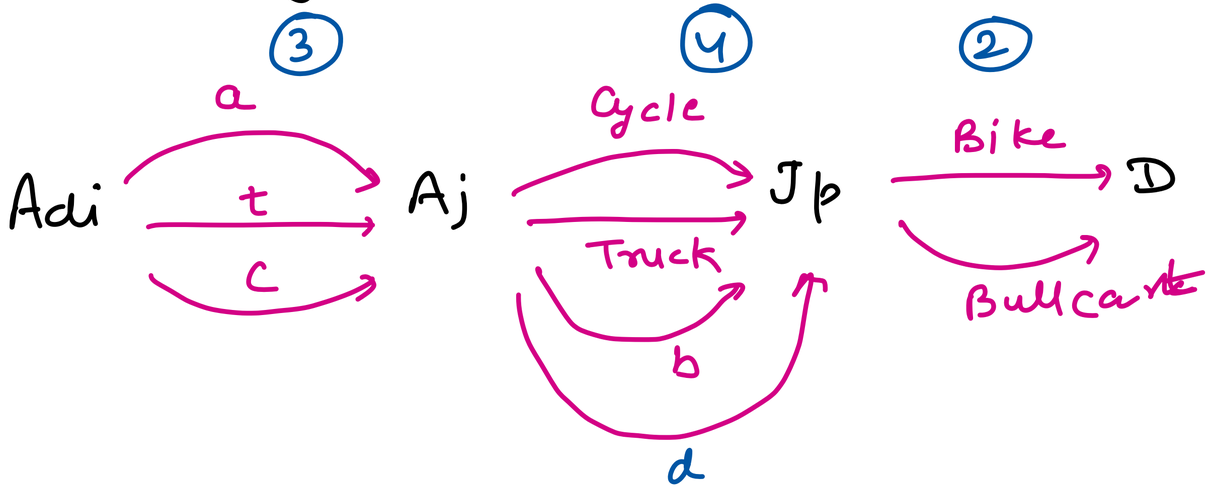
Permutation and combination
CL01

(1) fundamental principle of counting : →

Ex-1

(24) ← No. of ways.

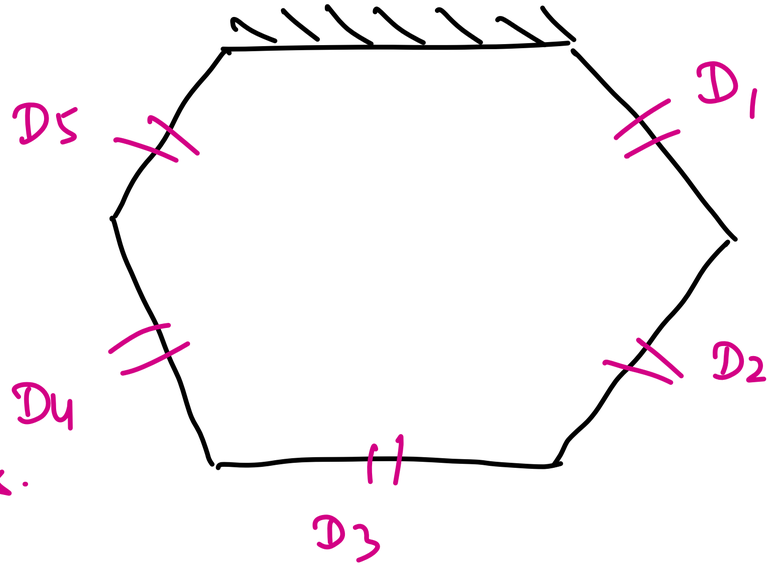


a	cycle	Bike
a	cycle	Bull
a	truck	Bike
a	"	R
"	"	✓
a	b	✓
a	c	✓
		✓

Ex-2 Cinema hall (5 doors)

