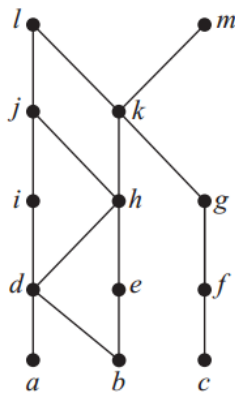


Assignment 1

1. [2pts] Let $A = \{0,2,4,6,8,10\}$, $B = \{0,1,2,3,4,5,6\}$, $C = \{4,5,6,7,8,9,10\}$. Find
 - a) $A \cap B \cap C$
 - b) $A \cup B \cup C$
 - c) $(A \cup B) \cap C$
 - d) $(A \cap B) \cup C$
2. [2pts] Let A and B be sets in a finite universal set U . List the following in order of increasing size.
 - a) $|A - B|, |A \oplus B|, |A| + |B|, |A \cup B|, |\emptyset|$
 - b) $|A|, |A \cup B|, |A \cap B|, |U|, |\emptyset|$
3. [2pts] Determine whether the relation R on the set of all integers is reflexive, symmetric, antisymmetric, and/or transitive, where $(x, y) \in R$ if and only if
 - a) $x \neq y$
 - b) $xy \geq 1$
 - c) x is a multiple of y
 - d) $x \geq y^2$
4. [2pts] Answer these questions for the partial order represented by this Hasse diagram



- a) Find the maximal elements.
 - b) Find the minimal elements.
 - c) Find all upper bounds of $\{a, b, c\}$.
 - d) Find all lower bounds of $\{f, g, h\}$.
5. [2pts] Determine whether each of these sets is finite, countably infinite, or uncountable. For those that are countably infinite, exhibit a one-to-one correspondence between the set of positive integers and the set.
 - a) all bit strings only containing the bit 0

- b) the real numbers not containing 0 in their decimal representation
- c) the positive integers less than 100,000
- d) the integers that are multiples of 6