SMIT SIKKIM MANIPAL UNIVERSITY
SIKKIM MANIPAL INSTITUTE OF TECHNOLOGY

Engineering Mathematics III

Discrete Mathematics

Lecture 8

Lattice

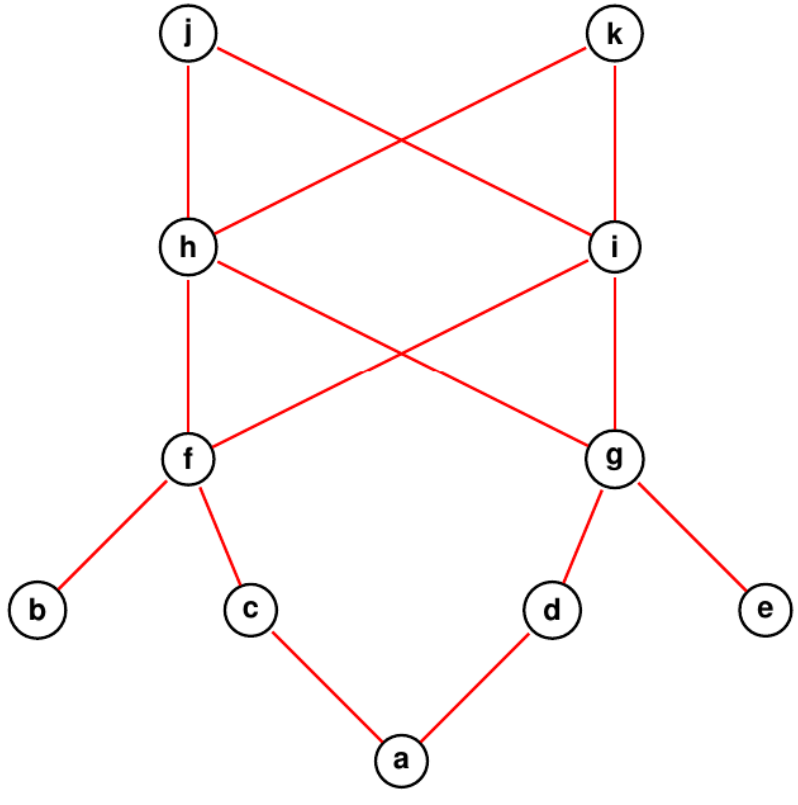
This course is taught to Computer Science Engineering students in SMIT, India during Jun-Dec, 2019.

Upper Bound

An element $c \in A$ is called as **upper bound** of two element a and b if $a \leq c$ and $b \leq c$.

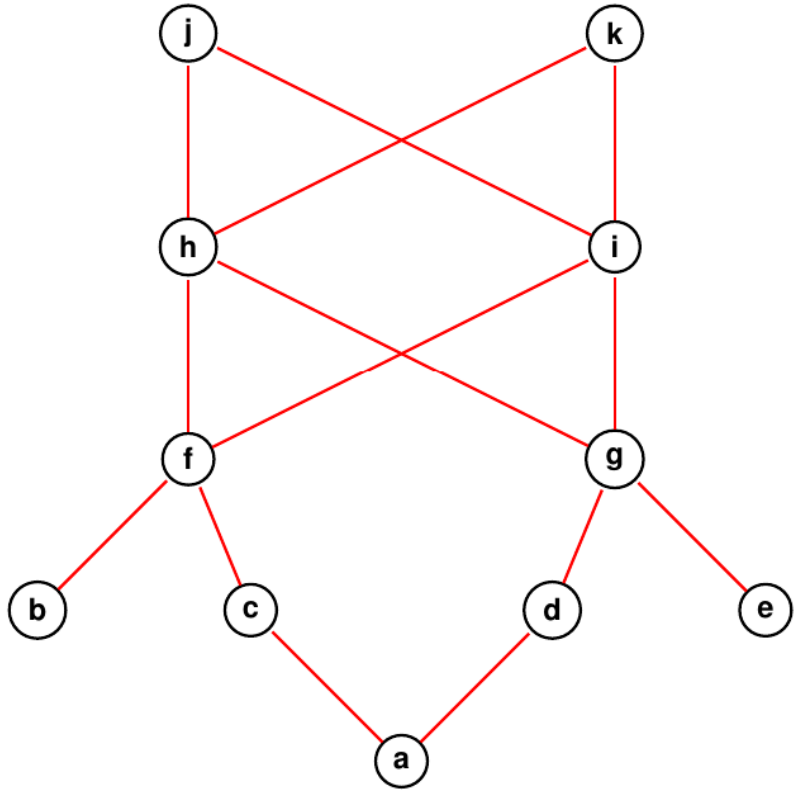
Least upper bound

An element $c \in A$ is said to be a **least upper bound** of a and b if c is an upper bound of a and b and if there is no other upper bound d of a and b such that $d \leq c$.



