

# **ALGORITMA DAN STRUKTUR DATA**

Week 9 : Quick & Merge Sort



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## Q. Quick Sort

58 78 97 48 67 86 6 57 76 95

→ Pivot = 58

→ QS(0, 9) → i=0, j=9 → i=0, j=7 → 57 78 97 48 67 86 6 58 76 95

i=1, j=6 → i=1, j=6 → 57 6 97 48 67 86 78 58 76 95

i=2, j=5 → i=2, j=3 → 57 6 48 97 67 86 78 58 76 95

i=3, j=2 → q=2

→ QS(0, 2) → i=0, j=2 → i=0, j=2 → 48 6 57

i=1, j=1 → i=2, j=1 → q=1

→ QS(0, 1) → i=0, j=1 → i=0, j=1 → 6 48 //

i=1, j=0 → q=0

→ QS(1, 1) → i=1, j=1 → i=1, j=1 → 57 //

→ QS(3, 9) → i=3, j=9 → i=3, j=9 → 95 67 86 78 58 76 97

i=4, j=8 → i=4, j=8 → q=8

→ QS(3, 8) → i=3, j=8 → i=3, j=8 → 76 67 86 78 58 95

i=4, j=7 → i=8, j=7 → q=7

→ QS(3, 7) → i=3, j=7 → i=3, j=7 → 58 67 86 78 76

i=4, j=6 → i=5, j=4 → q=4

→ QS(3, 4) → i=3, j=4 → i=3, j=3 → ~~78 86~~ → q=3

→ QS(3, 3) → i=3, j=3 → i=3, j=3 → 58 //

→ QS(4, 4) → i=4, j=4 → i=4, j=4 → 67 //

→ QS(5, 7) → i=5, j=7 → i=5, j=7 → 76 78 86

i=6, j=6 → i=7, j=6 → ~~95~~ q=6

→ QS(5, 6) → i=5, j=6 → i=5, j=5 → q=5

→ QS(5, 5) → i=5, j=5 → i=5, j=5 → 76 //

$$\rightarrow QS(6,6) \rightarrow i=6, j=6 \rightarrow i=6, j=6 \rightarrow 78 //$$

$$\rightarrow QS(7,7) \rightarrow i=7, j=7 \rightarrow i=7, j=7 \rightarrow 86 //$$

$$\rightarrow QS(8,8) \rightarrow i=8, j=8 \rightarrow i=8, j=8 \rightarrow 95 //$$

$$\rightarrow QS(9,9) \rightarrow i=9, j=9 \rightarrow i=9, j=9 \rightarrow 97 //$$

Hasil Akhir :

$QS(0,1), QS(1,1), QS(2,2), QS(3,3), QS(4,4), QS(5,5), QS(6,6)$   
 $QS(7,7), QS(8,8), QS(9,9)$

$\rightarrow 6, 48, 57, 58, 67, 76, 78, 86, 95, 97$

## b. Merge Sort

50 78 97 48 67 86 6 57 76 95

$$\rightarrow MS(0,9) \rightarrow \text{med} = (0+9)/2 = 4$$

$$\rightarrow MS(0,4) \rightarrow \text{med} = (0+4)/2 = 2$$

$$\rightarrow MS(0,2) \rightarrow \text{med} = (0+2)/2 = 1$$

$$\rightarrow MS(0,1) \rightarrow \text{med} = (0+1)/2 = 0$$

$$\rightarrow \text{Merge} : MS(0,1), MS(1,1) = 50 \ 78$$

$$\text{Merge} \rightarrow MS(0,1), MS(2,2) = 50 \ 78 \ 97$$

~~Merge  $\rightarrow MS(0,2)$~~

$$\rightarrow MS(3,4) \rightarrow \text{med} = (3+4)/2 = 3$$

$$\rightarrow MS(3,3)$$

~~Merge~~

$$\text{Merge} \rightarrow MS(3,3) \ \& \ MS(4,4) = 48 \ 67$$

$$\text{Merge} \rightarrow MS(0,2) \ \& \ MS(3,4) = 48 \ 50 \ 67 \ 78 \ 97$$

$$\rightarrow MS(5,9) \rightarrow \text{med} = (5+9)/2 = 7$$

$$\rightarrow MS(5,7) \rightarrow \text{med} = (5+7)/2 = 6$$

$$\rightarrow MS(5,6) \rightarrow \text{med} = (5+6)/2 = 5$$

$$\text{Merge} \rightarrow MS(5,5) \ \& \ MS(6,6) = 6 \ 86$$

$$\rightarrow MS(7,7)$$

$$\text{Merge} \rightarrow MS(5,6) \ \& \ MS(7,7) = 6 \ 57 \ 86$$

$$\rightarrow MS(8,9) \rightarrow \text{med} = (8+9)/2 = 8$$

$$\text{Merge} \rightarrow MS(8,8) \ \& \ MS(9,9) = 76 \ 95$$

$$\text{Merge} \rightarrow MS(5,7) \ \& \ MS(8,9) = 6 \ 57 \ 76 \ 86 \ 95$$

$$\text{Merge} \rightarrow MS(0,4) \ \& \ MS(5,9) = 6 \ 48 \ 50 \ 67 \ 76 \ 78 \ 86 \ 95 \ 97 //$$