Exercise – Hash Maps

Exercises:

1. Implement your own HashMap and Pair classes. Your HashMap class should contain a basic hashing function and correctly map data into an internal array. Your HashMap class will need the following functions:
    a. Hash a string of any length into an integer.
    b. Add a new value and key and store them in the internal array based on a hash of the key.
    c. Get a value using a specified key.
    d. Remove a value using a specified key.
    e. Clear the HashMap.

2. CHALLENGE: add extra functions:
    a. A way to iterate through the map.
    b. A way to get an array of all the keys in the map.

3. CHALLENGE:
    a. Find and implement a more reliable hash function.

4. CHALLENGE:
    a. Implement open addressing to deal with hash collisions.
    b. Large hash maps that use open addressing can slow down as the internal array fills up (if they don't immediately find the key, they have to keep searching until they find an empty index or get back to their starting point). To prevent this, implement dynamic resizing of the internal array so that it's never more than 70% full.