Lab Report – Week 9

CS2023 Data Structures and Algorithms
Dept. of Computer Science and Engineering, University of Moratuwa

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Section1

2.

```
PS C:\Users\thari\UoM-DSA-S2-Labs\Lab9> g++ -o bin\app.exe hashtable_basics.cpp
PS C:\Users\thari\UoM-DSA-S2-Labs\Lab9> ./bin/app.exe
0
Type command: 1
Enter user name: Tharindu
Enter password to be saved: 210472J
Type command: 4
[0]-->
[1]-->
[2]-->
[3]-->210472J
Type command:
```

3.

```
PS C:\Users\thari\UoM-DSA-S2-Labs\Lab9> ./bin/app.exe
0
Type command: 1
Enter user name: Tharindu
Enter password to be saved: 210472J
Type command: 4
[0]-->
[1]-->
[2]-->
[3]-->210472J
Type command: 1
Enter user name: Menuka
Enter password to be saved: asdasd
Type command: 1
Enter user name: Nimeth
Enter password to be saved: qwdsadqwss
Hash Collision. This user cannot be saved.
Type command: 1
Enter user name: Kauthuka
Enter password to be saved: asdwqwddqcc
Type command: 4
[0]-->
[1]-->asdasd
[2]-->asdwqwddqcc
[3]-->210472J
Type command:
```

4.

```
PS C:\Users\thari\UoM-DSA-S2-Labs\Lab9> ./bin/app.exe
0
Type command: 1
Enter user name: Tharindu
Enter password to be saved: 210472J
Type command: 4
[0]-->
[1]-->
[2]-->
[3]-->210472J
Type command: 1
Enter user name: Menuka
Enter password to be saved: asdasd
Type command: 1
Enter user name: Nimeth
Enter password to be saved: qwdsadqwss
Hash Collision. This user cannot be saved.
Type command: 1
Enter user name: Kauthuka
Enter password to be saved: asdwqwddqcc
Type command: 4
[0]-->
[1]-->asdasd
[2]-->asdwqwddqcc
[3]-->210472J
Type command: 2
Enter item to be deleted: Tharindu
User deleted
Type command: 4
[0]-->
[1]-->asdasd
[2]-->asdwqwddqcc
[3]-->
Type command: 
```

5.

Since there are only 4 buckets many hash collisions may occur. And they aren't handled in a meaningful way in this simple implementation. There are several techniques to handle collisions:

Separate Chaining: In this technique, each slot in the hash table contains a linked list of items that have the same hash code. When a collision occurs, the new item is added to the end of the linked list at the corresponding slot.

Open Addressing: In this technique, when a collision occurs, a different slot in the hash table is chosen based on a predetermined algorithm. The most common open addressing algorithms are linear probing and quadratic probing.

Double Hashing: This technique involves using a second hash function to determine the next slot to try when a collision occurs. The second hash function is computed using the original key and is used to compute a step size to jump to the next slot.

Section2

2.

```
PS C:\Users\thari\UoM-DSA-S2-Labs\Lab9> g++ -o bin\app.exe .\hashtable_with_chaining.cpp
PS C:\Users\thari\UoM-DSA-S2-Labs\Lab9> ./bin/app.exe
0
Type command: 1
Enter user name: Tharindu
Enter password to be saved: 210472J
Type command: 1
Enter user name: udnirahT
Enter password to be saved: J274012
Type command: 3
[0]-->[]
[1]-->[]
[2]-->[]
[3]-->[Tharindu, udnirahT, ]
Type command:
```

3.

```
PS C:\Users\thari\UoM-DSA-S2-Labs\Lab9> g++ -o bin\app.exe .\hashtable_with_chaining.cpp
PS C:\Users\thari\UoM-DSA-S2-Labs\Lab9> ./bin/app.exe
0
Type command: 1
Enter user name: Tharindu
Enter password to be saved: 210472J
Type command: 1
Enter user name: udnirahT
Enter password to be saved: J274012
Type command: 3
[0]-->[]
[1]-->[]
[2]-->[]
[3]-->[Tharindu, udnirahT, ]
Type command: 1
Enter user name: Nimeth
Enter password to be saved: qwdsdwqd
Type command: 1
Enter user name: Kauthuka
Enter password to be saved: ssoihdf
Type command: 1
Enter user name: Ravindu
Enter password to be saved: e23ed2w
Type command: 3
[0]-->[]
[1]-->[Nimeth, Ravindu, ]
[2]-->[Kauthuka, ]
[3]-->[Tharindu, udnirahT, ]
Type command:
```

GitHub Link : Tharindu6516/UoM-DSA-S2-Labs (github.com)