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CS215

Assignment 5.1

Part 1

1. Explain how a hash function is used.
   1. A hash function is used with a hash table to store and retrieve data items. The hash functions takes the search key and produces the integer index of an element in the hash table. The search key is mapped (or hashed) to the index.
2. How might a string hash function be written?
   1. The definition of the hash of a string s of length n is:
      1. Hash(s) = s[0] + s[1] x p + s[2] x p^2 + … + s[n-1] x p^(n-1) mod m
      2. P and m are chosen, constant numbers
3. Explain why we might choose to use a hash function rather than search for a key.
   1. A hash function enables efficient data retrieval in hash tables when working with large data sets. Functions or algorithms map object data to an integer value which allows the hash to narrow down searches when locating these items on that object data map. Hashing allows comparison of large amounts of data by just comparing the hashes rather than the complete data set.
4. What hash function does the Java Util HashMap use for hashing strings?
   1. Java **String hashCode()** method returns the hashcode for the String. The hashcode value is used in hashing-based collections like HashMap, HashTable etc. The hashCode() method must be overridden in every class that overrides [equals()](https://howtodoinjava.com/java/string/string-equals-method/) method to avoid any unpredicted behavior when used in hash-based collections.