L14 28 Feb 2022

28 February 2022 10:08

Bounded Lattice :→

A Lattice L is s.t.b bounded if L has a least element and a greatest element.

① eg Non Negative integers , $<$

$$(Z^+, <)$$

$0 < 1 < 2 < 3 < 4 < 5 < 6 < 7 \ldots\ldots$

↓ Least element.

② $A = \{a, b\}$ → Bounded Lattice

$P(A) = \{ \phi, \{a\}, \{b\}, \{a,b\} \}$, $\subseteq$

$\phi \subseteq \phi$

$\phi \subseteq \{a\}$

$\phi \subseteq \{b\}$

$\phi \subseteq \{a,b\}$

ϕ → Least element

$\{a,b\}$ – Greatest element.

$\phi \subseteq \{a,b\}$

$\{a\} \subseteq \{a,b\}$

$\{b\} \subseteq \{a,b\}$

$\{a,b\} \subseteq \{a,b\}$

Distributive Lattice :→

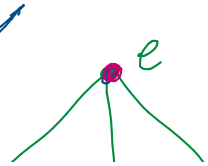
	Join	meet
(a,b)	$a \vee b$	$a \wedge b$
	Least upper bound of a and b	greatest lower bound of a and b

A Lattice is s.t.b distributive if it satisfies distributive laws

i.e ① $x \wedge (y \vee z) = (x \wedge y) \vee (x \wedge z)$

② $x \vee (y \wedge z) = (x \vee y) \wedge (x \vee z)$

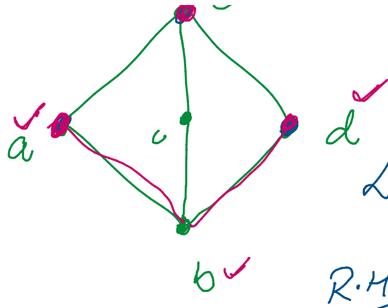
eRx ✓ dRx ✓ eRe ✓ dRe ✓



$\boxed{a, e \text{ and } d}$

Lower bound = a and b

V – Join



$\boxed{a, e \text{ and } d}$

V - Join

L.H.S $\quad a \wedge (e \vee d) = a \wedge e = a$

greatest lower bound

R.H.S $\quad (a \wedge e) \vee (a \wedge d)$

$a \vee b = a$

bRa $\quad$ aRa

bRe $\quad$ aRe

0, 1, 2, 3, 4, 5, 6, 7, 8, 9

Unit - 3

Fundamental principle of counting :→

× × × ×

↓ ↓ ↓ ↓

10 10 10 10

$\boxed{10,000}$

J1 $\quad$ J2 → 2 ways

T1 $\quad$ T2 $\quad$ T3 → 3 ways

J1 T1	J2 T1
J1 T2	J2 T2
J1 T3	J2 T3

6 ways = (2×3) ways

"If an event can occur in m different ways, following which another event can occur in n different ways, then the total number of occurrence of the events in the given order is m×n."

How many 3-digit even numbers can be formed from the digits 1, 2, 3, 4, 5, 6 if the digits can be repeated?

1, 2, 3, 4, 5, 6

× × ×

↓ ↓ ↓

$6 \times 6 \times 3 = 108$

How many 3-digit numbers can be formed from the digits 1, 2, 3, 4 and 5 assuming that

(i) repetition of the digits is allowed?

(ii) repetition of the digits is not allowed?

(i) X X X

$5 \times 5 \times 5 = 125$

(ii) X X X

$5 \times 4 \times 3 = 60$

A coin is tossed 3 times and the outcomes are recorded. How many possible outcomes are there?

X X X

$2 \times 2 \times 2 = 8$

T H T H T H

Example 4 Find the number of different signals that can be generated by arranging at least 2 flags in order (one below the other) on a vertical staff, if five different flags are available.

flags → 2 3 4 5

X X   XXX   XXXX   XXXXX

5×4 $5 \times 4 \times 3$ $5 \times 4 \times 3 \times 2$ $5 \times 4 \times 3 \times 2 \times 1$

$20 + 60 + 120 + 120$

$= 320$