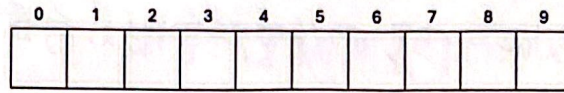60

Student ID: 113179.9   Student Name: 李佶賽
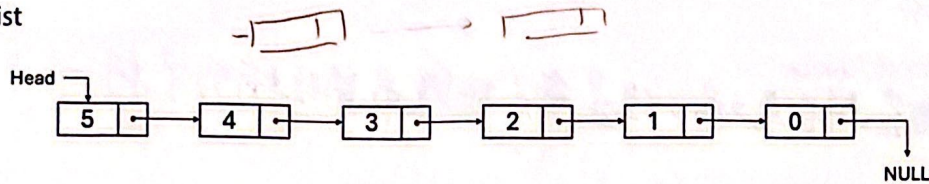
Data Structures: Visualization

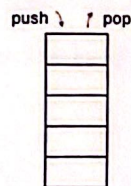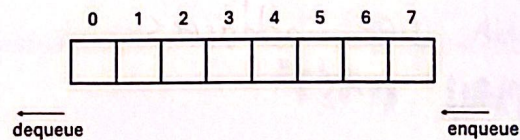(1) Array

(2) Linked List

(3) Stack   (4) Queue

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

—20

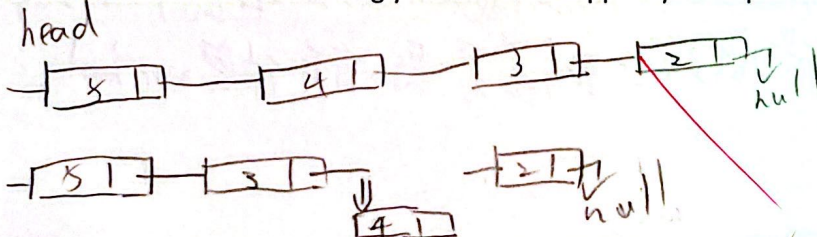**MoveTo(node *head, node *target, node*destination)**

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.

Moveto 是將 target 移到 destination 後，

需要一個變數去儲存 destination 原本的 next 並把這個改接到 target 後

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

要記 value 3的 next
才能將 value 4接到
後面, 然後後面會消失

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?

circular linked list ✓

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

Define the following data structures and list their fundamental operations.

A2:

① Definition of "Stack"

永遠新增資料在尾端，但是刪除資料會刪最後面的。

② Definition of "Queue"

新增資料在尾端，但是會先刪除最開始給的資料

③ Preliminary operations of "Stack"

push . pop

刪除最後　新增資料

④ Preliminary operations of "Queues"

dequeue 、enqueue

刪最前　　　新增資料

-10

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.

-10

A3: stack 和 queue 用 array 和 linked list 寫需要注意的地方，和用這兩個寫法的後缺點，在使用上會依照什麼來選擇使用的寫法，這兩者在 operation 時需要避免的地方，哪一個更建議來寫，哪個對空間時間複雜度更友善。在程式碼簡潔上會有差異嗎，會有什麼 overhead.