

# LAB 3 EXAMPLE

## Quick Sort

|          |     |      |      |       |       |
|----------|-----|------|------|-------|-------|
| n :      | 100 | 200  | 400  | 800   | 1600  |
| ≈ A(n) : | 951 | 2203 | 4812 | 10675 | 23630 |

TEST :  $A(n) = \Theta(n^2 \log n)$

i.e.  $A(n) = \text{const.} \cdot n^2 \log n + \text{I.O.T.}$

i.e.  $\frac{A(n)}{n^2 \log n} = \text{const} + \frac{\text{I.O.T.}}{n^2 \log n}$

↓  
0 as  $n \rightarrow \infty$

i.e.  $\frac{A(n)}{n^2 \log n} \rightarrow \text{const.}$  as  $n \rightarrow \infty$

$n^2 \log n$  : 46051, 211932, 958634, 4278151, 18887062

$\frac{\approx A(n)}{n^2 \log n}$  : .0206, .0103, .0050, .00249, .001251

cut by about  $\frac{1}{2}$  each time.

∴ NOT CONST.

∴  $A(n) \neq \Theta(n^2 \log n)$ .