Least upper bound

An element $c \in A$ is said to be a **least upper bound** of a and b if c is an upper bound of a and b and if there is no other upper bound d of a and b such that $d \leq c$.

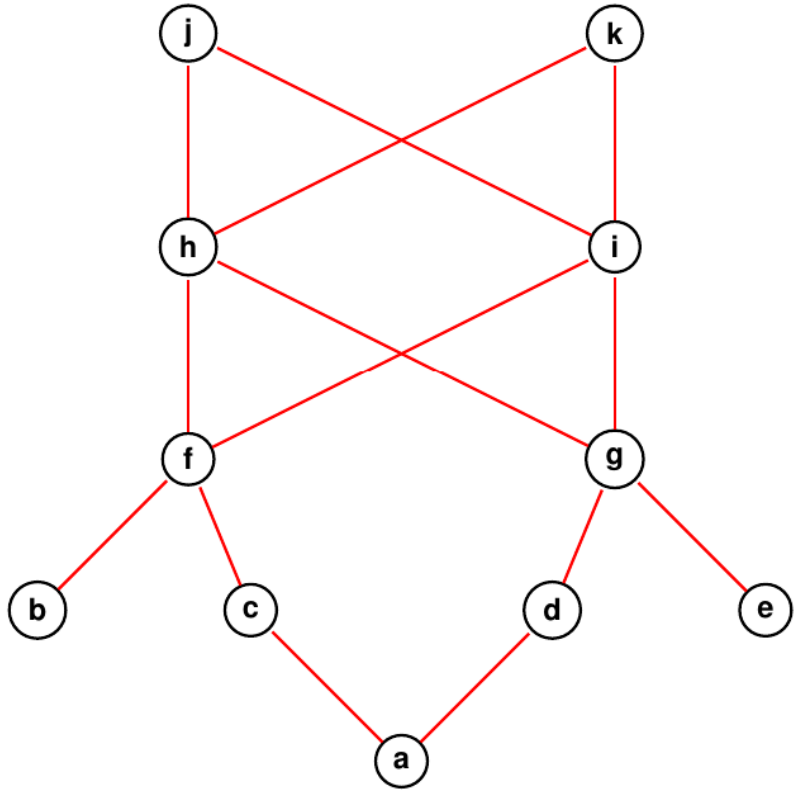


Least upper bound

Least Upper Bound

Let $(A, \leq)$ be a poset. An element $c \in A$ is called as **least upper bound** of two elements a and b if

- c is an upper bound of a and b and
- if there exists an upper bound d of a and b then $c \leq d$.



Lower Bound

Let $(A, \leq)$ be a poset.

An element $c \in A$ is called as **lower bound** of two element a and b if $c \leq a$ and $c \leq b$.

Lower Bound

Let $(A, \leq)$ be a poset.

An element $c \in A$ is called as **lower bound** of two element a and b if $c \leq a$ and $c \leq b$.

Greatest Lower Bound

An element $c \in A$ is said to be a **greatest lower bound** of a and b if

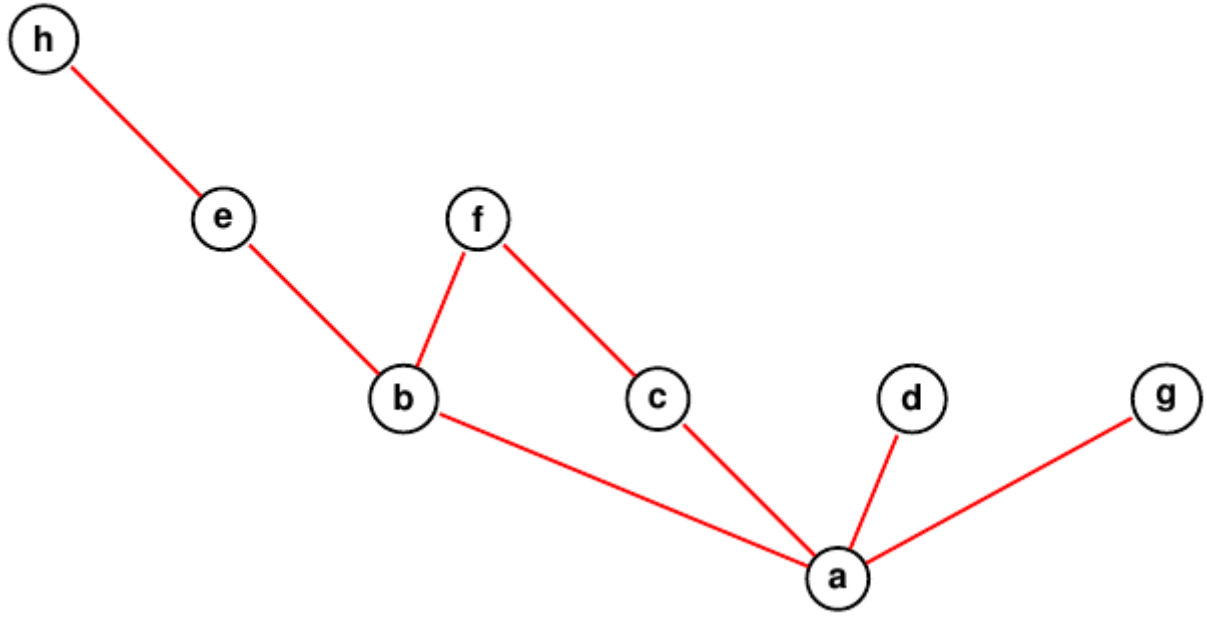
- c is an lower bound of a and b and
- if there exists a lower bound d of a and b then $d \leq c$.

