

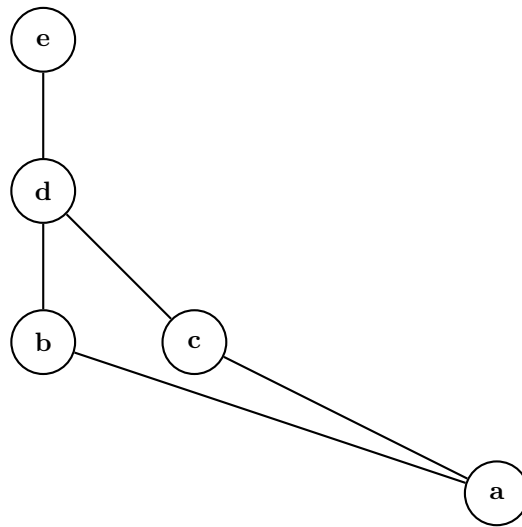
Posets & Lattices. Exercises.

Generated Exercises

January 4, 2025

Exercise 1

Consider the following poset:



For elements d and e , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

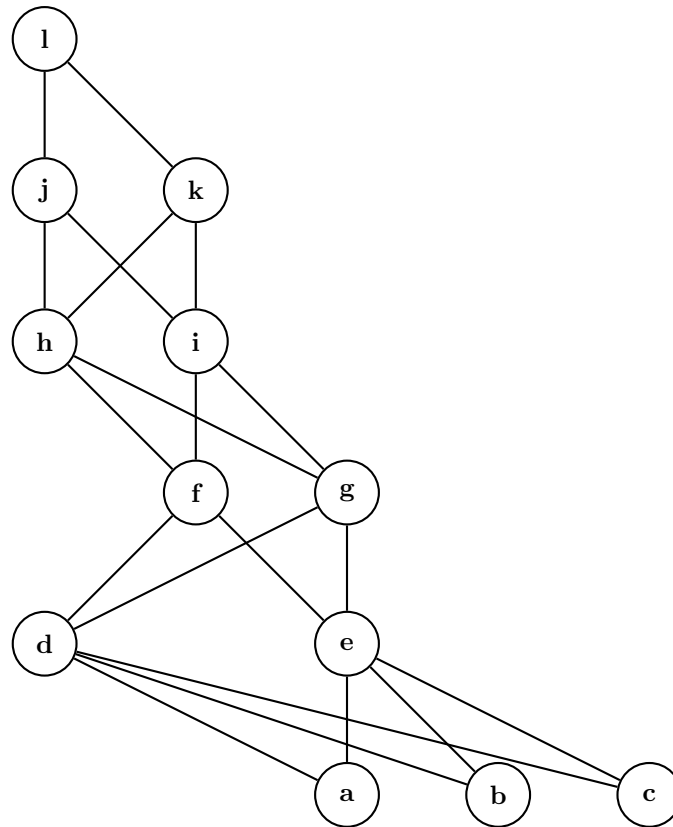
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c, d
2. Upper bounds: e
3. LUB: e
4. GLB: d
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 2

Consider the following poset:



For elements b and k , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

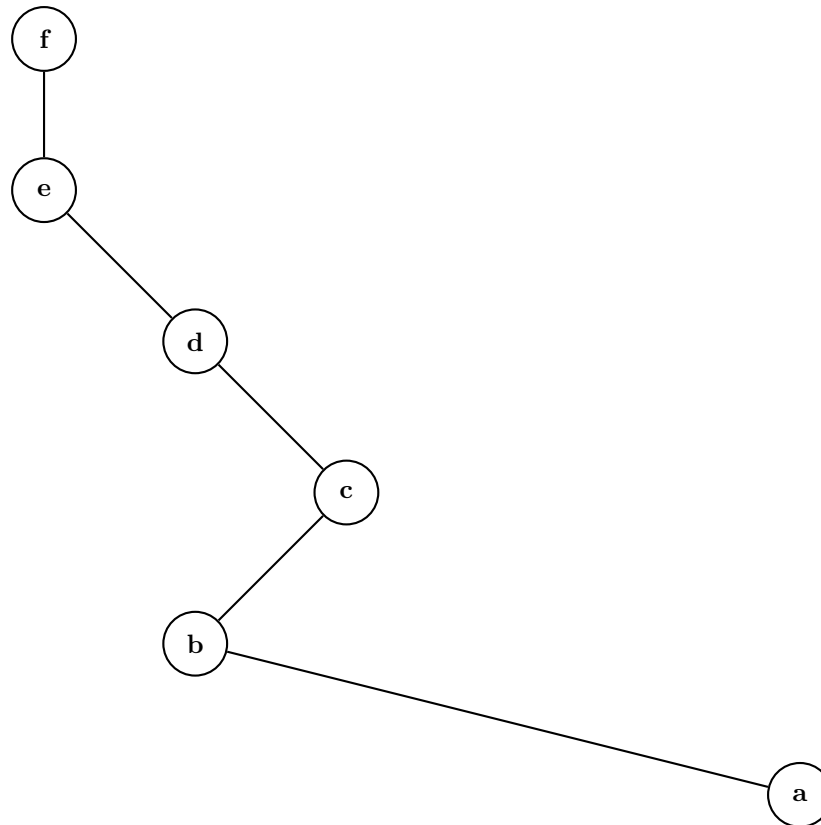
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: b
2. Upper bounds: k, l
3. LUB: k
4. GLB: b
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 3