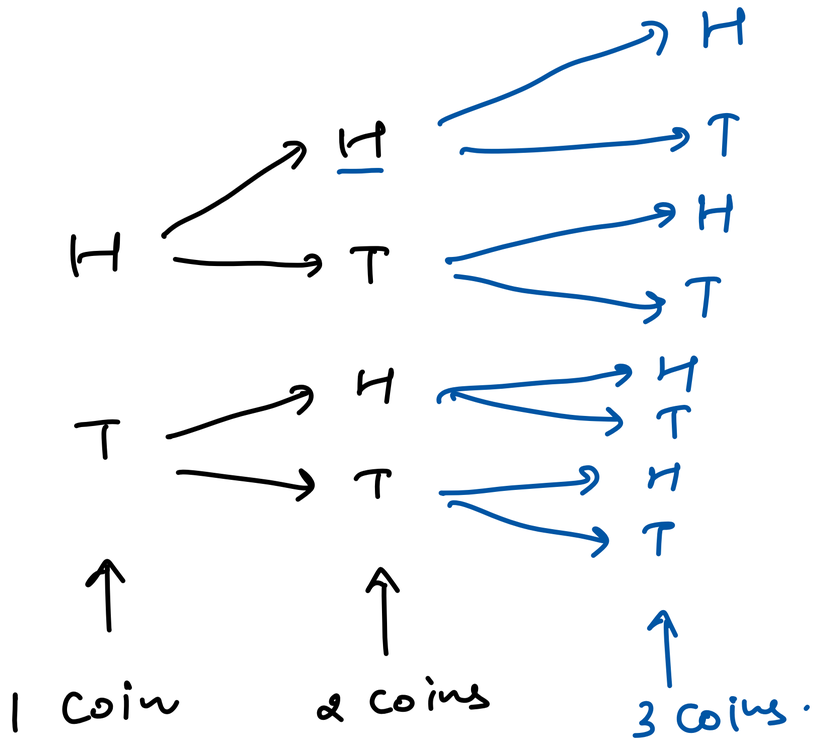
No. of ways in which he can enter and leave the cinema hall by a different door

$= 5 \times 4 = 20$ ways.



$2^4 \to 16$

E 3 Tossing a coin



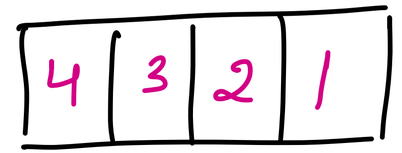
4 Coins

H	H	H	H
H	H	H	T
H	H	T	H
H	H	T	T
H	T	H	H
H	T	H	T
H	T	T	H
H	T	T	T
T	H	H	H
T	H	H	T
T	H	T	H
T	H	T	T
T	T	H	H
T	T	H	T
T	T	T	H
T	T	T	T

E-4

P/C/M/B → 4 books

No. of ways of arranging =



= 24

any one out of 4 books.

any one out of 3 remaining books.

E(1) 3 digit numbers using the digits 1, 2, 3, 4, 5 without repetition. $5 \times 4 \times 3 = 60$ ways.

E(2) 10 students compete in a swimming race. In how many ways can they occupy the first 3 positions.

$10 \times 9 \times 8 = 720$

E(3) 7 flags of different colour. Number of different signals that can be transmitted by the use 2 flags one above the other. $\frac{7}{6} = 42$ ways.

E(4) Number of words which can be formed from the letters of the word **Machine/Miracle** if Vowels may occupy the

(a) odd position

(b) even position.

E(5) If the letters of the word "TOUGH" are written in all possible ways and then are arranged as in a dictionary, then find the rank of the word TOUGH.

E(6) 4 lettered word using only the letters from the word "DAUGHTER" if each word is to include "G".

D(7) 10 T/F questions. How many sequences of answers are possible. $2 \times 2 \times 2 \times 2 \times \dots \times 2 = 2^{10} = 1024$

D(8) A letter lock consists of four rings marked 26 different english alphabet. The number of ways in which an unsuccessful attempt can be made. $(26 \times 26 \times 26 \times 26) - 1 = 26^4 - 1 = 456975$

D(9) If there m monkeys & n available masters in how many ways monkeys can be given to the masters, if a master has any number of monkeys.

