

This is CS50.
This is CS220.



problem set 3

cs50.net/asus



4

2

6

8

1

3

7

5

divide and conquer

recursion

On input of n elements:

If $n < 2$

Return.

Else:

Sort left half of elements.

Sort right half of elements.

Merge sorted halves.

$$T(n) = 0, \text{ if } n < 2$$

$$T(n) = T(n/2) + T(n/2) + n, \text{ if } n > 1$$

$$T(16) = 2 \cdot T(8) + 16$$

$$T(16) = 2 \cdot T(8) + 16$$

$$T(8) = 2 \cdot T(4) + 8$$

$$T(16) = 2 \cdot T(8) + 16$$

$$T(8) = 2 \cdot T(4) + 8$$

$$T(4) = 2 \cdot T(2) + 4$$

$$T(16) = 2 \cdot T(8) + 16$$

$$T(8) = 2 \cdot T(4) + 8$$

$$T(4) = 2 \cdot T(2) + 4$$

$$T(2) = 2 \cdot T(1) + 2$$

$$T(16) = 2 \cdot T(8) + 16$$

$$T(8) = 2 \cdot T(4) + 8$$

$$T(4) = 2 \cdot T(2) + 4$$

$$T(2) = 2 \cdot T(1) + 2$$

$$T(1) = 0$$

$$T(16) = 2 \cdot T(8) + 16$$

$$T(8) = 2 \cdot T(4) + 8$$

$$T(4) = 2 \cdot T(2) + 4$$

$$T(2) = 2 \cdot 0 + 2$$

$$T(1) = 0$$

$$T(16) = 2 \cdot T(8) + 16$$

$$T(8) = 2 \cdot T(4) + 8$$

$$T(4) = 2 \cdot 2 + 4$$

$$T(2) = 2 \cdot 0 + 2$$

$$T(1) = 0$$

$$T(16) = 2 \cdot T(8) + 16$$

$$T(8) = 2 \cdot 8 + 8$$

$$T(4) = 2 \cdot 2 + 4$$

$$T(2) = 2 \cdot 0 + 2$$

$$T(1) = 0$$

$$T(16) = 2 \cdot 24 + 16$$

$$T(8) = 2 \cdot 8 + 8$$

$$T(4) = 2 \cdot 2 + 4$$

$$T(2) = 2 \cdot 0 + 2$$

$$T(1) = 0$$

64

n log *n*

to be continued...