Consider the following poset:



For elements e and a , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

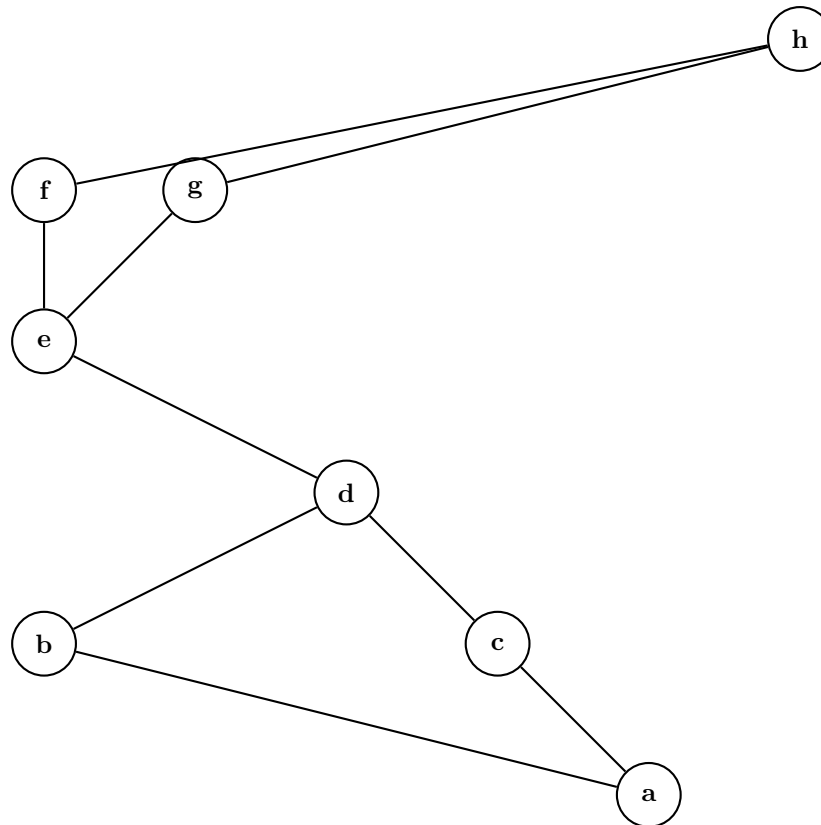
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: e, f
3. LUB: e
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 4

Consider the following poset:



For elements h and e , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

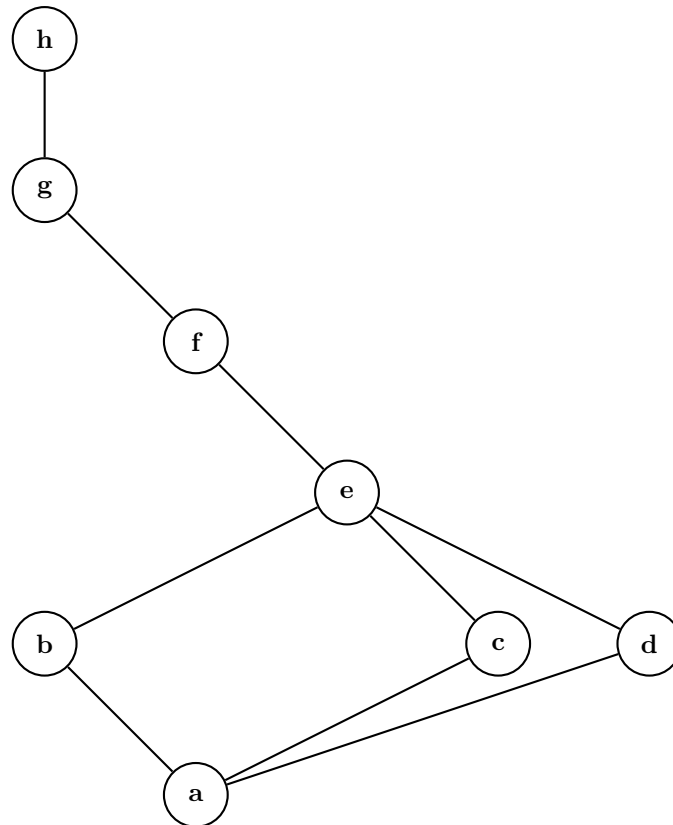
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c, d, e
2. Upper bounds: h
3. LUB: h
4. GLB: e
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 5

Consider the following poset:



