lecture 19:-

HASSE DIAGRAM.

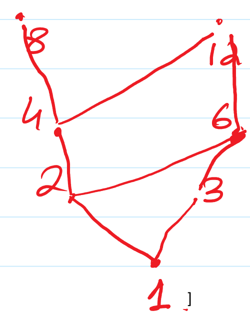
$(\{\cancel{1},2,3,\cancel{4}\}, \leq)$.

$R = \{\cancel{(1,1)}, (1,2), (1,3), (1,4), \cancel{(2,2)}, (2,3), (2,4),$
$\cancel{(3,3)}, (3,4), \cancel{(4,4)}\}$.

$R = \{(1,1), (2,2), (3,3), (4,4), (1,2)$
$(2,3), (3,4), (1,3), (2,4), (1,4)\}$.

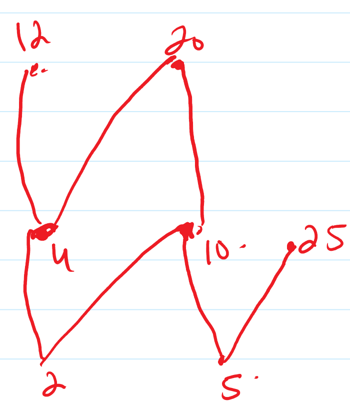
Ex 12 :- $(\{\cancel{1},2,3,4,6,\cancel{8},\cancel{12}\}, \mid)$.
508

$R = \{\cancel{(1,1)}, (1,2), (1,3), (1,4), (1,6), (1,8), (1,12),$
$\cancel{(2,2)}, (2,4), (2,6), (2,8), (2,12),$
$\cancel{(3,3)}, (3,6), (3,12),$
$\cancel{(4,4)}, (4,8), (4,12),$
$\cancel{(6,6)}, (6,12),$
$\cancel{(8,8)},$
$\cancel{(12,12)}\}$.



$\Rightarrow$ Find Relation.

Ex 14 :- $(\{\cancel{2},4,\cancel{5},10,\cancel{12},\cancel{20},\cancel{25}\}, \mid)$.



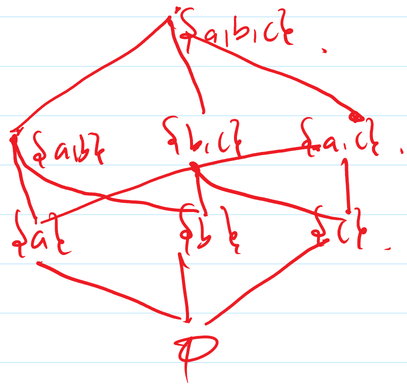
Ex 16 $(P\{a,b,c\}, \subseteq)$.

$P(\{a,b,c\}) = \{\cancel{\emptyset}, \cancel{\{a\}}, \cancel{\{b\}}, \cancel{\{c\}},$
$\{a,b\}, \{a,c\}, \{b,c\},$
$\{a,b,\cancel{c}\}\}$

{a,b},{a,c},{b,c},
~~{a,b,c}}~~

$R = \{(\cancel{\emptyset, \emptyset}), (\emptyset, \{a\}) (\emptyset, \{b\}), (- - - -)$ - - - -
$(\cancel{\{a\}, \{a\}}), (\{a\}, \{a,b\}), (\{a\}, \{a,c\}), (\{a\}, \{a,b,c\}),$

