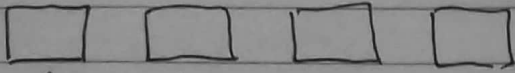


① 1, 2, 3, 4, 5, 6, 7, 8

tidak boleh ada pengulangan

4 angka < 5000

kelipatan 5



4 cara 6 cara 5 cara 1 cara

↳ Angka tidak boleh lebih dari 5

$$= 4 \times 6 \times 5 \times 1$$

$$= 120 \text{ cara.}$$

$$\textcircled{2} \binom{n}{r} + \binom{n}{r+1} = \frac{n!}{r! (n-r)!} + \frac{n!}{(r+1)! (n-(r+1))!}$$

$$= \frac{n!}{r! (n-r)(n-r-1)!} + \frac{n!}{(r+1)r! (n-r-1)!}$$

$$= \frac{n!}{r! (n-r-1)!} \left(\frac{1}{(n-r)} + \frac{1}{(r+1)} \right)$$

$$= \frac{n!}{r! (n-r-1)!} \left(\frac{r+1 + n-r}{(n-r)(r+1)} \right)$$

$$= \frac{n!}{r! (n-r-1)!} \left(\frac{(n+1)}{(n-r)(r+1)} \right)$$

$$= \frac{(n+1)n!}{(r+1)r! (n-r)(n-r-1)!}$$

$$= \frac{(n+1)!}{(r+1)! (n-r)!}$$

$$= \frac{(n+1)!}{(r+1)! [(n+1) - (r+1)]!}$$

$$= \binom{n+1}{r+1}$$

$$\textcircled{3} a \binom{8}{3} \binom{7}{2} = \frac{8!}{3!5!} \times \frac{7!}{2!5!} \quad (3 \text{ dokter dan } 2 \text{ Perawat})$$

$$= \frac{8 \cdot 7 \cdot 6 \cdot \cancel{5!}}{3 \cdot 2 \cdot \cancel{5!}} \times \frac{7 \cdot 6 \cdot \cancel{5!}}{2 \cdot 1 \cdot \cancel{5!}} = \frac{336}{6} \times \frac{42}{2} = 56 \times 21 = 1176 \text{ cara}$$

⑥ Paling Sedikit 1 dokter

$$\binom{8}{1} \binom{7}{4} = \frac{8!}{1!(7!)} \times \frac{7!}{4!(3!)} = \frac{8 \cdot \cancel{7!}}{1 \cdot \cancel{7!}} \times \frac{7 \cdot 6 \cdot 5 \cdot \cancel{4!}}{\cancel{4!} \cdot 3 \cdot 2 \cdot 1} = 8 \times 35 = 280 \text{ cara}$$

$$\binom{8}{2} \binom{7}{3} = \frac{8!}{2!(6!)} \times \frac{7!}{3!(4!)} = \frac{8 \cdot 7 \cdot \cancel{6!}}{2 \cdot 1 \cdot \cancel{6!}} \times \frac{7 \cdot 6 \cdot 5 \cdot \cancel{4!}}{3 \cdot 2 \cdot 1 \cdot \cancel{4!}} = 28 \times 35 = 980 \text{ cara}$$

$$\binom{8}{3} \binom{7}{2} = \frac{8!}{3!(5!)} \times \frac{7!}{2!(5!)} = \frac{8 \cdot 7 \cdot 6 \cdot \cancel{5!}}{3 \cdot 2 \cdot 1 \cdot \cancel{5!}} \times \frac{7 \cdot 6 \cdot \cancel{5!}}{2 \cdot 1 \cdot \cancel{5!}} = 56 \times 21 = 1176 \text{ cara}$$

$$\binom{8}{4} \binom{7}{1} = \frac{8!}{4!(4!)} \times \frac{7!}{1!(6!)} = \frac{8 \cdot 7 \cdot 6 \cdot 5 \cdot \cancel{4!}}{4 \cdot 3 \cdot 2 \cdot 1 \cdot \cancel{4!}} \times \frac{7 \cdot \cancel{6!}}{1 \cdot \cancel{6!}} = 70 \times 7 = 490 \text{ cara}$$

$$\binom{8}{5} \binom{7}{0} = \frac{8!}{5!(3!)} \times \frac{7!}{0!(7!)} = \frac{8 \cdot 7 \cdot 6 \cdot \cancel{5!}}{\cancel{5!} \cdot 3 \cdot 2 \cdot 1} \times \frac{\cancel{7!}}{1 \cdot \cancel{7!}} = 56 \times 1 = 56 \text{ cara.}$$

$$= 280 + 980 + 1176 + 490 + 56$$

$$= 2982 \text{ cara}$$

Jadi ada 2.982 cara jika minimal ada 1 dokter.

