Challenge 12: Union & Intersection of Linked Lists

Let's try and implement the union and intersection on two linked lists.

We'll cover the following

Problem Statement

Union and **intersection** are two of the most popular operations which can be performed on data sets. Now, you will be implementing them for linked lists! Let's take a look at their definitions:

Union

> Given two lists, **A** and **B**, the union is the list that contains elements or objects that belong to either **A**, **B**, or to both.

Intersection

> Given two lists, **A** and **B**, the intersection is the largest list which contains all the elements that are common to both the sets.

The `union` function will take two linked lists and return their union.

The `intersection` function will return all the elements that are common between two linked lists.

You have already seen this challenge previously in chapter 3 (https://www.educative.io/courses/data-structures-in-python-an-interview-refresher/3j6jX9GyZz4) of this course. Here you would use HashTables for a more efficient solution.

Input

Two linked lists.

Output

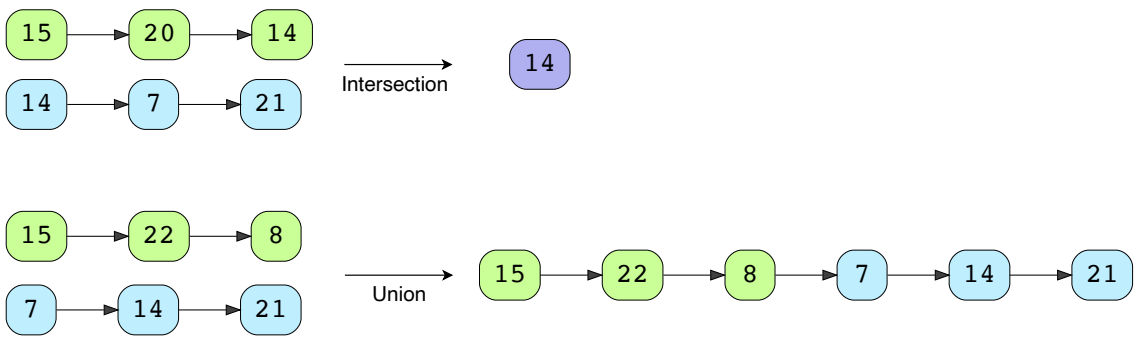
- A list containing the union of the two lists.
- A list containing the intersection of the two lists.

Sample Input

```
list1 = 10->20->80->60
list2 = 15->20->30->60->45
```

Sample Output

```
union = 10->20->80->60->15->30->45
intersection = 20->60
```



Coding Exercise

Design a step-by-step algorithm for the problem before jumping on to the implementation.

We are assuming that `union` and `intersection` will remove duplicates. For this reason, the `remove_duplicates` method has been provided to you as a member function of the `LinkedList` class. A more efficient version of the `remove_duplicates` method is available which we implemented in the previous lesson.

If you get stuck, you can always refer to the solution provided in the solution section.

Good luck!

main.py

LinkedList.py

Node.py

```
from LinkedList import LinkedList
from Node import Node
# Access head_node => list.get_head()
# Check if list is empty => list.is_empty()
# Delete at head => list.delete_at_head()
# Delete by value => list.delete(value)
# Search for element => list.search()
# Length of the list => list.length()
# Remove duplicates => list.remove_duplicates()
# Node class  {int data ; Node next_element;}

# Returns a list containing the union of list1 and list2


def union(list1, list2):
    # Write your code here

    return list1

# Returns a list containing the intersection of list1 and list


def intersection(list1, list2):
    # Write your code here

    return list1

```

Back

Solution Review: Remove Duplicates f...

Next

Solution Review: Union & Intersection ...

Mark as Completed