Overview

This Java program implements a custom hash table with specified hash functions and collision resolution strategies. It is designed to handle non-uniform distributions of integer data, providing functionalities such as data insertion, searching, and hash table state display.

Features

- Reads and validates input data distribution.

- Determines hash table capacity and employs custom hash and probing functions.

- Inserts unique elements into the hash table from a specified file.

- Allows user interactions for searching and displaying hash table contents.

- Resets hash table for new data insertion with the same distribution.

Requirements

- Java Development Kit (JDK) - Java 11 or higher recommended.

Compilation and Execution

To compile and run the program, follow these steps:

1. Compile the Program:

javac CustomHashTable.java

1. Run the Program:

java CustomHashTable

Instructions

1. Input Data Distribution:

- At the start, input the number of lines $(L)$ for the data distribution.

- Enter each line of the distribution with 10 numbers (ratios or decimals).

2. Hash Table Capacity:

- Input the desired capacity of the hash table (between 1000 and 1024).

3. File Input:

- When prompted, enter the filename containing the test data.

- The file should contain integers separated by spaces, tabs, or newlines.

4. User Interactions:

- After data insertion, you can choose to print the hash table.

- You can search for specific elements in the hash table.

- To insert a new set of data, reset the table by entering a new filename.

5. Exit the Program:

- Enter 'Q' when prompted for a filename to quit the program.

Testing

- Ensure to test the program with different data distributions and file inputs.

- Verify the correctness of the hash function and collision resolution strategy.

- Check the program's response to invalid inputs and edge cases.

Notes

- This program does not include extensive error handling for simplicity.

- Adjustments might be necessary for handling larger datasets or specific requirements.