}

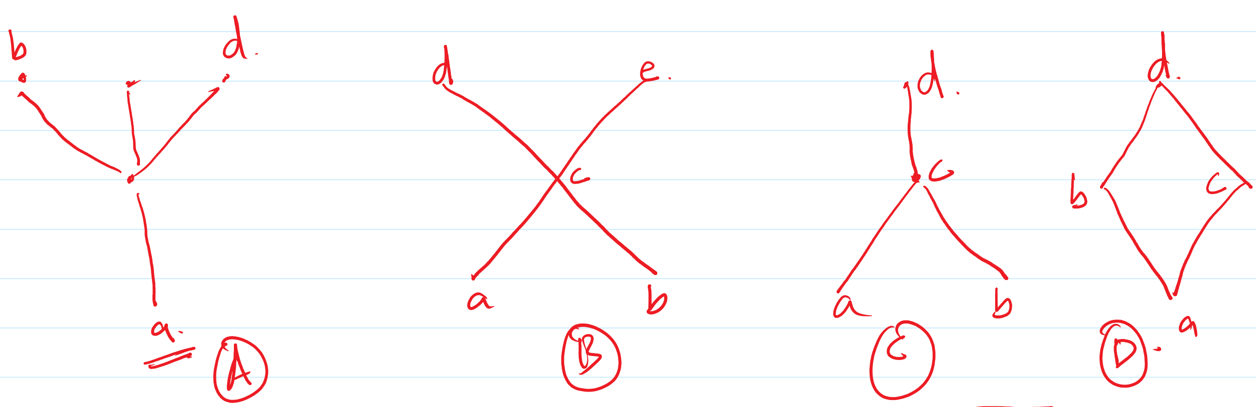


Maximal :- a is maximal $(S, \preceq)$.
if $\neg\exists b \in S \quad a \prec b$.

Minimal. a is minimal $(S, \preceq)$.
if $\neg\exists b \in S \quad b \prec a$.

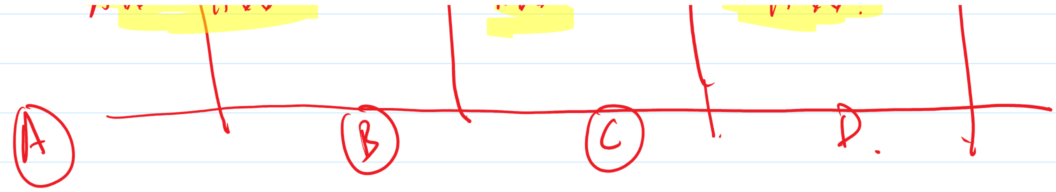
Greatest a is Greatest $(S, \preceq)$.
$\forall b \in S \quad b \preceq a$.

Least. a is least $(S, \preceq)$.
$\forall b \in S \quad a \preceq b$.



	A	B	C	D
Maximal Minimal Greatest Least	HW	HW	HW	HW.

Greatest
least.



Ex 17
510

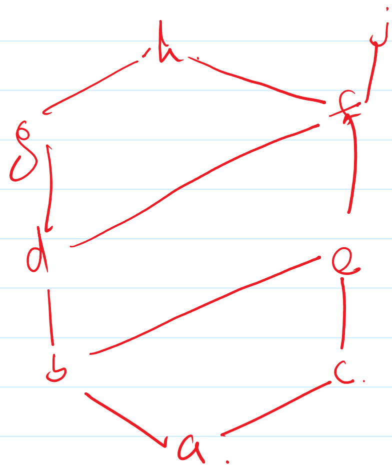
Lower Bound. $(S, \leq)$.

if $l \in S$ $\forall_{a \in A}$, $l \leq a$ then l = lower bound of A.

Upper Bound $(S, \leq)$.

if $u \in S$ $\forall_{a \in A}$ $a \leq u$ u is the upper bound.

$\{j, h\}$



lower bound of $\{a, b, c\}$.
$= \{a\}$.

Upper bound $= \{e, f, h, j\}$.

Greatest lower bound =.

least Upper bound.

5/3 or 3/5

Ex 5.4:- Show that Inclusion or $\subseteq$ is a partial order on the powerset of any set.

$(P(S), \subseteq)$

$R = \{(a,b) \mid a \subseteq b\}$.

$S = \{a,b,c\}$.

$P(S) = \{\phi, \{a\}, \{b\}, \{c\}, \{a,b\}, \{b,c\}, \{a,c\}, \{a,b,c\}\}$

$R = \{(\phi,\phi), (\phi,\{a\}), (\phi,\{b\}), (\phi,\{c\}), (\phi,\{a,b\}), (\phi,\{b,c\}), (\phi,\{a,c\}), (\phi,\{a,b,c\}),$

$(\{a\},\{a\}), (\{a\},\{a,b\}), (\{a\},\{a,c\}), (\{a\},\{a,b,c\}),$

$(\{b\},\{b\}), \ldots$

$R = \{(a,b) \mid a \cap b = \phi\}$. $R = \{a,b,c\}$

$(P(S), a \cap b = \phi)$.

$\left(P(S), \frac{|a \cap b|}{|a \cup b|} \geq 1\right)$