Latihan 2

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a. $T(n)$ untuk bubble short : $\frac{n^2 - n}{2}$

1.) $5 = O(1)$ dengan $n_0 = 1 = 5$ //

2.) $T(n) = n(n-1)/2 + n - 1 = O(n^2)$

$= \frac{n^2}{2} - \frac{n}{2} + n - 1$

$= \frac{n^2}{2} + \frac{n}{2}(-1) \leq \frac{n^2}{2} + \frac{n^2}{2} + n^2 = 2n^2$

$C = 2$, $n_0 = (-1)$ //

3.) $T(n) = 6.2^n + 2n^2 = O(2^n)$

$2n^2 \leq 2^n$

$= 6 . 2^n + 2^n = 7 . 2^n$ //

$C = 7$, $n_0 = 0$

4.) $T(n) = 1 + 2 + \ldots + n = O(n^2)$

$1 < n$, $2 < n$, $3 < n \ldots$, $n - 1 < n$

$= \underbrace{n + n + n + \ldots + n}_{\text{sebanyak } n \text{ kali}} = n \cdot n = n^2$ //

5.) $T(n) = n! = 1 \times 2 \times \ldots \times n = O(n^n)$

$1 < n$, $2 < n$, $3 < n \ldots$, $n - 1 < n$

$= \underbrace{n \times n \times n \times \ldots \times n}_{\text{sebanyak } n \text{ kali}} = n^n$ //

6.) $T(n) = 1^k + 2^k + \ldots + n^k = O(n^{k+1})$

$1^k < n^k$, $2^k < n^k$, $3^k < n^k \ldots$, $(n-1)^k < n^k$

$= \underbrace{n^k + n^k + n^k + \ldots + n^k}_{\text{sebanyak } n \text{ kali}} = n \cdot n^k = n^{k+1}$ //

7.) $T(n) = 5 \log(3^n) = O(n)$

$5 \log(3^n) = n \cdot 5 \log 3$

$C = 5 \log(3)$, $n = n$ //

8.) $T(n) = \log(n!) = O(n \log(n))$

* berdasar no. 5 $n! = O(n^n)$

$\log(n!) = \log(n^n)$

$= n \log(n)$ //