

No.: kecerdasan buatan

Date.:

\* permintaan

$$\mu_{turun}(x) = \begin{cases} 1 - \frac{x}{3000} & \text{jika } 0 \leq x \leq 3000 \\ 0 & \text{jika } x > 3000 \end{cases}$$

$$\mu_{tetap}(x) = \begin{cases} \frac{x - 2000}{1000} & \text{jika } 2000 \leq x \leq 3000 \\ \frac{4000 - x}{1000} & \text{jika } 3000 \leq x \leq 4000 \\ 0 & \text{lainnya} \end{cases}$$

$$\mu_{naik}(x) = \begin{cases} \frac{x - 3000}{3000} & \text{jika } 3000 \leq x \leq 6000 \\ 0 & \text{jika } x < 3000 \end{cases}$$

\* persediaan

$$\mu_{sedikit}(y) = \begin{cases} 1 - \frac{y}{500} & \text{jika } 0 \leq y \leq 500 \\ 0 & \text{jika } y > 500 \end{cases}$$

$$\mu_{sedang}(y) = \begin{cases} \frac{y - 250}{250} & \text{jika } 250 \leq y \leq 500 \\ \frac{750 - y}{250} & \text{jika } 500 \leq y \leq 750 \\ 0 & \text{lainnya} \end{cases}$$

$$\mu_{banyak}(y) = \begin{cases} \frac{y - 500}{500} & \text{jika } 500 \leq y \leq 1000 \\ 0 & \text{jika } y < 500 \end{cases}$$

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\* produksi

- berkurang

$$z_{\text{berkurang}}(z) = 8000 - \alpha \cdot (8000 - 2000)$$

- bertambah

$$z_{\text{bertambah}}(z) = 2000 + \alpha \cdot (8000 - 2000)$$



## kecerdasan buatan

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### \* definisi variabel

- permintaan : turun, tetap, naik
- persediaan : sedikit, sedang, banyak
- produksi : berkurang, bertambah

Input = permintaan (x) : 3500  
persediaan (y) : 600

### \* permintaan :

$$\text{- turun } x = \frac{3000 - x}{3000 - 0}$$

$$= \frac{3000 - 3500}{3000} \quad (x = 3500 \text{ diluar rentang turun})$$

$$\text{- tetap } x = \frac{x - 2000}{3000 - 2000} \quad \text{dan} \quad \frac{4000 - x}{4000 - 3000}$$

$$= \min \left( \frac{3500 - 2000}{1000}, \frac{4000 - 3500}{1000} \right)$$

$$= \min (1.5, 0.5) = 0.5$$

$$\text{- naik } x = \frac{x - 3000}{6000 - 3000} = \frac{3500 - 3000}{3000} = \frac{500}{3000} = 0.167$$

### \* persediaan :

$$\text{- sedikit } (y) = \frac{500 - y}{500 - 0} = \frac{500 - 600}{500} = 0 \quad (y = 600 \text{ diluar rentang sedikit})$$

$$\text{- sedang } (y) = \min \left( \frac{y - 250}{500 - 250}, \frac{750 - y}{750 - 500} \right)$$

$$= \min \left( \frac{600 - 250}{250}, \frac{750 - 600}{250} \right)$$

$$= \min (1.4, 0.6) = 0.6$$

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$$\text{- banyak } (-y) = \frac{y - 500}{1000 - 500} = \frac{600 - 500}{500} = 0.2$$

menentukan aturan dan nilai alpha

- aturan 1 = permintaan ~~tidak ada~~ turun dan persediaan sedikit  $\rightarrow$  bertambah  $c_{x1} = \min(0, 0) = 0$
- aturan 2 = permintaan turun dan persediaan sedang  $\rightarrow$  berkurang  $c_{x2} = \min(0, 0.6) = 0$
- aturan 3 = permintaan turun dan persediaan banyak  $\rightarrow$  berkurang  $c_{x3} = \min(0, 0.2) = 0$
- aturan 4 = permintaan tetap dan persediaan sedikit  $\rightarrow$  bertambah  $c_{x4} = \min(0.5, 0) = 0$
- aturan 5 = permintaan tetap dan persediaan ~~banyak~~ <sup>sedang</sup>  $\rightarrow$  berkurang  $c_{x5} = \min(0.5, 0.6) = 0.5$
- aturan 6 = permintaan tetap dan persediaan banyak  $\rightarrow$  berkurang  $c_{x6} = \min(0.5, 0.2) = 0.2$
- aturan 7 = permintaan naik dan persediaan sedikit  $\rightarrow$  bertambah  $c_{x7} = \min(0.167, 0) = 0$
- aturan 8 = permintaan naik dan persediaan sedang  $\rightarrow$  bertambah  $c_{x8} = \min(0.167, 0.6) = 0.167$
- aturan 9 = permintaan naik dan persediaan banyak  $\rightarrow$  berkurang  $c_{x9} = \min(0.167, 0.2) = 0.167$

$$\text{bertambah } z = 2000 + \alpha \cdot (8000 - 2000)$$

$$\text{berkurang } z = 8000 - \alpha \cdot (8000 - 2000)$$

nilai z berdasarkan alpha



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- aturan 5 (berkurang) :  $z_5$  :

$$8000 - 0.5 \cdot 6000 = 8000 - 3000 = 5000$$

- aturan 6 (berkurang) :  $z_6$  :

$$8000 - 0.2 \cdot 6000 = 8000 - 1200 = 6800$$

- aturan 8 (bertambah) :  $z_8$  :

$$2000 + 0.167 \cdot 6000 = 2000 + 1002 = 3002$$

- aturan 9 (berkurang) :  $z_9$  :

$$8000 - 0.167 \cdot 6000 = 8000 - 1002 = 6998$$

defuzzifikasi

$$z = \frac{\sum (a_i \cdot z_i)}{\sum a_i}$$

substitusi

$$z = \frac{(0.5 \cdot 5000) + (0.2 \cdot 6800) + (0.167 \cdot 3002) + (0.167 \cdot 6998)}{0.5 + 0.2 + 0.167 + 0.167}$$

$$= \frac{5529.999}{1.034} \approx 5347.49$$

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