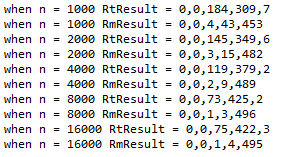
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CISC 235

Assignment 2

Data Analyze part



Run the program serval times and get similar result.

The tables of Rt and Rm as following.

Here is the Rt table:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| N | Rt<0.5 | 0.5≤Rt<0.75 | 0.75≤Rt≤1.25 | 1.25<Rt≤1.5 | Rt>1.5 |
| 1000 | 0% | 0% | 36.8% | 61.8% | 1.4% |
| 2000 | 0% | 0% | 29% | 69.8% | 1.2% |
| 4000 | 0% | 0% | 23.8% | 75.8% | 0.4% |
| 8000 | 0% | 0% | 14.6% | 85.0% | 0.4% |
| 16000 | 0% | 0% | 15% | 84.4% | 0.6% |

From the Rt table, we can conclude most of time Rt is between 1.25 and 1.5. So the Average Search time of Red-Black tree is better than simple Binary Search Tree in most of time.

And when n increase, the result group more tightly in range of 1.25 and 1.5.

Here is the Rm table:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| N | Rm<0.5 | 0.5≤Rm<0.75 | 0.75≤Rm≤1.25 | 1.25<Rm≤1.5 | Rm>1.5 |
| 1000 | 0% | 0% | 0.8% | 8.6% | 90.6% |
| 2000 | 0% | 0% | 0.6% | 3% | 96.4% |
| 4000 | 0% | 0% | 0.4% | 1.8% | 97.8% |
| 8000 | 0% | 0% | 0.2% | 0.6% | 99.2% |
| 16000 | 0% | 0% | 0.2% | 0.8% | 99% |

From the Rm table, we can conclude nearly all the time Rm is greater than 1.5, which means Red-Black Tree’s worst cases are always better than simple Binary Search Tree’s worst case. And when when n increase, the result group more tightly in range of 1.5 and higher.

Conclusion: The Red-Black Tree are superior to simple Binary Search Trees in both structure and worst-case-protect, the difference is more significant when n becomes greater.