

12/9/27/2021

WEEK REPO OF PARTITION EXAMPLE

This is called partition & it is done in place

then do partition on each side (like Merge Sort).

What does the PARTITION FUNCTION NEED AS PARAMS.?

LIST, START & END INDEXES

WHAT OTHER VARS WILL IT NEED?

PIVOT, LASTLHS, FIRSTUNK.

WILL BE CALLED LIKE:

PIVOT ← PARTITION(LIST, START, END)

PARTITION(LIST, START, END)

1. PIVOT ← END

2. LASTLHS ← START - 1

3. FIRSTUNK ← START

4. while FIRSTUNK < END

5. if LIST[FIRSTUNK] < LIST[PIVOT]

6. LASTLHS++

7. SWAP(LIST, FIRSTUNK, LASTLHS)

8. FIRSTUNK++

9. SWAP(LIST, PIVOT, LASTLHS+1)

10. RETURN: LASTLHS+1.

QUICK SORT(LIST, START, END)

1. IF START < END

2. PIVOT ← PARTITION(LIST, START, END)

3. QUICKSORT(LIST, START, PIVOT - 1)

4. " (" , PIVOT + 1, END)

When we have an algorithm what do we usually like to analyze?
Space &
Runtime

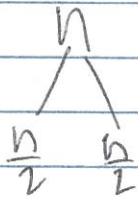
└ Best Case
└ Worst Case

How LONG DOES PARTITION TAKE?

loop iterates n times when $n = \text{END} - \text{START} + 1$
 $\Rightarrow \Theta(n)$

For Best Case

do fewest calls to ~~SS~~ SS. \Rightarrow cent i'n HALF all the time:



← note each is off by 1.

↑ ↑ ↑

this should look familiar.

BEST CASE: $T(n) = 2T\left(\frac{n}{2}\right) + \Theta(n)$

$a=2, b=2$ $f(n) = \Theta(n)$ $n^{\log_b a} = n = \Theta(n)$

CASE 2: $T(n) = \Theta(n \lg n)$

