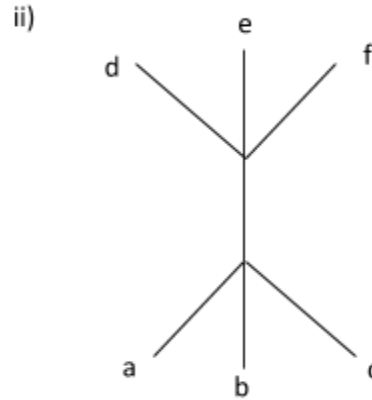
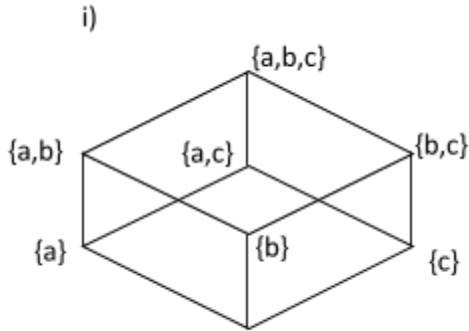


Discrete Structures - Tutorial III

1 Find the chain and the anti-chain in the following Hass Diagrams.



2. Let $S = \{a, b, c, d, e, f\}$ be a poset. Suppose there are exactly six pairs of elements such that the first immediately precedes the second as follows:

$$f \ll a, f \ll d, e \ll b, c \ll f, e \ll c, b \ll f,$$

- (a) Find all minimal and maximal elements of S .
- (b) Does S have any maximum or minimum element?
- (c) Find all pairs of elements, if any, which are non-comparable.

3. What is the covering relation of the partial ordering $\{(a, b) \mid a \text{ divides } b\}$ on $\{1, 2, 3, 4, 6, 12\}$? Draw the Hasse diagram using the covering of the function.

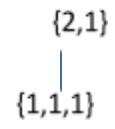
4. A partition of a positive integer m is a set of positive integers whose sum is m . For example:

for $m = 3$, partitions can be

- i) 2-1 ($2+1=3$),
- ii) 1-1-1 ($1+1+1=3$), and
- iii) 3

We can order the partitions of integer m as follows. A partition P_1 precedes a Partition P_2 if integers in P_1 can be added up to obtain the integers of P_2 or, equivalently, if the integers in P_2 can be further subdivided to obtain the integers in P_1 . For example

1-1-1 precedes 2-1 for $m = 3$. (Shown in Diagram)



Draw the Hasse Diagram of partitions of $m = 5, 10$.