Lecture 29:-

HASSE DIAGRAM. 1898– 1979.

Ex13:- $R = \{(a,b) \mid A \subseteq B\}$. $P(S) \times P(S)$. $A \subseteq B$

$B \supseteq A$.

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

$\subseteq$ Prove in HW.

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

$P(S) \times P(S) = \{(\Phi,\Phi), (\Phi,\{a\}), (\Phi,\{b\})$ - - - -

$(\{a\},\Phi), (\{a\},\{a\}), (\ --\ )$ - - -

- - - - - - (HW).

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

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

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

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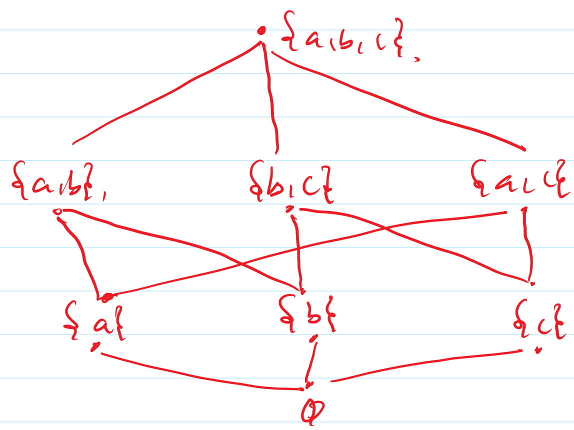
$\cancel{(\{a,b,c\},\{a,b,c\})}\}$.

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



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

HW.

$P(S)$

$S = \{1,4,8\}$.

Ex:- $R = \{(a,b) \mid \frac{|a \cup b|}{|a|} \geq 1\}$.

Ex 14. $(\{2,4,5,10,12,20,25\}, /)$ HASSE DIAGRAM.

SOME BASIC DEFINITIONS.

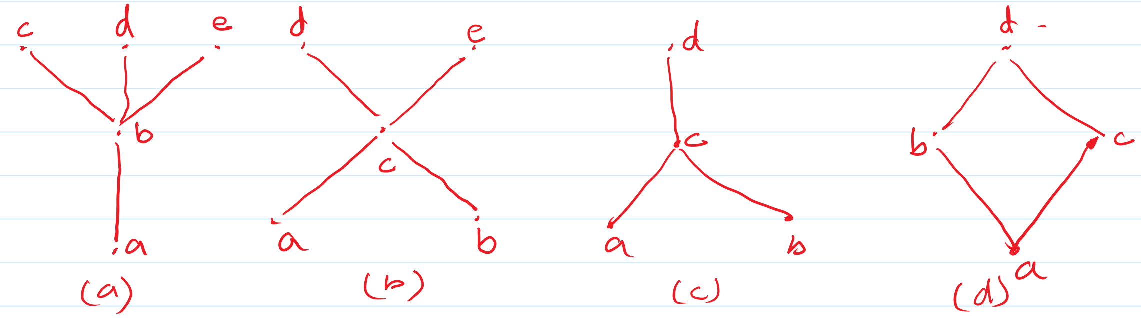
PS09. 1- Greatest :- $a \in S$ is the greatest in $(S, \preceq)$ if $b \preceq a$ $\forall b \in S$.

2- LEAST :- $a \in S$ is the least in $(S, \preceq)$ if $a \preceq b$ $\forall b \in S$.

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

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

Ex 17./PS10.



Observation :- if Greatest exist $\rightarrow$ that element is maximal.
" Least " $\rightarrow$ " " " Minimal.
if Greatest does not exist $\rightarrow$ we may or may not have maximal.

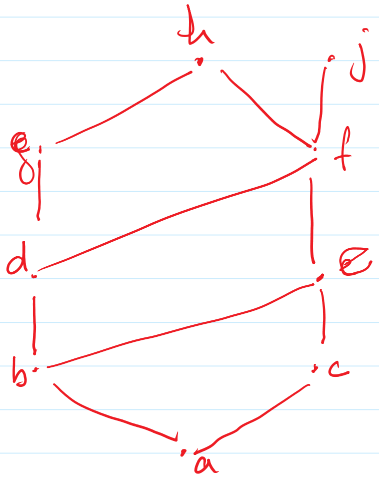
if Least does not exist $\rightarrow$ we may or may not have minimal.

Definitions :- Upper Bound :- $u \in UB$. $(u \in S)$ if $a \preceq u$ $\forall a \in A$. Then $u \in UB$ for the Set $A \subseteq S$.

PS10.

lower Bound :- $l \in LB$ $(l \in S)$. if $l \preceq a$ $\forall a \in A$ then $l \in LB$ for the Set $A \subseteq S$.

lower Bound. $a \geq$ LB ($\ell \leq a$). if each
$\forall a \in A$ then
$\ell \in$ LB for the Set $A \subseteq S$.



$\{a,b,c\}$ find Upper bound.

UB = $\{e, f, j, h\}$.

LB = $\{a\}$.

$\{a,b,c\}$.
Least Upper Bound :- $\{e\}$.

P 511.

Definitions :-

$\{a,b,c\}$.
Greatest lower Bound :- $\{a\}$.

Set = $\{b, e\}$.

UB = $\{f, j, h, e\}$. LUB = $\{e\}$.

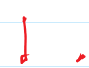
LB. = $\{a, b\}$. GLB = $\{b\}$.

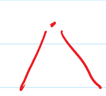
Ex :- 3 elements.

(a)

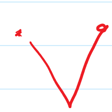
4 elements. CHW.

(b) 

(e) 

(c) 

GCD / LCM.
⇓.
Next lecture.

(d) 

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