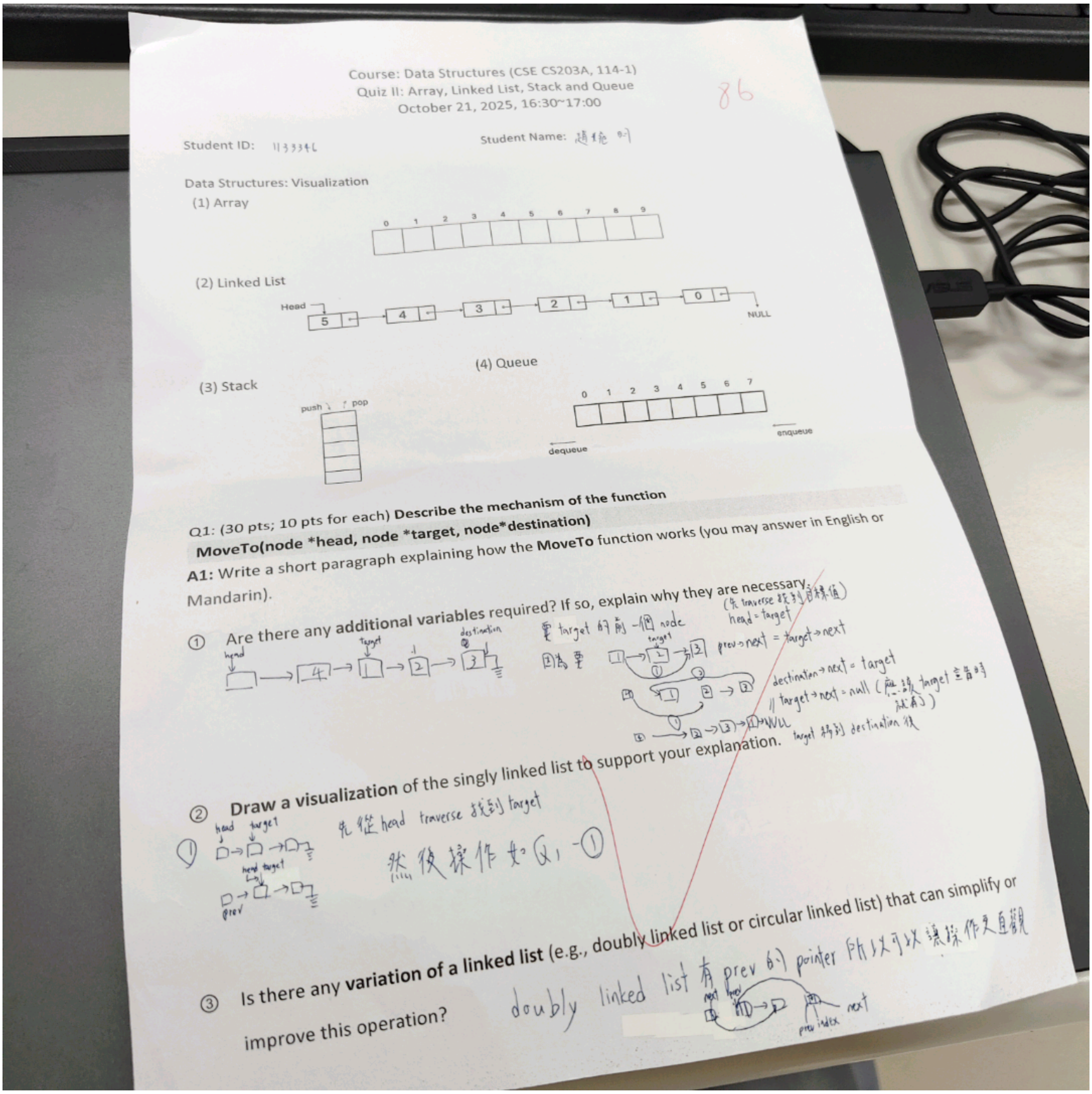


Course: Data Structures (CSE CS203A, 114-1)
Quiz II: Array, Linked List, Stack and Queue
October 21, 2025, 16:30~17:00

86

Student ID: 113346 Student Name: 趙[illegible]

Data Structures: Visualization

(1) Array

(2) Linked List

(3) Stack

(4) Queue

0 1 2 3 4 5 6 7 8 9
Head
5
4
3
2
1
0
NULL
push
pop
0 1 2 3 4 5 6 7
dequeue
enqueue

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.

要 target 的前一個 node
因為要
(先 traverse 找到目標值)
head = target
prev→next = target→next
destination→next = target
// target→next = null (應該 target 是最後的時候)
target 移到 destination 後

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

先從 head traverse 找到 target
然後操作如 Q1 -①

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?

doubly linked list 有 prev 的 pointer 所以可以讓操作更直觀

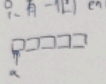
Q2: (40 pts, 10 pts for each) **Definition of Data Structures**

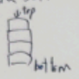
Define the following data structures and list their fundamental operations.

A2:

① Definition of "Stack"

只有一個 entrance，有 top 跟 bottom 的概念





LAST IN, FIRST OUT ✓

疊椅

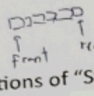
−4

② Definition of "Queue"

有一個 entrance 一個 exit

FIRST IN, FIRST OUT ✓

排隊



rear − 開始都 −1

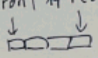
ADT ③ Preliminary operations of "Stack"

isEmpty()	boolean	return 是不是空的
traverse()	Stack	return 整個 stack (沒有就 error)(跑一遍)
push()	stack	return 整個 stack (沒有就 error)(確認 push 的值有進去) 新增
pop()	Stack	同 push()，但目的為了確認 pop 的值有出來 取出
maxsize()		return 有幾項 (通常從 top 就能知)
isFull()		return 是不是滿了
stack(num)		return item 的值

④ Preliminary operations of "Queues"

isEmpty()	boolean	return 是不是空的
enqueue()	Queue	會把 rear 位置往後加
dequeue()	Queue	會把 front 位置消掉
isFULL()		return 是不是滿了
maxSize()		return 有幾項
queue(num)		return item 的值

有 front 有 rear



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

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

Compose a **single prompt (within $\overset{150}{300}$ words)** that you would use with an **AI Copilot** to explore or learn advanced concepts related to your chosen data structures.

26

A3: ① 讓我比較兩者(如:array、linked list)在演算法或操作時的時間複雜度，用途上的區別，

哪些時候容易出現問題"，並用表格方式說明。並且

linked list 在 traverse 為什麼這麼久？如果真的要實作，用

怎樣的 struct 會比較好維護？比較不會被同事罵？

ARRAY 連續的 固定空間到底為什麼反而大家喜歡使用？

請以條列式回答我所有的問題。如果可以，請提供我額外的

資訊及補充內容，還有大家都問你什麼相關內容，一併提供。

−6