11.txt** and fill in your actual time spent and expected grade and include a brief justification of your expected grade.
4. Submit *TreeMapBible.java* and **MyGrade_P11.txt** using Handin under assignment **235-P11**.
5. Grades will be based on the tests and your implementation of *TreeMapBible*.

Hints:

- Iterating over the elements of a **TreeMap** can be tricky the first time you see it. Here is one way to do it. If you have a **TreeMap<Reference,String> theVerses**, the following line gives you a set (**mySet**) that you can iterate over:


```
Set<Map.Entry<Reference,String>> mySet=theVerses.entrySet();
```
- Related to the previous hint, you should look at the API for **Map.Entry**. In particular, note that it has two methods you might need: **getKey()** and **getValue()**.
- You should really dig into the API for **TreeMaps**, **Sets**, etc. so you can better understand how to work with them and find out what they are capable of. Trust me—understanding the available methods on **TreeMap** will make your job much easier.
- The *getVersesExclusive* method is already implemented for you to give you an idea of how to use **TreeMaps** for the kinds of tasks you need to do on this assignment.
- Do not treat a **TreeMap** like an **ArrayList**. In particular, do not iterate over a **TreeMap** unless you really need to (because you HAVE TO look at every verse for some reason).
- If you are going to iterate over a **TreeMap** (again, this should be rare), iterate over the *entrySet* instead of the *keySet*. It is a lot more efficient. One of the hints above shows how to do this.
- The **get** method is your friend, so use it. Think of it as a search method.
- As you did (hopefully) in the **ArrayListBible**, you should use the methods **getReferences/Verses/Inclusive/Exclusive** in some of the other methods. Big hint: Some of the methods from **ArrayListBible** will be identical in **TreeMapBible** if you heed this advice. Thus, you can just copy some methods from there to here.