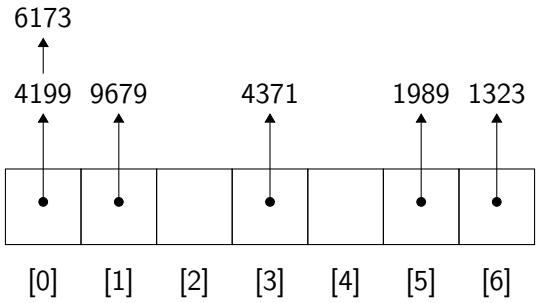
CS310 – Assignment 401 – Karl Ramberg

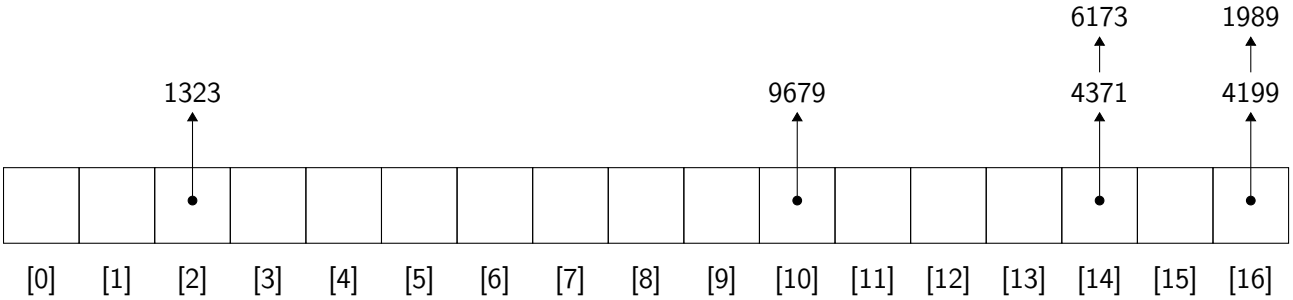
Problem 1: Given the input 4371, 1323, 6173, 4199, 9679, and 1989 for an initially empty hash table, and the hash function $h(x) = 6 - (x \bmod 7)$, draw the resulting hash table. State and explain any assumptions you make.

Answer:



Problem 2: Assuming conditions indicate a need to rehash, perform a rehash the hash table of problem 1, and show the hash table that results from the rehashing. Briefly explain your process and results.

Answer: To rehash we need to increase the table size to the next prime number more than twice the original size of 7, which is 17. This also means we need to change the hash function to reflect this size to $h(x) = 16 - (x \bmod 17)$.



Problem 4: State, explain, and justify the results you got from running the program in question 3. Be sure to explain what table size you used in your program, and why you chose that value, and what the load factor used by your program is.

Answer: I am using Solus Linux distro and when I ran `$ wc -w /usr/share/dict/words` I got a word count of $1,931,546$. For my program I used a table size of $2,000,000$. This means I have a load factor (α) of 0.965773 which is close to 1. The total number of collisions was $691,914$.