Lec # 19:- PARTIAL ORDER.

HASSE DIAGRAM.

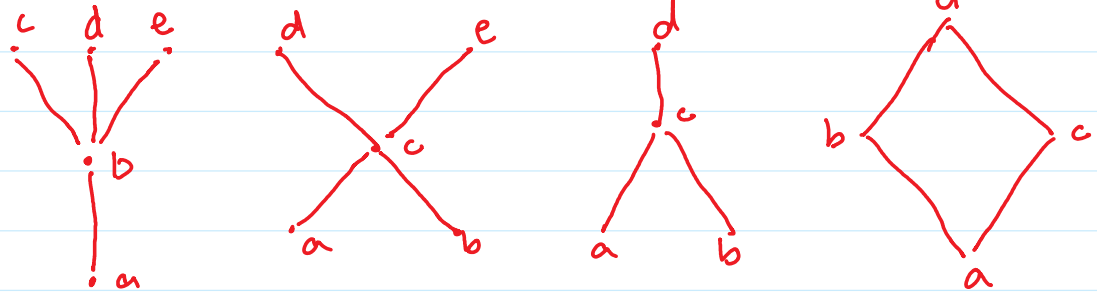
Maximal:- $a \in S$ is maximal in Poset $(S, \preceq)$
$\neg \exists_{b \in S}\ a \prec b$.

Minimal:- $a \in S$ is minimal in Poset $(S, \preceq)$
$\neg \exists_{b \in S}\ b \prec a$

Greatest :- $a \in S$ is greatest in Poset $(S, \preceq)$
$\forall_{b \in S}\ b \preceq a$.

least :- $a \in S$ is least in Poset $(S, \preceq)$
$\forall_{b \in S}\ a \preceq b$.

Ex#7 :- Sol



Maximal	c, d, e	d, e	d	d
Minimal	a	a, b	a, b	a
Greatest	∄	∄	d	d
least.	a	∄	∄	a.

Lower Bound :- $(S, \leq)$ $A \subseteq S$

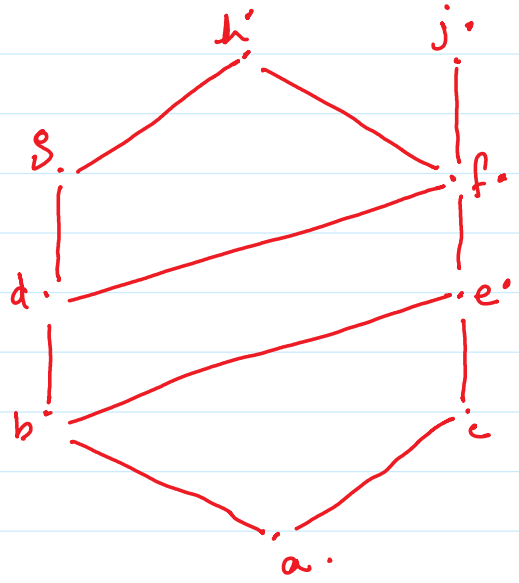
Lower Bound (A) = $l \in S$ such that $\forall_{a \in A}$ $l \leq a$.

Upper Bound :- $(S, \leq)$ $A \subseteq S$.

Upper Bound (A) = $u \in S$ such that $\forall_{a \in A}$ $a \leq u$.

Ex18 :-

S11



Lower Bound $(\{a,b,c\})$ = $\{a\}$.

Upper Bound $(\{a,b,c\})$. = $\{e, f, h, j\}$.

Greatest LB = a

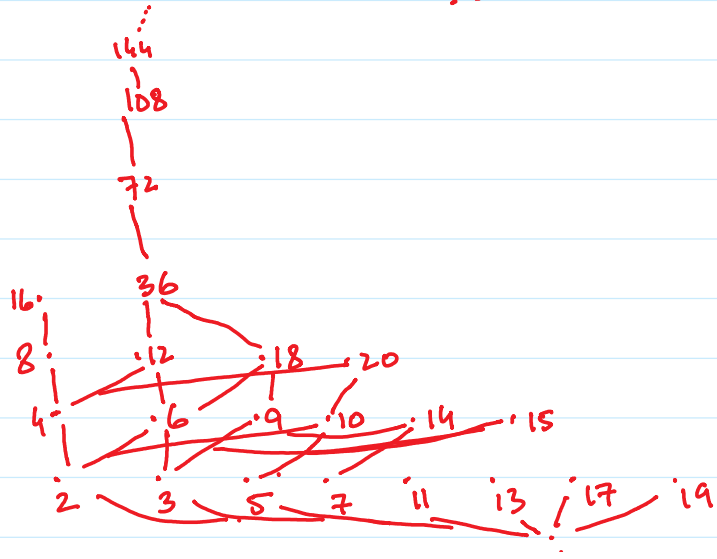
Least UB = e

Ex19 Hw.

S11.

Ex20 :- $\{3, 9, 12\}$.

S11. $(\mathbb{Z}^+, /)$.



GCD } 4-5.
LCM }

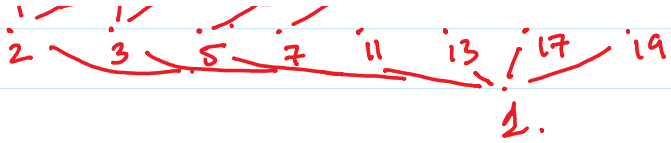
$\{3, 9, 12\}$.

LB $\{3, 9, 12\}$ = $\{2, 3\}$.

GLB $\{3, 9, 12\}$ = 3.

GCD

UB $\{3, 9, 12\}$ = $\{36, 72$
$108, 144 \ldots ?$

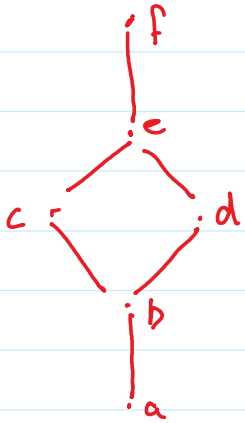


$UB\{3,9,12\} = \{36, 72, 108, 144 \cdots\}$.

$LUB = 36$.

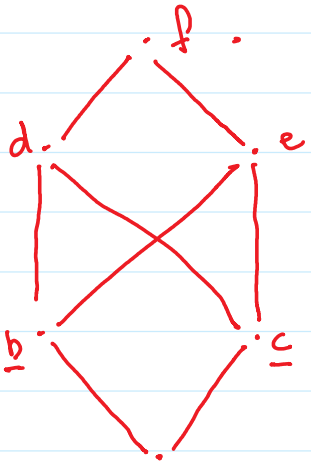
LCM.

Lattice :- $\forall a,b \in S$ if $\exists$ $GLB\{a,b\}$ & $LUB\{a,b\}$.



✓

$GLB\{a,b\} = a$



X.

$UB\{b,c\} = \{d, e, f\}$.

$LUB\{b,c\} = \phi$.

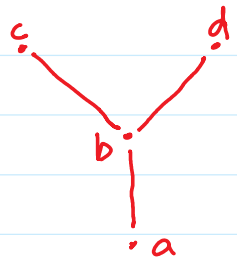
Ex23 $(\{1,2,4,8,16\}, /)$. Lattice = ?

Total order lattice ✓.

Sorting & Ranking.

Quiz # 4

27TH - OCT - 2023.



a) FIND the Graph Corresponding to the Hasse diagram.

b). " " Matrix " " " " " ".