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

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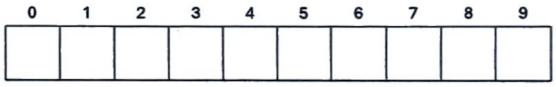
Definition

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. Linear probing Quadratic probing Double hash

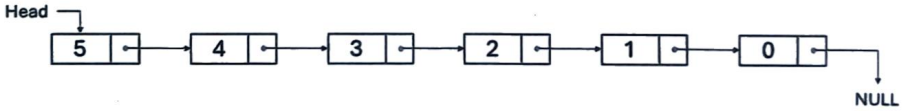
利用array [index] 快速查找但是需traverse when finding nonuse memory address ⇒ 空間利用率高

Data Structures: Visualization

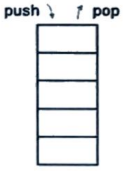
(1) Array



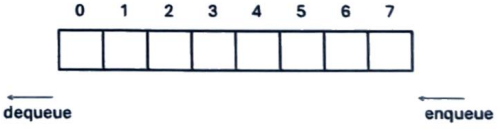
(2) Linked List



(3) Stack

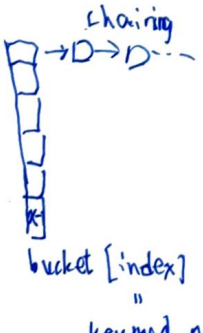


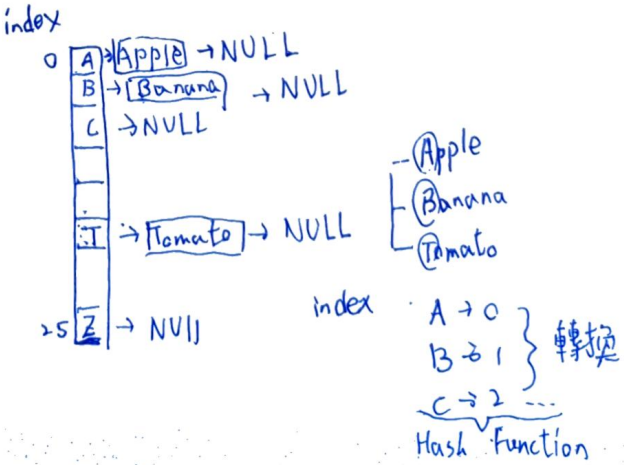
(4) Queue



Note

1. Visualization





2. Abstract Data Type

3. Implementation

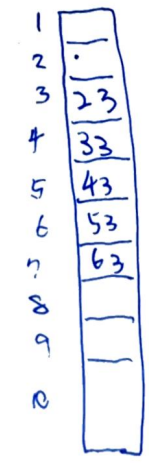
Hash Table : Array + Linked List

快查

index	value
0	Apple
1	Banana

key

散亂



Hash = input mod 10

issue:

① 找space成本↑ → 找資料↑

② capacity → realloc

↳ 重新設計 Hash Function

→ key: diverse

→ collision 變少 → 有效性存取

probing < Linear
Quadratic

hashing - Double

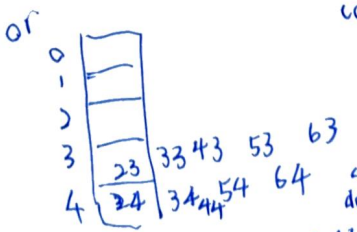
Linear probing

$h(k) = k \bmod m \ (m = 10)$

collision : $index(i) = (h(k) + i) \bmod m$

Long Array

or



Problems:

- primary cluster