Algoritmi e Strutture Dati
Costi Computazionali
A.A. 2024/2025

1 Dizionari

	search	insert	delete
Array non ord.	$\Theta(n)$	$\Theta(n)$	$\Theta(n)$
Array ord.	$\Theta(\log n)$	$\Theta(n)$	$\Theta(n)$
Lista concat.	$\Theta(n)$	$\Theta(n)$	$\Theta(n)$
BST	$\Theta(n)$	$\Theta(n)$	$\Theta(n)$
Albero AVL	$\Theta(\log n)$	$\Theta(\log n)$	$\Theta(\log n)$

Costi caso pessimo e medio coincidono

2 Tabelle Hash

	search		insert		delete	
	Med	Pess	Med	Pess	Med	Pess
Ind. aperto	$O(1)$	$\Theta(n)$	$O(1)$	$\Theta(n)$	$O(1)$	$\Theta(n)$
Concat.	$O(1)$	$\Theta(m)$	$O(1)$	$\Theta(m)$	$O(1)$	$\Theta(m)$

n: num. elementi; m: dim. tabella

3 Heap

Operazione	Costo
findMax	$O(1)$
fixHeap	$O(\log n)$
heapify	$O(n)$
deleteMax	$O(\log n)$
heapsort	$O(n \log n)$

Costi equivalenti per un minHeap

3.1 d-heap

Operazione	Costo
findMin	$O(1)$
insert	$O(\log_d n)$
delete	$O(d \log_d n)$
deleteMin	$O(d \log_d n)$
increaseKey	$O(d \log_d n)$
decreaseKey	$O(\log_d n)$

4 UnionFind

	makeSet	union	find
QuickFind	$O(1)$	$O(n)$	$O(1)$
QuickUnion	$O(1)$	$O(1)$	$O(n)$
QF.peso	$O(1)$	$O(\log n)$	$O(1)$
QU.rango	$O(1)$	$O(1)$	$O(\log n)$

5 Grafi

5.1 Visite di grafi

	BFS	DFS
Liste adiac.	$O(n+m)$	$O(n+m)$
Matrice adiac.	$O(n^2)$	$O(n^2)$

n: num. vertici; m: num. archi

5.2 Minimum Spanning Tree

Algoritmo	Costo
Kruskal	$O(m \log n)$
Prim	$O(m \log n)$

5.3 Cammini minimi

Algoritmo	Costo
Bellman-Ford	$O(nm)$
Dijkstra	$O(m \log n)$
Floyd-Warshall	$O(n^3)$ spazio
Floyd-Warshall	$O(n^2)$ tempo

6 Master Theorem

Data un'equazione di ricorrenza del tipo

$$T(n) = \begin{cases} d & n = 0 \\ aT(\frac{n}{b}) + cn^\beta & n \geq 1 \end{cases}$$

dove $a, b \geq 1$, c, d costanti, si può trovare il costo computazionale calcolando

$$\alpha = \log_b a = \frac{\log a}{\log b}$$

e applicando uno di questi tre casi del *Master Theorem*:

$$T(n) = \begin{cases} \Theta(n^\alpha) & \alpha > \beta \\ \Theta(n^\alpha \log n) & \alpha = \beta \\ \Theta(n^\beta) & \alpha < \beta \end{cases}$$

B

uon

giorno

per

qualsiasi

correzione

o consiglio

questa è la mia

mail :-) eugenioam-

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Qui sotto c'è il codice sorgente

LaTeX convertito in base64, per de-

codificarlo: echo "testo" — base64 -d

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