

① $T(n) = 2 + 4 + 6 + 8 + 10 + \dots + 2^n$
 Best = $\frac{n(n^2-1)}{(n^2-1)} = \frac{2(2^n-1)}{2-1} = 2^{n+1} - 2$

$O(2^n)$
 $T(n) \leq C \cdot 2^n \quad n=1$
 $2^{n+1} - 2 \leq C \cdot 2^n$
 $2 - \frac{2}{2^n} \leq C$
 $C \geq 1$

② Buktikan $p, q, r(+), T(n) = pn + q + r =$
 $O(n^2) \Omega(n^2) \Theta(n^2)$

* Big O
 $T(n) \leq C(n)$
 $pn^2 + qn + r \leq Cn^2$
 $\frac{pn^2 + qn + r}{n^2} \leq C$
 $p + \frac{q}{n} + \frac{r}{n^2}$
 $n=1$
 $C \geq 3$

* Big Ω
 $T(n) \geq C(n)$
 $pn^2 + qn^2 + r \geq Cn^2$
 $p + \frac{q}{n} + \frac{r}{n^2} \geq C$
 $n=1$
 $C \leq 3$

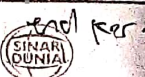
* Big Θ
 $3 \leq C \leq 3$ atau $C=3$

③ $n_1 \leftarrow n_1, \text{ iterasi } n_1, n_1$
 $T(n) = n^3$

$O(n^3)$ | $\Omega(n^3)$
 $n^3 \leq Cn^3$ | $n^3 \geq Cn^3$
 $C \geq 1$ | $C \leq 1$

$\Theta(n^3) = \Omega(n^3)$ maka $\Theta(n^3)$

④ for $i \leftarrow 1$ to n do
 for $j \leftarrow 1$ to n do
 $m_{ij} \leftarrow m_{ij} + b_{ij}$
 end for



$T(n) = n^2$

$O(n^2)$ | $\Omega(n^2)$
 $n^2 \leq C \cdot n^2$ | $n^2 \geq C \cdot n^2$
 $C \geq 1$ | $C \leq 1$

$\Theta(n^2) = \Omega(n^2)$

maka $\Theta(n^2) = \Theta(n^2)$

⑤ for $i \leftarrow 1$ to n do
 $a_i \leftarrow b_i$

enfor

$T(n) = n$
 $O(n)$ | $\Omega(n)$
 $n \leq Cn$ | $n \geq Cn$
 $C \geq 1$ | $C \leq 1$

$\therefore O(n) = \Omega(n) \rightarrow \Theta(n)$

⑥ a) O pada p dan q

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

b) p dan q ketikan
 $\frac{n(n-1)}{2}$

* Best case

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

* Worst case

$T(n) = \frac{n(n-1)}{2} + \frac{3n(n-1)}{2}$
 $= \frac{4n(n-1)}{2} = 2n^2 - 2n$

$O(n^2)$ | $\Omega(n^2)$
 $2n^2 - 2n \leq Cn^2$ | $\frac{n^2 - n}{2} \geq Cn$
 $2 - \frac{2}{n} \leq C$ | $\frac{1}{2} - \frac{1}{2n} \geq C$
 $2 - 2 \leq C$ | $\frac{1}{2} - \frac{1}{2} \geq C$
 $C \geq 0$ | $C \leq 0$

$\therefore O(n^2) = \Omega(n^2) \rightarrow \Theta(n^2)$

⑦ a) $A \rightarrow O(\log n)$ | b) $O(\log 8) \leq O(3 \log 2)$
 b) $B \rightarrow O(\log n)$ | b) $O(\log 8) = O(2 \log 2)$
 c) $C \rightarrow O(n^2)$ | c) $O(6^2) = O(36)$

A tercepat dengan 0,301

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$$O(n) p^2 = T(n) = 1 + n$$

$$O(n) p = T(n) = 2n$$

p^2 lebih baik dari p

karena $p^2 < p$