L13 23 Feb 2022

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upper and lower bound

$R \leq$

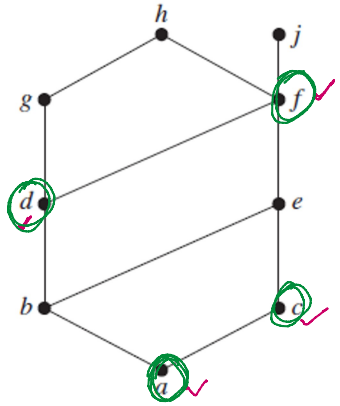
Let A be the subset of the poset (S, R)

If u is the element of the set S such that aRu for all $a \in A$.

then u is called the upper bound of A.

If l is the element of the set S such that lRa for all $a \in A$.

then l is called the lower bound of A.



Find the lower and upper bounds of the subsets $\{a, b, c\}$, $\{j, h\}$, and $\{a, c, d, f\}$ in the poset

① $A = \{a,b,c\}$

upper bounds of $\{a,b,c\} = e, f, j, h$

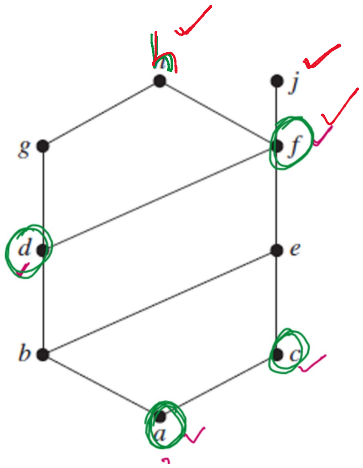
aRe
bRe
cRe
eRf

$\Rightarrow aRf$
bRf
cRf
fRj
fRh

② $A = \{j,h\}$

NO upper bound

③ $\{a,c,d,f\}$



$A = \{a,c,d,f\}$

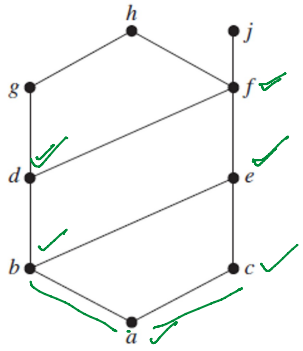
upper bound $= \{j,h,f\}$

aRj
cRj
dRj
fRj

aRf
cRf
dRf
fRf

aRf

aRx
cRx
dRx
fRx



① $A = \{a, b, c\}$

Lower bound $= \{a\}$

$l \not\leq a$

$l \not\leq b$

$l \leq c$

② $A = \{j, f\}$

Lower bounds $= \{j, d, e, b, c, a\}$