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Distribution of alike Objects.

alike Object → diff. Person } Beggar's Method
Same Coin → diff. Beggar.

Base

n logo ko Coins Bantne ho then hme (n-1) (walls) NKLI Sikke.

20

(1) NOW to distribute "n" Coins among $\boxed{\text{P Beggars}}$ when none, one or more Coins are distributed

(p-1) nkli coins.

Total Coin.
$= n+p-1$

$^{n+p-1}C_{p-1}$

distribution
$= p-1$

(2) NoW to distribute "n" Coins among P beggars if each beggar gets atleast one Coin.

पहले 1-1 Sikka Banto
→ p coins distributed

left
$= \underline{n-p}$
nkli (p-1) Sikke

$^{n-p+p-1}C_{p-1} = {}^{n-1}C_{p-1}$

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Q Distributa io id nti

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Q Distribute loiden

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① Distributeioid ntical.

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Q Distribute 10 identical coins among 4 boys so that each have none, one or more.

$^{n+p-1}C_{p-1}$

n kli coins = 3 total = 13 coins, distribution

Asli = 3 में

$^{10+4-1}C_{4-1} = {}^{13}C_3$

Q Find No. of Non negative Integral sol. of $\underbrace{x_1+x_2+x_3+x_4}_{4\text{ Beggars}}=10 \rightarrow 10$ coins

0 भी Include

$^{13}C_3$

Q Find Natural No solution of $x_1+x_2+x_3+x_4=10$

atleast 1

$^{n-1}C_{p-1} = {}^{10-1}C_{4-1} = {}^{9}C_3$

Q Find all non-neg Solution of $x+y+z \le 10$

Scheme

3 beggars में 10 या कम coins बांटें

n kli Beggar की entry = p

$x+y+z+p=10$

Now $= {}^{10+4-1}C_{4-1} = {}^{13}C_3$

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M2

$\underbrace{x+y+z=0}$, $x+y+z=1$, $x+y+z=2$, $x+y+z=3$ - - - $x+y+z=10$

$^{0+3-1}C_{3-1} + {}^{1+3-1}C_{3-1} + {}^{2+3-1}C_{3-1} + {}^{3+3-1}C_{3-1} + \cdots + {}^{10+3-1}C_{3-1}$

$\boxed{{}^2C_2} + {}^3C_2 + {}^4C_2 + {}^5C_2 + \cdots + {}^{12}C_2$

$\to {}^3C_3 + {}^3C_2 + {}^4C_2 + {}^5C_2 + \cdots + {}^{12}C_2$

${}^4C_3 \to {}^5C_3 \to {}^6C_3 \cdots = {}^{13}C_3$

Q A Shelf contain 6 seperate compartments. No. of ways in which 12 indistinguishable marbles can be placed if No compartment Remains empty
atleast 1

$^{12-1}C_{6-1} = {}^{11}C_5$

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Q Find Non-ve sol. of $x+y+z=0$

if $x \geq -5$, $y \geq -6$, $z \geq -2$

$x+5 \geq 0$ | $y+6 \geq 0$ | $z+2 \geq 0$

$(x+5)+(y+6)+(z+2) = 13$

$t_1 + t_2 + t_3 = 13$

non-ve sol. $\rightarrow$ $t_1 \geq 0, t_2 \geq 0, t_3 \geq 0$

$x+5 \geq 0$

$x \geq -5$

$^{13+3-1}C_{3-1} = {}^{15}C_2$

Q Find Non-ve Integral sol.

of $x+y+z+t=29$

if $x \geq 1, y \geq 2, z \geq 3, t \geq 0$

$x-1 \geq 0$, $y-2 \geq 0$, $z-3 \geq 0$ $t \geq 0$

$(x-1)+(y-2)+(z-3)+t = 29-1-2-3$

$t_1+t_2+t_3+t_4 = 23$

NoIN $^{23+4-1}C_{4-1} = {}^{26}C_3$

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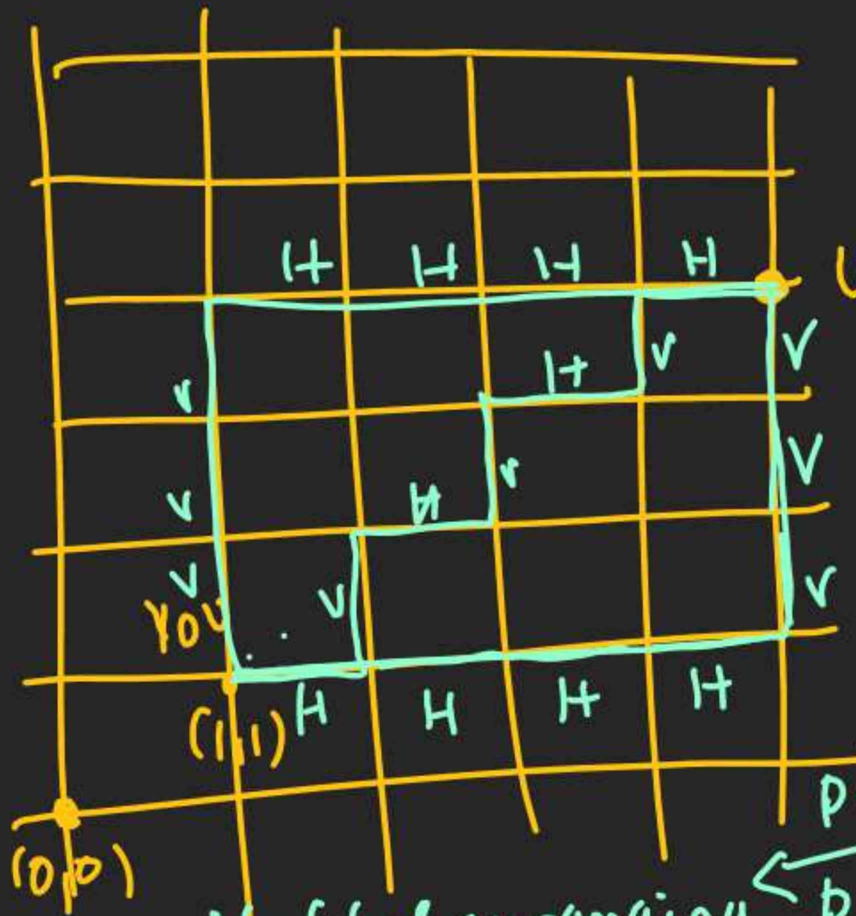
Q IHMW 30 marks to be alloted to 8 questions of atleast 2 marks are to be given to each qs.

