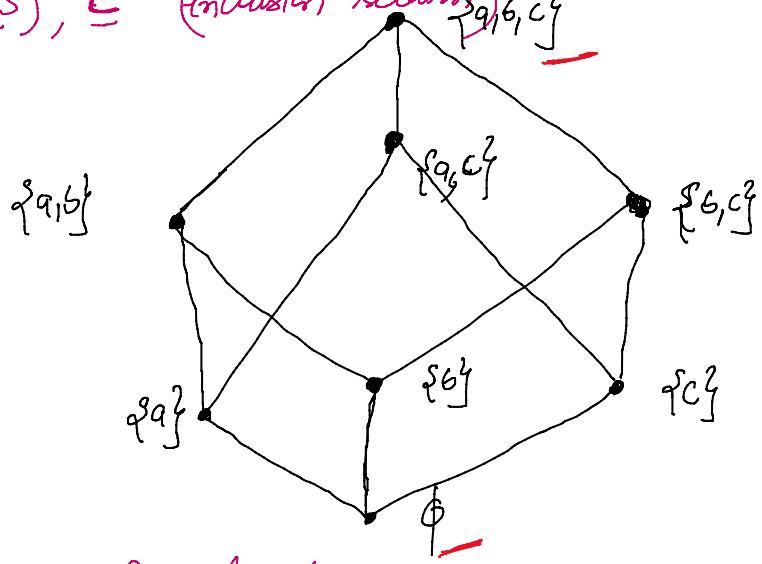
L12 22 Feb 2022

22 February 2022 11:04

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

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

$P(S), \subseteq$ (inclusion relation)



Subset

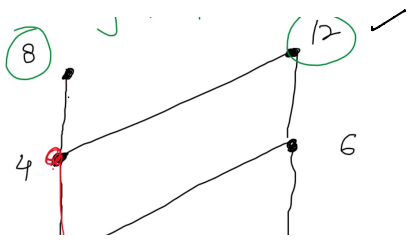
Maximal and Minimal elements :-

An element of a poset is called maximal if it is not less than any element of the set

i.e a is the maximal in the poset $(S, \leq)$ if there is no $b \in S$ such that $a \leq b$

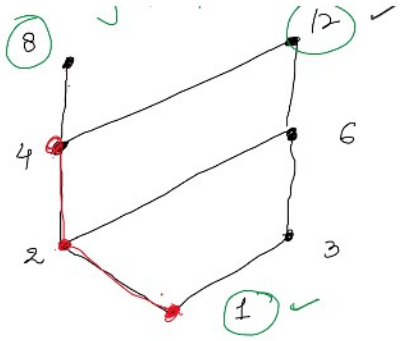
Ily an element of a poset is called minimal if it is not greater than any element of the poset.

i.e a is minimal if there is no b such that $b \leq a$



Maximal elements = 8 and 12

Minimal element = 1.



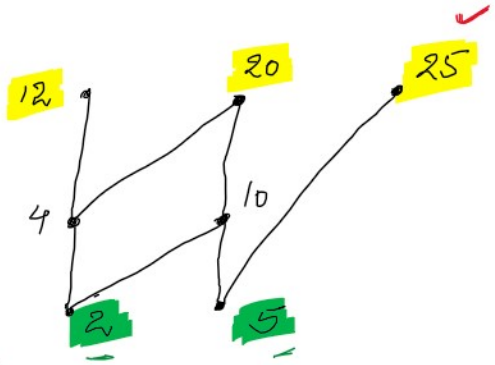
Maximal elements
8 and 12

Minimal element
= 1.

$\{\{2,4,5,10,12,20,25\}, 1\}$

which elements of the poset are maximal = 12, 20, 25

Minimal elements = 2, 5



Greatest and least element :→

a is the greatest element of the poset $(S, \leq)$ if $b \leq a$ for all $b \in S$.

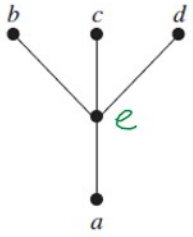
The greatest element is always unique (if it exists).

a is the least element of the poset $(S, \leq)$ if $a \leq b$ for all $b \in S$.

The least element is always unique. (if it exists).

No Greatest element in the above example
No least element.

No Least element.



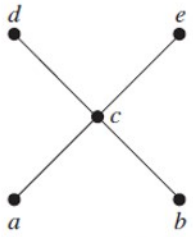
(a)

① Maximal elements b, c, d.

② Minimal elem a

No Greatest

Least = a



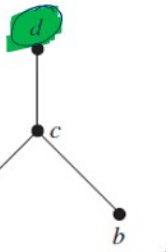
(b)

Maximal elems d, e

Minimal elements a, b.

No. Greatest

No. Least



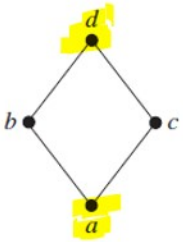
(c)

Maximal d.

Minimal elem a and b.

Greatest elem = d

No. Least elem



(d)

Maximal elem = d.

Minimal = a

Greatest = d

Least elem = a

a R c

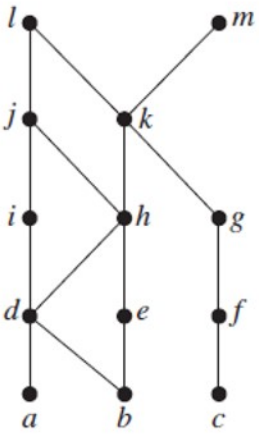
a R d.

b R c

b R d.

c R d.

d R d.



Maximal elements = l, m

Minimal elements = a, b, c

Greatest elements = No

Least elem = No

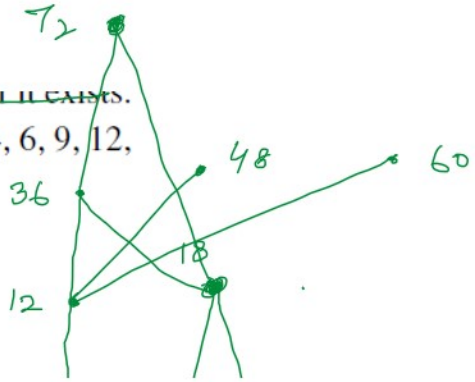
~~h) Find the greatest lower bound of {1, 4}, if it exists.~~

. Answer these questions for the poset ({2, 4, 6, 9, 12, 18, 27, 36, 48, 60, 72}, |).

27, 48, 60, 72 **a)** Find the maximal elements.

2, 9 **b)** Find the minimal elements.

No **c)** Is there a greatest element?



2, 1

b) Find the minimal elements.

c) Is there a greatest element?

NO.

d) Is there a least element?

NO