⑦ Paling banyak 1 perawat.

$$\binom{8}{4} \binom{7}{1} = \frac{8!}{4!(4!)} \times \frac{7!}{1!(6!)} = \frac{8 \cdot 7 \cdot 6 \cdot 5 \cdot \cancel{4!}}{4 \cdot 3 \cdot 2 \cdot 1 \cdot \cancel{4!}} \times \frac{7 \cdot \cancel{6!}}{1 \cdot \cancel{6!}} = 70 \times 7 = 490 \text{ cara}$$

$$\binom{8}{5} \binom{7}{0} = \frac{8!}{5!(3!)} \times \frac{7!}{0!(7!)} = \frac{8 \cdot 7 \cdot 6 \cdot \cancel{5!}}{\cancel{5!} \cdot 3 \cdot 2 \cdot 1} \times \frac{\cancel{7!}}{1 \cdot \cancel{7!}} = 56 \times 1 = 56 \text{ cara}$$

$$= 490 + 56$$

$$= 546 \text{ cara}$$

Jadi ada 546 cara jika minimal ada 1 perawat.

④ Simetris

- a lebih tinggi dari b (tidak ada sifat simetris)
- a dan b lahir pada hari yang sama (~~tidak~~ ada sifat simetris)
- a dan b memiliki nenek yang sama (ada sifat simetris)
- a dan b memiliki nama panggilan yang sama (ada sifat simetris)

Refleksif

- a ~~dan~~ lebih tinggi dari b (tidak ada sifat refleksif)
- a dan b lahir pada hari yang sama (ada sifat refleksif)
- a dan b memiliki nenek yang sama (ada sifat refleksif)
- a dan b memiliki nama panggilan yang sama (ada sifat refleksif)

Transitif

- a lebih tinggi dari b (ada sifat transitif)
- a dan b lahir pada hari yang sama (ada sifat transitif)
- a dan b memiliki nenek yang sama (ada sifat transitif)
- a dan b memiliki nama panggilan yang sama (ada sifat transitif)

⑤ $b_n = 7b_{n-1} - 12b_{n-2}$ $b_0 = 1$ $b_1 = 2$

$$b_n = 7b_{n-1} - 12b_{n-2} = 0$$

$$t^2 - 7t + 12 = 0$$

$$(t-3)(t-4) = 0$$

$$t_1 = 3 \quad t_2 = 4$$

$$b_n = \alpha_1 t_1^n + \alpha_2 t_2^n$$

$$b_n = \alpha_1 (3)^n + \alpha_2 (4)^n$$

$$b_0 = 1 \rightarrow 1 = \alpha_1 (3)^0 + \alpha_2 (4)^0$$

$$1 = \alpha_1 + \alpha_2 \quad (1)$$

$$b_1 = 2 \rightarrow 2 = \alpha_1 (3)^1 + \alpha_2 (4)^1$$

$$2 = 3\alpha_1 + 4\alpha_2 \quad (2)$$

Eliminasi α_1

$$1 = \alpha_1 + \alpha_2$$

$$2 = 3\alpha_1 + 4\alpha_2$$

$$\begin{array}{r} \times 3 \\ \hline 3 = 3\alpha_1 + 3\alpha_2 \end{array}$$

$$2 = 3\alpha_1 + 4\alpha_2$$

$$1 = -\alpha_2$$

$$-1 = \alpha_2$$

Substitusi

$$1 = \alpha_1 + \alpha_2$$

$$1 = \alpha_1 + (-1)$$

$$1 + 1 = \alpha_1$$

$$2 = \alpha_1$$

$$b_n = 2(3)^n + (-1)(4)^n$$