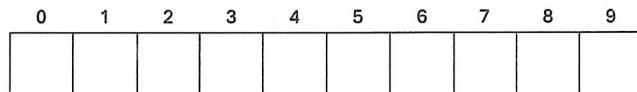


Student ID: 1131523

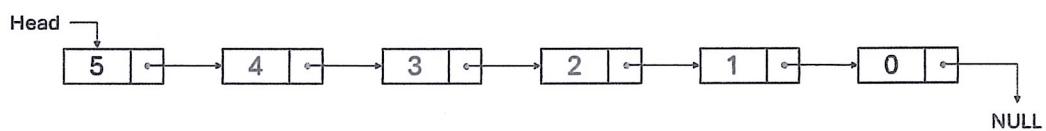
Student Name: 顏其昌

Data Structures: Visualization

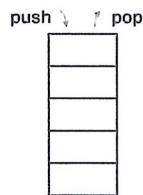
(1) Array



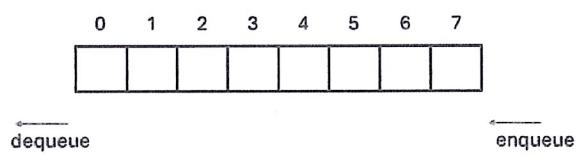
(2) Linked List



(3) Stack



(4) Queue



Q1: (30 pts; 10 pts for each) Describe the mechanism of the function

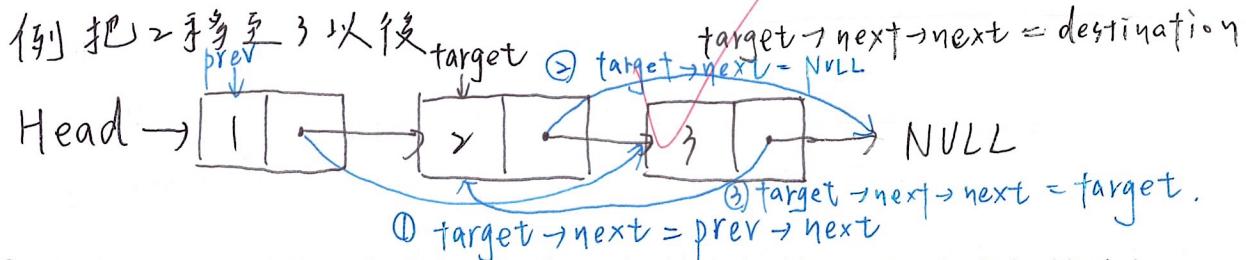
-10

MoveTo(node *head, node *target, node*destination)**A1:** Write a short paragraph explaining how the **MoveTo** function works (you may answer in English or Mandarin).

- ① Are there any **additional variables** required? If so, explain why they are necessary.

需要一個 **prev** 指標指向目標節點前的一個節點，用於斷開連結。

- ② Draw a visualization of the singly linked list to support your explanation.



- ③ Is there any **variation of a linked list** (e.g., doubly linked list or circular linked list) that can simplify or improve this operation?

在教授的 ppt 中有展現過使用 dummy 的方式，但我不認為有較簡潔
方式

使用 dummy node 簡化前面的 Head 操作，並避免邊界檢查

Q2: (40 pts, 10 pts for each) **Definition of Data Structures**

- 2

Define the following data structures and list their fundamental operations.

A2:

① Definition of "Stack"

像堆成一疊一樣，先被放入的資料會被堆在下面，後被放入的資料
會先能被取出（先進後出）

② Definition of "Queue"

像排隊一樣，Queue 是行列，一端進一端出，因此資料會是先進先出。

③ Preliminary operations of "Stack"

push 推入元素 peek 查看 (return 最部元素)

pop 移除 isEmpty / isFull 是否已滿

④ Preliminary operations of "Queues"

enqueue → 將新元素加入行列 peek 儻回行列

dequeue → 將元素從另一端移出

Q3: (30 pts) **AI Copilot Application**

Choose up to two data structures from the visualization list above.

Compose a single prompt (within 300 words) that you would use with an AI Copilot to explore or learn advanced concepts related to your chosen data structures.

A3:

我是一個就讀資訊工程學系大二的學生，目前在學習 Data structures 這門課的 array 跟 linked list 結構時遇到了困難，我希望你能首先把我當一個毫無基礎的人，講解 array 和 linked list 的基本觀念和基本的運作方式，再來分別

我需要你舉例出一些 sorting 方式(例): selection sorting, inserting sorting 或 bubble sorting)並使用 array 及 linked list 兩種結構進行圖示 sorting 的詳細步驟講解，我還希望你能告訴我 static memory array 和 dynamic memory array 的操作比較及應用，而 linked list 方面我想了解 singly linked list, doubly linked list 和 circular linked list 的應用方式，最後，你需幫我統計出 array 及 linked list 在各種操作下的特性及時間複雜度差別和比較。