9 Sept 2022

Real-RAM model of computation

"the mathematical model of how computers work"

random access machine

I can access a random part of memory (with known location) in constant time.

we "store" real numbers.

unsorted array

```
QuickSort (A)
    pick a random pivot $p \in A$
    L ← run QuickSort on things $< p$ in A
    R ← run QuickSort on things $> p$ in A
    return $L \,||\, \{p\} \,||\, R$
```

inplace sorting: just run the sorting algo on the input itself w/out creating aux. data structures (other than $\Theta(1)$ temp variables maybe)

EXERCISE: Pseudocode for inplace quicksort example:

index	1	2	3	4	5	6	7	8	9
	e	h	b	c	a	f	d	g	i

My pivot

goal: prep for recursive calls

1	2	3	4	5	6	7	8	9
b	c	a	d	e	h	f	g	i

<pivot

My pivot

>pivot

e h b $\boxed{d}$ a f c g i

↑ ↑