$m \rightarrow$ monkeys

$n \rightarrow$ masters. $\boxed{n}$

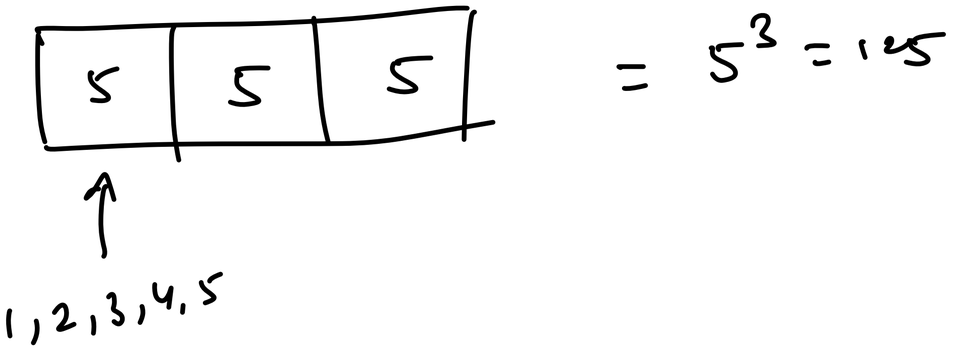
$1 \rightarrow n$

$2 \rightarrow n$

n^m

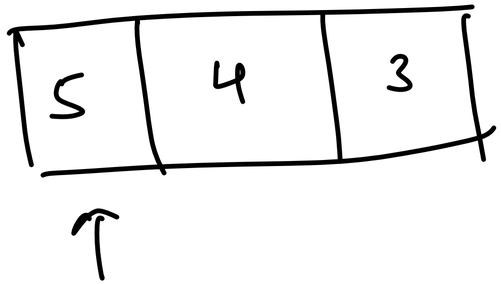
Ex 1

Repetition allowed



$= 5^3 = 125$

Rep not allowed



$= 60$

Q TOUGH

Arrange alphabetic order

G H O I U

G _ _ _ _ = 4×3×2×1 = 24

H _ _ _ _ = 4×3×2×1 = 24

O _ _ _ _ = 4×3×2×1 = 24

T G _ _ _ = 3×2×1 = 6

T H _ _ _ = 3×2×1 = 6

T O G _ _ = 2×1 = 2

T O H _ _ = 2×1 = 2

T O U G H = 1 = 1

89th Rank

G 4 3 2 1

HOTU

Q

PROBLEM

B _ _ _ _ _ _ =

E _ _ _ _ _ _ =

L _ _ _ _ _ _ =

M _ _ _ _ _ _ =

O _ _ _ _ _ _ =

P B _ _ _ _ _ =

P E _ _ _ _ _ =

P L _ _ _ _ _ =

P M _ _ _ _ _ =

P O _ _ _ _ _ =

P R B _ _ _ =

B ELMOPR

6 x 5 x 4 x 3 x 2 x 1 = 720

720

720

720

720

720

5 x 4 x 3 x 2 x 1 = 120

= 120

= 120

120

120

24

B E L M O P R

~~P R O B L E M~~

P R E _ _ _ _ = 24

P R L _ _ _ _ = 24

P R M _ _ _ _ = 24

P R O B E _ _ = 2

P R O B L E M = 1

4299th Rank

Q PERSON

ENOPRS

E _ _ _ _ _ = 120

N _ _ _ _ _ = 120

O _ _ _ _ _ = 120

P E N _ _ _ = 6

P E O _ _ _ = 6

P E R N _ _ = 2

P E R O _ _ = 2

P E R S N _ = 1

P E R S O N = 1

378^{th} Rank