

2, 3, 3, 4, 4, 4

$$\left( 4 \times \frac{5!}{2!2!} + 3 \times \frac{5!}{3!} + 2 \times \frac{5!}{3!2!} \right) \left( 10^0 + 10^1 + 10^2 + 10^3 + 10^4 + 10^5 \right)$$

22222200

$$\begin{array}{ccccccc} & & & \downarrow & & 2 & \\ \_ & \_ & \_ & \_ & \_ & \_ & \\ & & & & 2 & & \\ \_ & \_ & \_ & \_ & \_ & \_ & \\ & & & & & 4 & \\ \_ & \_ & \_ & \_ & \_ & \_ & \end{array} \quad \begin{array}{l} \frac{5!}{3!2!} \\ \frac{5!}{3!} \\ \frac{5!}{2!2!} \end{array}$$

# De Arrangement

Find no. of ways to place 'n' letters in 'n' addressed envelopes so that no letter is placed in its corresponding envelope.

$A_1 = L_1$  is correctly placed

$A_2 = L_2$  — " —

$A_n = L_n$  — " —

$$= n! - n(A_1 \cup A_2 \cup \dots \cup A_n)$$

$$= n! - \left[ {}^nC_1(n-1)! - {}^nC_2(n-2)! + {}^nC_3(n-3)! - {}^nC_4(n-4)! + \dots \right]$$

$$D_n = n! \left( \frac{1}{2!} - \frac{1}{3!} + \frac{1}{4!} - \frac{1}{5!} + \dots + \frac{(-1)^n}{n!} \right)$$

$$\frac{Q}{Q} = 1$$

$$\frac{Q}{A} = 1$$

$$D_5 = 5! \left( \frac{1}{2!} - \frac{1}{3!} + \frac{1}{4!} - \frac{1}{5!} \right) = 44$$

$$D_6 = 6! \left( \frac{1}{2!} - \frac{1}{3!} + \frac{1}{4!} - \frac{1}{5!} + \frac{1}{6!} \right) = 265$$

$$\therefore {}^6C_1 D_5 + D_6$$

$$= 6 \times 44 + 265$$

$$2. \quad 6! - \left( 4_{\text{corr.}} + \boxed{5_{\text{corr.}}} + 6_{\text{corr.}} \right)$$

$$= 6! - \left[ {}^6C_4 D_2 + 0 + 1 \right] \quad \text{One to one}$$

$$= 6! - (15 \times 1 + 1)$$

$$D_2 = 2! \left( \frac{1}{2!} \right) = 1$$

Find no. of ways to match  
no that

1. at least 5 questions are  
wrongly matched

2. at most 3 questions are  
correctly matched

3. all wrongly matched.

$$D_2 = 1$$

$$D_3 = 2$$

$$D_4 = 9$$

$$D_5 = 44$$

$$D_6 = 265$$

$$\boxed{3: D_6 = 265}$$



Find no. of ways to move  
from O to P moving  
on grids via  
shortest path.

6 horizontal, 6 vertical  
6H 6V

$$= {}^{12}C_6 - \left( {}^6C_2 \cdot {}^6C_2 + {}^6C_2 \cdot {}^6C_2 \right) - 4 \cdot {}^6C_2 \cdot {}^6C_2$$

DPP-8  
DPP-9 (1-7)

$$= {}^{12}C_6$$

H V H H H H V V V V

O-A-P → E<sub>1</sub>  
O-B-P → E<sub>2</sub>  
O-A-B-P

8H  
6V

