**CMPUT 291 Project 2 Report**

**Omar Almokdad, Gemma Marcinkoski, Wai Yi Low**

Implementation Techniques

BTREE & HASH:

Both BTREE and HASH databases have similar response to the three different implementations: searching by key, searching by value, and searching by range with lower and upper limit. We set the program to encode the input and decode the output for all three different methods of searching.

Our first method, searching by key, generated the results by both databases is in average of 200 microseconds. This method took the shortest time among the three different methods and therefore showed as most efficient.

For the other two methods, searching by value and searching by range, generated results in average of over 100,000 microseconds. These two methods shown to taking over 5 times longer to get the data compare to the first method.

Although this has shown a significant differences for the results generated from the three different methods, the differences are not comparable to the INDEXFILE database structure. We will discuss this in the next section.

INDEXFILE:

Experimental Results

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | key | value | range | # of entries |
| b\_tree1 | 159 | 109851 | 114220 | 3776 |
| b\_tree2 | 338 | 103225 | 122203 | 3830 |
| b\_tree3 | 183 | 103806 | 109262 | 3900 |
| b\_tree4 | 269 | 112935 | 110991 | 3773 |
| b\_tree ave | 237.25 | 107454.3 | 114169 | 3819.75 |
|  |  |  |  |  |
|  | key | value | range | # of entries for range |
| hash1 | 183 | 119030 | 136416 | 3776 |
| hash2 | 177 | 121662 | 133407 | 3830 |
| hash3 | 180 | 122166 | 131969 | 3900 |
| hash4 | 314 | 128582 | 130380 | 3773 |
| hash ave | 213.5 | 122860 | 133043 | 3819.75 |
|  |  |  |  |  |
|  | key | value | range | # of entries |
| index1 | 204 | 196 | 12334 | 3776 |
| index2 | 308 | 195 | 11934 | 3830 |
| index3 | 193 | 323 | 13095 | 3900 |
| index4 | 314 | 200 | 11050 | 3773 |
| index ave | 254.75 | 228.5 | 12103.25 | 3819.75 |

Analysis

Hash was on average is the better choice for a single key find. However, B Tree has overwhelmingly faster times for both value and range retrieval because they both must iterate through the entirety of the database for each execution.