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CS 261

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HW 5 Part 3

1. Give an example of two words that would hash to the same value using `hash_function_1()` but would not by using `hash_function_2()`. Explain why this is the case.
The words “bad” and “dab” would produce the same value using `hash_function_1` and not in `hash_function_2` because the first function only adds the character values producing no effect when reversing a string. The second function includes the index of each character when generating the hash value producing a different value.
2. Why does the above observation make `hash_function_2()` superior to `hash_function_1()`?
`hash_function_2` must iterate with a smaller amount of links in each bucket giving it a better time complexity
3. When you run your program on the same input file once with `hash_function_1()` and once with `hash_function_2()`, is it possible for your `empty_bucket()` and `table_load()` functions to return different values? Why or why not?
With `table_load()` it is not possible to return different values because either the size or capacity of the table will vary and the number of buckets do not modify from each hash function.
With `empty_bucket()` it is possible to return different values because each hash function assigns input keys to different buckets resulting in a different number of unfilled buckets.
4. Is there any difference in the number of empty buckets when you change the table size from an even number like 1000 to a prime like 997?
Once we modify the size of the table the number of empty buckets is different. A prime number is able to distribute the links with different buckets.