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Assignment 5  
Data Structures 261

#1) Give an example of two words that would hash to the same value using `hash_function_1` but would not be using `hash_function_2`. Explain why this is the case.

Two words that would hash to the same value using `hash_function_1()` but would not using `hash_function_2()` are “part” and “trap”. Any two words that can be formed by rearranging the letters. Function 1 adds the values of the characters and function 2 adds the index of the characters.

#2) Why does the above observation make `hash_function_2` superior to `hash_function_1`?

`Hash_function_2()` is superior because of its constant time complexity  $O(1)$  and it maps its input to a single output.

#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?

Yes it is possible for the `empty_bucket()` function to return different values because `hash_function_1()` and `hash_function_2()` do different things with assigning the input values to different buckets. So there may be a variance in the amount of empty buckets. The `table_load()` will not return different values because there is an equal amount of links made with both `hash_function_1()` and `hash_function_2()`.