

Course: Data Structures (CSE CS203A, 114-1)  
Study Note: Hashing

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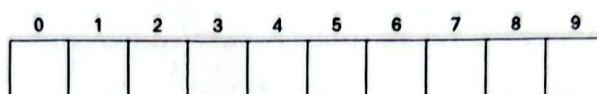
Student Name: 許芷瑜

Definition

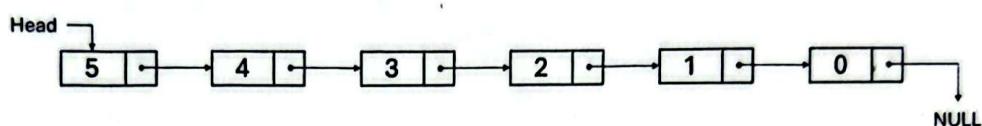
1. Hash Function - A hash function is a function that converts a key (such as a number or string) into an integer index. This index is then used to determine where the data will be stored in a hash table.
2. Hash Table - A hash table is a data structure that stores key-value pairs. It uses a hash function to compute an index in a data structure (called a bucket) where the data will be placed.
3. Collision Handling - A collision occurs when two or more keys are assigned to the same index by the hash function. Collision handling refers to the methods used to store and retrieve these multiple items that share the same index.

Data Structures: Visualization

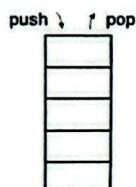
(1) Array



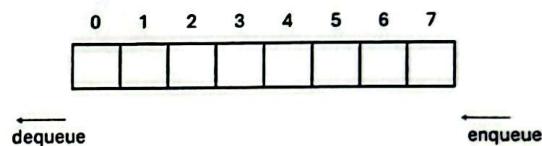
(2) Linked List



(3) Stack

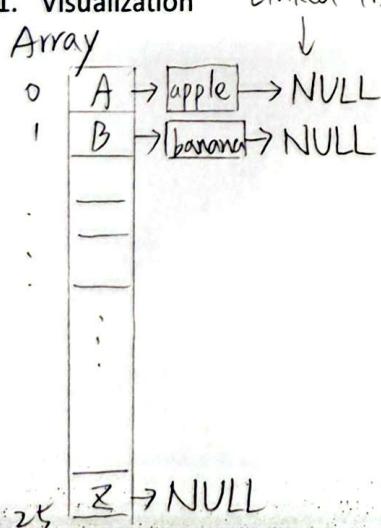


(4) Queue



Note

1. Visualization



Linked list

collision 頻繁  $\rightarrow$  key 不夠 diverse.  
→ 重新設計 Hash Function  
→ key diverse  
→ collision 變少  
→ Collision 有效的存取

index  $\leftarrow$  hash function

$\emptyset \leftarrow \text{Hash(apple)}$

$1 \leftarrow \text{Hash(banana)}$

↓  
key

A  $\rightarrow$  0      B  $\rightarrow$  1      C  $\rightarrow$  25  
↑  
hash function  
↓  
positive integer