Doubly Linked List ✔✔✔ ☺

This assignment **closed** December 1, 2024 at 23:15.

In this assignment we will implement the lecture version of a doubly linked list.

Assignments

1. Implement all necessary methods for `DoublyLinkedNode`. You decide what you need and how you use it, we only test `DoublyLinkedList`.
2. Implement the following methods for `DoublyLinkedList`. The functionality was discussed during the lecture.

   a. `__len__(self) -> int` that returns the length of the list.

   b. `is_empty(self) -> bool` that returns `True` if and only if the list does not contain any items. `False` otherwise.

   c. `add_first(self, item: int) -> None` that pushes an item in front of the list.

   d. `get_first(self) -> int | None` that returns the item in front of the list. `None` if there exists no such item.

   e. `remove_first(self) -> int | None` that removes the item in front of the list and returns it. It returns `None` and does nothing if such item does not exist.

   f. `add_last(self, item: int) -> None` that pushes an item to the end of the list.

   g. `get_last(self) -> int | None` that returns the item at the end of the list. `None` if there exists no such item.

   h. `remove_last(self) -> int | None` that removes the item at the end of the list and returns it. It returns `None` and does nothing if such an item does not exist.

   i. `at(self, i: int) -> int` that returns the item stored at the `i` th node. It should raise an error, if `i` is larger than `len(self)-1` (i.e. the indexed element does not exist). Note that the `_head` and `_tail` nodes do not belong to the list's items.
3. Test your `DoublyLinkedList` using the script.

Hint

- The `DoublyLinkedList` should always contain a dummy node at the `_head` and the `_tail`. These should not contain any items.
- Implement a `__str__` and/or `__repr__` method if necessary.
- If you also implement the `__getitem__(self, i: int)` function, you can actually enable your own implementation to react properly to array-like indexing!

Template files

Get all files in an archive templates.zip or templates.tgz.

`doubly_linked_list.py`

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