Faculty of Mathematical Economics

Data Structures and Algorithms

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DSEB Class of 2021 - 2024

Homework Assignment Week 11

Topic: Hash Tables
Date Created: April 15, 2023

Problem 1: Separate Chaining method

a. Implement a Hashing class with Separate Chaining method:

```
class Node:
    def __init__(self, data, next = None):
        self.data = data
        self.next = next

    def __repr__(self):
        return str(self.data)

class SepChainHash:
    def __init__(self, size):
        pass

    def hash(self, key):
        pass

    def add(self, key, val):
        pass

    def __getitem__(self, key):
        pass

    def delete(self, key):
        pass

    def __repr__(self):
        pass
```

b. Check your implementation by performing these tasks:

- Create a `SepChainHash` object with size 5 and add these items into the hash table:

```
(6, 'a'), (1, 'b'), (12, 'h'), (10, 'r'), (6, 'p'), (4, 's'), (2, '
    n')
```

- Get the items with key 9 and 4.
- Delete the item with key 6.

Note: You should display the chain after each step to check the result.

Problem 2: Linear Probing method

a. Implement a Hashing class with Linear Probing method:

```
class LinProbHash:
    def __init__(self, size):
        pass

    def hash(self, key):
        pass

    def add(self, key, val):
        pass

    def __getitem__(self, key):
        pass

    def delete(self, key):
        pass

    def __repr__(self):
        pass
```

b. Check your implementation by performing these tasks:

- Create a `LinProbHash` object with size 8 and add these items into the hash table:

```
(6, 's'), (3, 'd'), (11, 'a'), (19, 'p'), (8, 'd'), (14, 'q'), (21, 'j')
```

- Delete the items with key 11 and 3.
- Add these items:

```
(16, 'l'), (0, 'o'), (9, 'a')
```

- Delete item with key 8

Note: You should display the chain after each step to check the result.

Guidelines for submission

- Your submission must be under the `.ipynb` format.
- Your submission will be graded and it is likely that homework grade will contribute as a component in your GPA.
- If your submission is later than the due date without special consideration approval, you will receive a penalty on your mark.