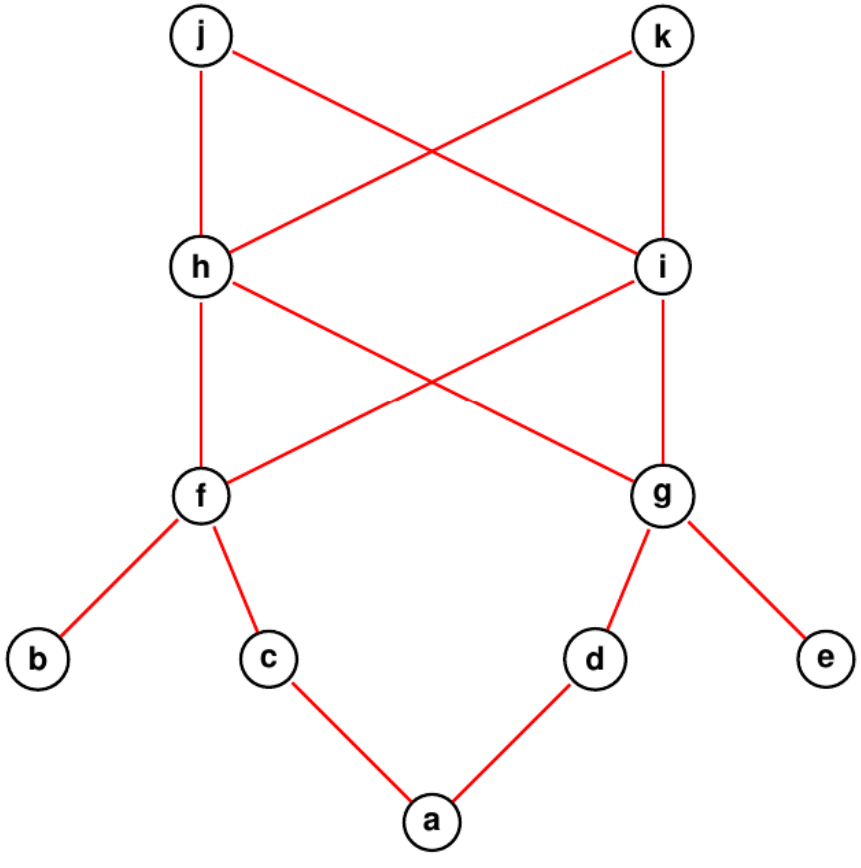
Lattice

A partially ordered set is said to be a **lattice** if every two elements in the set have a (unique) least upper bound and a (unique) greatest lower bound.

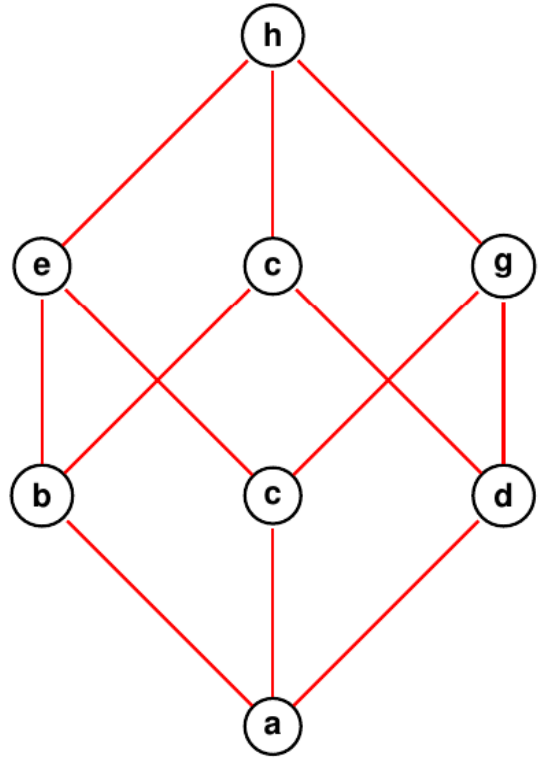
Problems

Verify the following for lattice.





(a)



(b)

Figure 4

Questions?

Thank you