Report

Team member:

Pengchao Cai pxc190029

Jie Su jxs190058

Feng Mi fxm150930

Linqian Zhu lxz190009

hybrid approach one algorithm:

|  |  |  |  |
| --- | --- | --- | --- |
| Ranges | 500M | 500M | 500M |
| Preprocessing Time | 2034159 usec | 1180753 usec | 1265373 usec |
| Preprocessing Memory | 4387 MB | 4447 MB | 4431 MB |
| Query Time(for current range 10M) | 9008 usec. | 8576 usec | 6842 |
| Query Memory(for current range 10M) | 4388 MB | 4447 MB | 4431 MB |
| Query Time(for current range 100M) | 50946 usec | 30308 usec | 35525 usec |
| Query Memory(for current range 100M) | 4388 MB | 4447 MB | 4431 MB |
| Query Time(for current range 200M) | 93666 usec | 59759 usec | 61683 usec |
| Query Memory(for current range 200M) | 4388 MB | 4447 MB | 4431 MB |
| Query Time(for current range 400M) | 181475 usec | 120539 usec | 126766 usec |
| Query Memory(for current range 400M) | 4388 MB | 4447 MB | 4431 MB |

Fischer-Heun algorithm:

|  |  |  |  |
| --- | --- | --- | --- |
| Ranges | 500M | 500M | 500M |
| Preprocessing Time | 23646853 usec | 37187336 usec | 10896051 usec |
| Preprocessing Memory | 19568 MB | 20342 MB | 20520 MB |
| Query Time(for current range 10M) | 309756 usec | 9564 usec | 52101 usec |
| Query Memory(for current range 10M) | 19576 MB | 20342 MB | 20528 MB |
| Query Time(for current range 100M) | 456483 usec | 55310 usec | 174900 usec |
| Query Memory(for current range 100M) | 19576 MB | 20342 MB | 20528 MB |
| Query Time(for current range 200M) | 334636 usec | 111341 usec | 210400 usec |
| Query Memory(for current range 200M) | 19576 MB | 20378 MB | 20528 MB |
| Query Time(for current range 400M) | 593738 usec | 231069 usec | 333884 usec |
| Query Memory(for current range 400M) | 19576 MB | 20378 MB | 20528 MB |

Comparison:

hybrid approach one algorithm’s Preprocessing time p(n)=O(n), Query time q(n) = O(logn).

While, Fischer-Heun algorithm’s Preprocessing time p(n)=O(n), Query time q(n) = O(1).

However, Fischer overall takes more query time. This might because of the HashMap search time, since HybridOne has a block size of 29 and Fischer 7. HybridOne query time is not that much longer.

For each algorithm , overall the wider the query range is, the longer it takes. This is because Math.pow(2,k ) ,where k = log2(j - i + 1), takes more time.