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Analisis I

Algorithm array Max (n)

```

1  Current Max ← A[0]
2  for ( i = 1 ; i ≤ n ; i++ )
3      if A[i] > Current Max then
4          Current Max ← A[i]
5  Return Current Max

```

berapa waktu operasi yang dibutuhkan?

Jawab:

baris pertama :

A[0] indeks Array \Rightarrow 1 operasi
 inisialisasi (\leftarrow) \Rightarrow 1 operasi } 2 operasi

baris kedua :

i = 1 \Rightarrow 1 operasi

i ≤ n \Rightarrow 1 + n operasi

i++ \Rightarrow n operasi

$\left. \begin{array}{l} n + 1 + n + 1 \\ = 2n + 2 \\ = \text{diambil terbesar } 2n \text{ waktu terbesar} \end{array} \right\}$

-> Alasan pertama :

barisan ke 3 lga

A[i] > Current Max \Rightarrow

A[i] \Rightarrow satu (1 operasi)

> \Rightarrow satu (1 operasi)

$\Rightarrow 2(n-1)$ merupakan

indeks dari Array dalam looping

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baris ke 4

$\text{CurrentMax} \leftarrow A[i]$

$A[i] \Rightarrow$ satu operasi

$\text{CurrentMax} \leftarrow A[i] \Rightarrow$ satu operasi

} $2(n-1)$
↓

Perulangan
pada Array

baris ke 5

$\text{return CurrentMax} \Rightarrow$ satu operasi = 1

Maka

$$T_n = 2 + 2n + 2(n-1) + 2(n-1) + 1$$

$$= 2 + 2n + 2n - 2 + 2n - 2 + 1$$

$$= 6n - 1 \quad \text{don} \quad O(n) = n \quad T_n = 6n$$

Analisa dari buku [lain] :

Jawab

Baris pertama :

$A[0] \Rightarrow$ 1 operasi
 $\leftarrow \Rightarrow$ 1 operasi } $\underline{2}$

Baris kedua :

$i = 1 \Rightarrow$ 1 operasi

$i < n \Rightarrow$ $n+1$ operasi

$i++ \Rightarrow$ n operasi

} $\underline{2n+2}$ diambil waktu sinkron $\underline{2n}$

Baris ketiga :

$A[i] > \text{CurrentMax} \Rightarrow$ $2n$

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Baris keempat:

current max $\leftarrow A[i] \Rightarrow 2n$

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Baris ke lima:

return current max $\Rightarrow 1$

maka

$$T_n = 2 + 2n + 2 + 2n + 2n + 1$$

$$= 6n + 5$$

maka $O(n) = n$ $T_{nm} = 6n$

Analisis dari buku lain II:

Baris pertama:

$A[0] \Rightarrow 1$
 $\leftarrow \Rightarrow 1$ } 2

Baris kedua:

$i = 1 \Rightarrow 1$

$i < n \Rightarrow$ tidak diambil } $n + 1$

$i++ \Rightarrow n$

Baris ketiga:

$A[i] > \text{current max} \Rightarrow 2(n+1)$

Baris ke empat

current max $\leftarrow A[i] \Rightarrow 2(n+1)$

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Baris ke lima

Return (current max) \Rightarrow 1

$$\begin{aligned}T_n &= 2 + n+1 + 2(n+1) + 2(n+1) + 1 \\&= 2 + n+1 + 2n+2 + 2n+2 + 1 \\&= 5n + 8 \quad O(n) = n \quad T_{nm} = 5n\end{aligned}$$

Analisis II

```
1 x = 2.5; y = 3.0;
2 for (int i = 0; i <= n; i++)
3 {
4     a[i] = x * y;
5     x = 2.5 * x;
6     y = y + a[i];
7 }
```

waktu yang dibutuhkan ialah ?

jawab

baris 1 :

$x = 2.5 \Rightarrow 1 \text{ operasi}$
 $y = 3.0 \Rightarrow 1 \text{ operasi}$ } 2 operasi

baris 2 :

$\text{int } i = 0 \Rightarrow 1 \text{ operasi}$
 $i <= n \Rightarrow n+1 \text{ operasi}$
 $i++ \Rightarrow n \text{ operasi}$ } $2n+2$ diambil alokasi waktu

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baris 4 :

$$a[i] = x * y \Rightarrow 2n \text{ operasi}$$

baris 5 :

$$x = 2.5 * x \Rightarrow 2n \text{ operasi}$$

baris 6 :

$$y = y + a[i] \Rightarrow 3n \text{ operasi}$$

$$T_n = 2 + 2n + 2 + 2n + 2n + 3n$$

$$= 9n + 4 \quad O(n) = n \quad T_{nm} = 9n$$

latihan :

1) Sum = 0

for (int i = 0 ; i < n ; i++)

Sum++;

$$T_n = ?$$

jawab.

Baris 1 :

$$\text{Sum} = 0 \Rightarrow 1 \text{ operasi}$$

Baris 2 :

$$\text{int } i = 0 \Rightarrow 1$$

$$i < n \Rightarrow n+1$$

$$i++ \Rightarrow n$$

$$\left. \begin{array}{l} \text{int } i = 0 \Rightarrow 1 \\ i < n \Rightarrow n+1 \\ i++ \Rightarrow n \end{array} \right\} 2n+1 \text{ diambil alokasi } n$$

↓

Baris 3 :

$$\text{Sum}++ \Rightarrow n$$

$$T_n = 2n+1 + n + 1 = 3n+2 \quad O(n) = T(n) = n$$

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```

2) 1 Som = 0
    2 for (i = 0 ; i < n ; i++)
    3     for (j = 0 ; j < n ; j++)
    4         Som ++ ;

```

Jawab

 $T_n = ?$

Baris ke 1:

 $Som = 0 \Rightarrow 1 \text{ operasi}$

Baris ke 2:

 $i = 0 \Rightarrow 1 \text{ operasi}$ $i < n \Rightarrow n+1 \text{ operasi}$ $i++ \Rightarrow 1 \text{ operasi}$

$$\left. \begin{array}{l} 1 \text{ operasi} \\ n+1 \text{ operasi} \\ 1 \text{ operasi} \end{array} \right\} 2n + 2 \text{ nilai Alokasi } n$$

Baris ke 3

 $j = 0 \Rightarrow 1 \times n = n \text{ operasi}$ $j < n \Rightarrow (n+1)n = n^2 + n \text{ operasi}$ $j++ \Rightarrow n \times n = n^2 \text{ operasi}$

$$\left. \begin{array}{l} n \text{ operasi} \\ n^2 + n \text{ operasi} \\ n^2 \text{ operasi} \end{array} \right\} 2n^2 + 2n \text{ Alokasi } n^2$$

Baris ke 4:

 $Som++ \Rightarrow 1 \times n^2 = n^2$

Maka

$$T_n = n^2 + 2n^2 + 2n + 2n + 2 + 1$$

$$= 3n^2 + 4n + 3 \quad o(n) = n^2 \quad T_{nm} = 3n^2$$