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| Comparative Analysis of Hashing Technique | |
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| Summary This report presents a comparative analysis of three different hashing techniques—linear probing, chaining with linked lists, and chaining with Binary Search Trees (BST), AVL—applied to the hashing of prime, even, and odd numbers. The study aims to evaluate the performance of each technique in terms of search operations, collisions, and efficiency. Introduction: Hashing is a widely used technique for efficient data retrieval, particularly when dealing with large datasets. In this study, we explore and compare three hashing techniques using prime, even, and odd numbers as key inputs. Implementation:  * The code is written in C++ and includes separate implementations for prime, even, and odd numbers. * For each technique, the code measures the number of comparisons made during 100 search operations and tracks the total number of collisions.  Results and Analysis:  1. Linear Probing:  |  |  | | --- | --- | | Prime Numbers | Total Collisions: 10  Total Search 100 iteration: 101850  Average Searches per iteration: 1018 | | Even Numbers | Total Collisions: 3  Total Search 100 iteration: 123491  Average Searches per iteration: 1234.91 | | Odd Numbers | Total Collisions: 3  Total Search 100 iteration: 130280  Average Searches per iteration: 1302.8 | |
| 1. Chaining with Linked List  |  |  | | --- | --- | | Prime Numbers | Total Collisions: 24  Total Search 100 iteration: 47  Average Searches per iteration: 0.47 | | Even Numbers | Total Collisions: 0  Total Search 100 iteration: 65  Average Searches per iteration: 0.65 | | Odd Numbers | Total Collisions: 2  Total Search 100 iteration: 71  Average Searches per iteration: 0.71 |  1. Chaining with BST:  |  |  | | --- | --- | | Prime Numbers | Total Collisions: 8  Total Search 100 iteration: 34  Average Searches per iteration: 0.34 | | Even Numbers | Total Collisions: 2  Total Search 100 iteration: 11  Average Searches per iteration: 0.11 | | Odd Numbers | Total Collisions: 3  Total Search 100 iteration: 7  Average Searches per iteration: 0.07 |  1. Chaining with AVL:  |  |  | | --- | --- | | Prime Numbers | Total Collisions: 9  Total Search 100 iteration: 34  Average Searches per iteration: 0.34 | | Even Numbers | Total Collisions: 2  Total Search 100 iteration: 11  Average Searches per iteration: 0.11 | | Odd Numbers | Total Collisions: 3  Total Search 100 iteration: 7  Average Searches per iteration: 0.07 | |