Lab 3

Multi Linked List

In this lab session, we will implement a data structure that can represent complex relationships between objects: Multi Linked List.

1 Tasks Arrangement

Given a list of relationships between tasks $x_1 \prec x_2$, $x_2 \prec x_3, \ldots$ represented in an input file. Implement a multi linked list to find a valid topological order such that for each relationship $x_i \prec x_j$, x_i appears before x_j in the output.

Constraints:

- The graph is directed and contains no self-loops.
- The number of relationships does not exceed 10^5.

Input:

- File `input.txt` contains relationships representing $x_1 \prec x_2$, $x_2 \prec x_3, \ldots$ in the format $(x_1, x_2), (x_2, x_3), \ldots$.
- Each x_i is a positive integer ($1 \leq x_i \leq 10^5$).
- The file has no whitespace and no duplicate relationships.

Output:

- Write the valid topological order to a file named `output.txt`, represented as a sequence of tasks separated by a single space.
- If topological sorting is not possible (e.g., due to a cycle), write `-1` to the file.

Example:

input.txt	output.txt
(1,2)(2,3)(1,4)	1 2 3 4
(4,3)(3,2)(2,1)	4 3 2 1
(1,2)(2,3)(3,1)	-1

Submission

Your source code must be contributed in the form of a compressed file and named your submission according to the format `StudentID.zip`. Here is a detail of the directory organization:

```
StudentID
└── Exercise_1.cpp
```

The end.