Workflow diagram:

Diagram

Description automatically generated

Diagram

Description automatically generated

Simulation Env:

* OS: Windows 10 – 64 bit
* 8GB RAM, 2.27GHz
* Mingw64 GCC 11

Results:

Time is in micro seconds

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Data Struct | T1 | T2 | T3 | T avg | No. of nodes |
| Linear Search | 468997 | 468806 | 467992 | 468598 | 1 |
| H-Trie | 253999 | 245996 | 243385 | 247793 | 43 |
| H-BSTree | 116002 | 124242 | 116983 | 119075 | 20 |

Therefore, in terms of overall performance(time and memory) Hierarchical Binary search Tree works better.

Possible Extension:

* The binary tree as of now is not self balancing, that can be implemented.
* Additionally rules should be possible to change, such features can be added.