Basic Linked List Operations

This lesson lists the various operations that can be performed on linked lists

We'll cover the following

The primary operations which are generally a part of the `LinkedList` class are listed below:

- `get_head()` - returns the head of the list
- `insert_at_tail(data)` - inserts an element at the end of the linked list
- `insert_at_head(data)` - inserts an element at the start/head of the linked list
- `delete(data)` - deletes an element with your specified value from the linked list
- `delete_at_head()` - deletes the first element of the list
- `search(data)` - searches for an element with the specified value in the linked list
- `is_empty()` - returns true if the linked list is empty

If you observe the list of functions mentioned above, `get_he` ar `is_empty()` are helper functions that will prove useful in all the others.

So let's define them first.

get_head()#

This method simply returns the head node of our linked list:

LinkedList.py

Node.py

```
from Node import Node


class LinkedList:
    def __init__(self):
        self.head_node = None

    def get_head(self):
        return self.head_node


lst = LinkedList()  # Linked List created
print(lst.get_head())  # Returns None since headNode does not contain

```

Time complexity

The time complexity for `get_head()` is O(1) as we simply return the `head` .

is_empty()

The basic condition for our list to be considered empty is that there are no nodes in the list. This implies that head points to `None`.

With that in mind, let's write down the simple implementation for `is_empty()`:

LinkedList.py

Node.py

```
from Node import Node


class LinkedList:
    def __init__(self):
        self.head_node = None

    def get_head(self):
        return self.head_node

    def is_empty(self):
        if self.head_node is None:  # Check whether the head is None
            return True
        else:
            return False


lst = LinkedList()  # Linked List created
print(lst.is_empty())  # Returns true
```

Explanation

Nothing tricky going on here. The crux of the code lies in the `if` condition on **line 12**. We merely check if the `head` points to `None`.

> Note: Even when a linked list is empty, the `head` must alw is

Time complexity

It will be in O(1) as all we need to do is check whether the `head` node points to `None` or not.

This is just the tip of the iceberg. We'll tackle each of the remaining methods in the following lessons and apply them in relevant problems.

In the next lesson, we'll begin our discussion on linked list insertion functions.

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