Journal Assignment

* What impact does a hashing algorithm have on performance?

Module 5 we learned about a data structure called hash tables and algorithms such as chaining and linear probing. Along with those we learned about how hash tables utilize several different functions (Perfect hash, Modulo Hash, Mid-Square Hash, Multiplicative Hash, and Direct hash functions) types for minimizing collisions, adjusting insert, searches, and remove actions. “Hashing as we know it is used for performance improvement, error checking, and authentication. One example of a performance improvement is the common hash table, which uses a hash function to index into the correct bucket in the hash table, followed by comparing each element in the bucket to find a match.” (USENIX, 2003). Implementing the functions and algorithms to a particular data set in order to access and delete when run in a program. For example, like chaining we have items appended to a bucket list versus a linear probe where we see the items updated by subsequent buckets until an empty one is found. The weaknesses I could identify from the ZyBooks chapter 5 reading are the fact that if there are too many collisions the hash is basically inefficient. There are things like null values aren’t allotted, there can be limited capacity in a hash table and eventually could be maxed out and filled, and not to mention it can be complex to implement. The strengths are that it provides a more secure and adjustable method retrieve data lists and arrays compared to other data structures.

* Beyond indexing data, what other uses might a hashing algorithm have?

Aside from indexing data hashing algorithms can be used for password storage, digital signatures, document management, and file management as stated in the Okta website. “Hashing algorithms can be used to [authenticate data](https://www.ibm.com/support/knowledgecenter/en/SSLTBW_2.1.0/com.ibm.zos.v2r1.csfb500/csfb5za212.htm). The writer uses a hash to secure the document when it's complete. The hash works a bit like a seal of approval.

A recipient can generate a hash and compare it to the original. If the two are equal, the data is considered genuine. If they don't match, the document has been changed.” (Okta, 2023) In security practices hashing can be used to store critical data in a scrambled state and are more difficult to retrieve.

**Resources:**

- Hashing algorithm overview: Types, methodologies & usage. (2023). The World’s #1 Identity Platform |

Okta. <https://www.okta.com/identity-101/hashing-algorithms/>

Traditional applications of hashing. (2003, June 16). USENIX | The Advanced Computing Systems

Association. Retrieved February 5, 2023,

from <https://www.usenix.org/legacy/publications/library/proceedings/hotos03/tech/full_papes/home/staff/alex/export/henson/henson_html/node3.html>

ZyBooks Chapter 5