# Tutorial 7, Week 8 - Maps and Hashing

## 1 Before Your Tutorial

- Review the basic ideas of hashes and maps. Particularly the "division" has function, and "linear probing".

## 2 During Your Tutorial

- Complete the code for `SimpleStringHashMap.cpp`.

  - To begin with, use linear probing for collision handling.
  - Remember to use the two auxilliary vectors to keep track of what's been used so that linear probing actually works!

## 3 Extensions

- Implement a different (hopefully better) hash function.

- Implement a different collision handling technique. Quadratic probing will work with no structural changes, if you want to try a chaining technique, you will have to modify the internal data structures.

- Implement the commented out `resize()` method. This requires considering when to resize, and what to resize to; do you resize when the map is full, or earlier, and how much bigger should it be. If in doubt, do some research, and some experiments.

- Extend the hashmap to handle key-value pairs (with templates if you can). How will you handle hashing on unknown types? (Hint: extend the templates.)