2-2 marks पहले से दे distribut

$30-8\times2 = 14$ marks.

Now $= {}^{14+8-1}C_{8-1} = {}^{21}C_{7}$

Grid Problem



Uncle's house

No of ways to Reach to them.

No of W of arranging them

P-1 HHHH VVV

P-2 VVV HHHH

P-3 H V H V H V H

$$= \frac{7!}{4!\,3!} = \frac{7.6.5}{6} = 35$$

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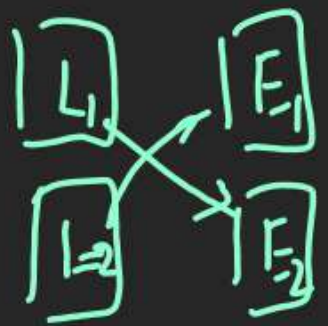
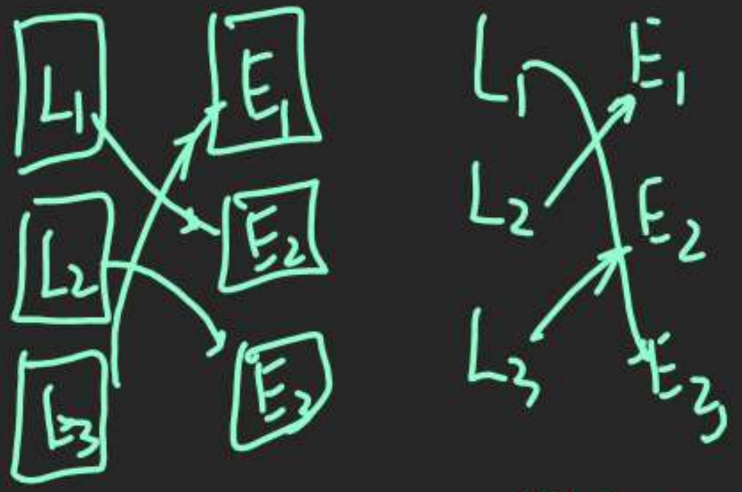
DEARRANGEMENTS (सब घोटाला)

$D(1) = 0$



$D(2) = 1$



$D(3) = 2$

$$D(n) = \lfloor n - \frac{\lfloor n}{\lfloor 1} + \frac{\lfloor n}{\lfloor 2} - \frac{\lfloor n}{\lfloor 3} + \cdots$$

Q Find Now to put 4 different colors ball in their own colored boxes when No ball is going in Right Box.

$$D(4) = \cancel{\lfloor 4} - \cancel{\frac{\lfloor 4}{\lfloor 1}} + \frac{\lfloor 4}{\lfloor 2} - \frac{\lfloor 4}{\lfloor 3} + \frac{\lfloor 4}{\lfloor 4}$$

$$= \lfloor 4 \left\{ \frac{1}{2} - \frac{1}{6} + \frac{1}{24} \right\}$$

$$= \cancel{24} \left\{ \frac{12 - 4 + 1}{\cancel{24}} \right\}$$

$$= 9$$

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Q Given 5 Letters & 5 respective envelops. IHMW letters can be arranged in envolope if

A) None goes in Rt. envelop.

$$D(5) = \left\{ \cancel{\lfloor 5} - \frac{\lfloor 5}{\lfloor 1} + \frac{\lfloor 5}{\lfloor 2} - \frac{\lfloor 5}{\lfloor 3} + \frac{\lfloor 5}{\lfloor 4} - \frac{\lfloor 5}{\lfloor 5} \right\}$$

$$= \lfloor 5 \left\{ \frac{1}{2} - \frac{1}{6} + \frac{1}{24} - \frac{1}{120} \right\}$$

$$= \cancel{120} \left\{ \frac{60 - 20 + 5 - 1}{\cancel{\lfloor 20}} \right\} = 44$$

(B) Exactly one L goes in Rt. envelop.

{1 letter to correct envelop me jaye. 4 letters Total dearrange ho.

$$^5C_1 \times 1 \times \lfloor 4 \left\{ \frac{1}{\lfloor 2} - \frac{1}{\lfloor 3} + \frac{1}{\lfloor 4} \right\}$$

(C) Exactly 2 letters goes in Rt. envelops.

$$^5C_2 \times 1 \times D(3) = 10 \times 2 = 20$$

(D) all letters in Rt. envelops = 1