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Hash Tables Assignment 4 Report

Hash Function

I chose age as the key in both classes because simple integers are easier to manipulate. The function takes the remainder of the age and the size of the insertions.

Hash Table using Linked List VS. Dynamic Array

Generally, I think hashing using linear probing is more efficient because it's locally referenced, and there is no need for new allocations. In addition, it’s faster because it is a single data structure instead of a separate list.

Hash Table Using Lists

```
Hash Table Using Linked List:
~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Name: Mina
Age: 30
Salary: 10000
Years of Experience: 4
==============================
Name: Yara
Age: 19
Salary: 2000
Years of Experience: 0
==============================
Name: Abdallah
Age: 29
Salary: 7000
Years of Experience: 4
==============================
Name: Mariam
Age: 32
Salary: 8000
Years of Experience: 2
==============================
Name: Roshdy
Age: 28
Salary: 9000
Years of Experience: 3
==============================
Name: Fawzy
Age: 45
Salary: 5000
Years of Experience: 8
==============================
Name: Aya
Age: 26
Salary: 6000
Years of Experience: 3
==============================
Name: Ayman
Age: 33
Salary: 4000
Years of Experience: 8
==============================
Collision rate is: 0%
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
```

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Hash Table using dynamic arrays

```
Hash Table Using Dynamic Array
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Name: Fawzy
Age: 45
Salary: 5000
Years of Experience: 8
==============================
Name: Yara
Age: 19
Salary: 2000
Years of Experience: 0
==============================
Name: Roshdy
Age: 28
Salary: 9000
Years of Experience: 3
==============================
Name: Mina
Age: 30
Salary: 10000
Years of Experience: 4
==============================
Name: Abdallah
Age: 29
Salary: 7000
Years of Experience: 4
==============================
Name: Mariam
Age: 32
Salary: 8000
Years of Experience: 2
==============================
Name: Ayman
Age: 33
Salary: 4000
Years of Experience: 8
==============================
Name: Fatma
Age: 21
Salary: 3000
Years of Experience: 1
==============================
Name: Aya
Age: 26
Salary: 6000
Years of Experience: 3
==============================
Collision rate is: 0%
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
```

References

- Hashtable code on blackboard
- https://discuss.codecademy.com/t/what-are-some-advantages-of-linear-probing-over-separate-chaining/370071
- https://www.youtube.com/watch?v=Rp3KxUdV09Y&t=361s (From TA Helaly)
- https://stackoverflow.com/questions/23821764/why-do-we-use-linear-probing-in-hash-tables-when-there-is-separate-chaining-link