Course: Data Structures (CSE CS203A, 114-1)
Quiz II: Array, Linked List, Stack and Queue
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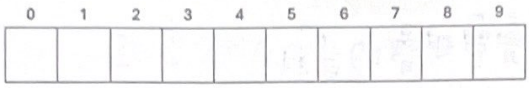
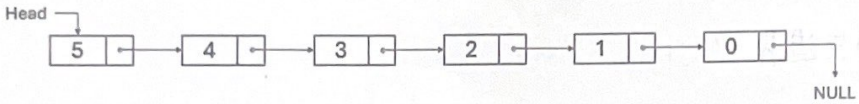
Data Structures: Visualization

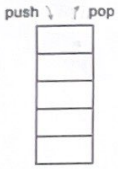
(1) Array



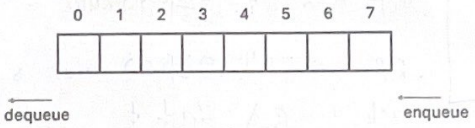
(2) Linked List



(3) Stack



(4) Queue



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Q1: (30 pts; 10 pts for each) **Describe the mechanism of the function**
MoveTo(node *head, node *target, node*destination)

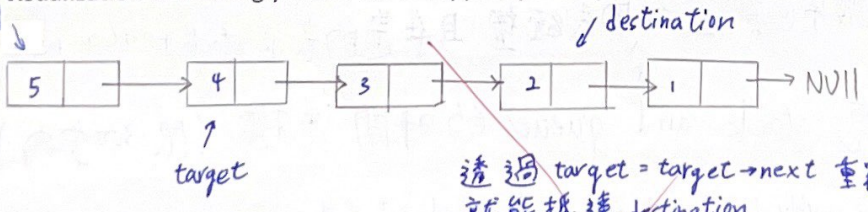
A1: Write a short paragraph explaining how the **MoveTo** function works (you may answer in English or Mandarin).

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

No, 可以透過讓 target 遍歷的方法找到 destination

target = target→next

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?

Yes, 如果使用 circular linked list, 就能處理 destination 的位子在 target 之

前的情形

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"

是一個先進後出，並透過層層堆疊的方式處理資料 (FILO)

② Definition of "Queue"

是一個先進先出 (FIFO)

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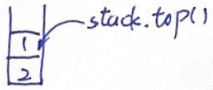
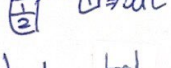
③ Preliminary operations of "Stack"

stack.top() → 得知頂部的value ⇒ 

stack.pop() → pop出頂部的value ⇒ 

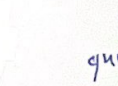
stack.push() → 存入 stack 中

stack.size()
表 stack 的大小

④ Preliminary operations of "Queues"

queue.pop() → 把資料從 rear 端 pop 出來

queue.push() → 把資料從 front 端存入到 queue 裡

queue.size()
表 queue 的大小

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:

1. 比較 stack 和 queue 差異(如：使用時機、存取資料的差異、程式碼的差異、在 C++ 中實作上的差別、stack 和 queue 在執行類似的 operations 中時間複雜度的差別)請依順序回答，並做圖表成現且清楚的表示 stack 和 queue 的差異處。

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