For elements h and f , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

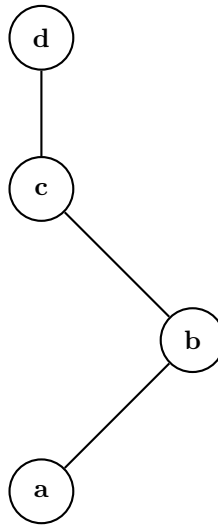
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c, d, e, f
2. Upper bounds: h
3. LUB: h
4. GLB: f
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 6

Consider the following poset:



For elements d and b , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

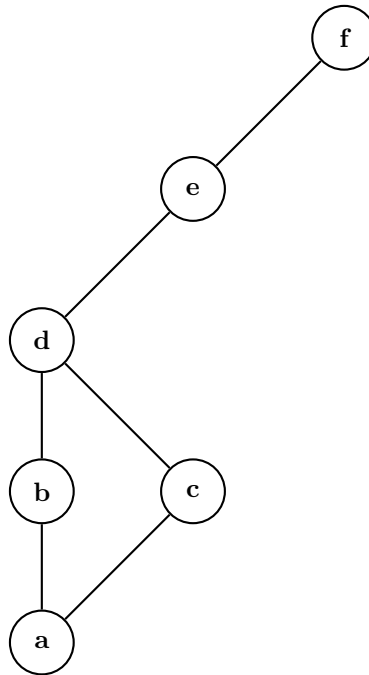
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b
2. Upper bounds: d
3. LUB: d
4. GLB: b
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 7

Consider the following poset:



For elements f and d , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

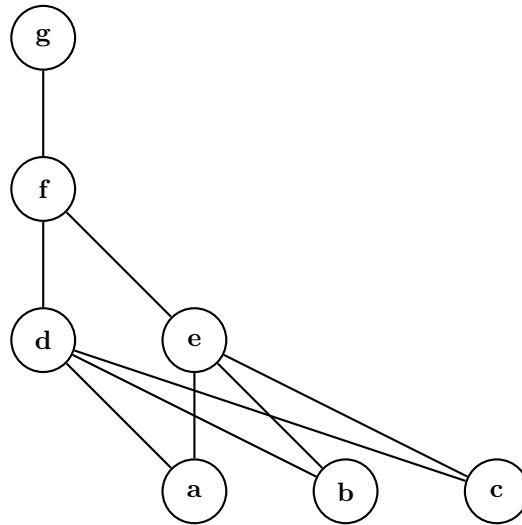
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c, d
2. Upper bounds: f
3. LUB: f
4. GLB: d
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 8

Consider the following poset:



For elements c and e , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

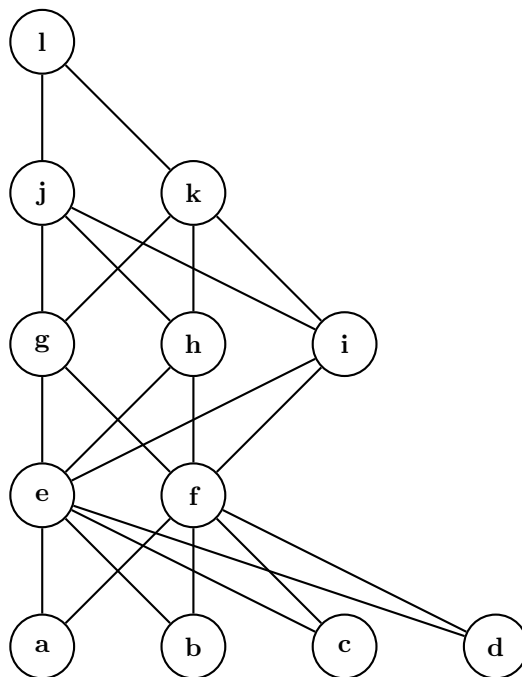
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: c
2. Upper bounds: e, f, g
3. LUB: e
4. GLB: c
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 9

Consider the following poset:



For elements a and g , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

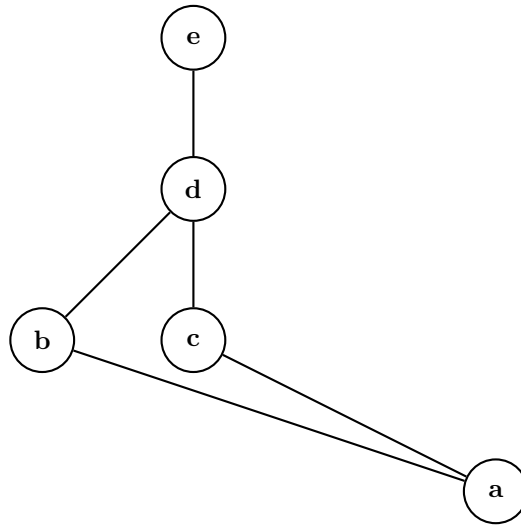
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: j, k, l, g
3. LUB: g
4. GLB: a
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 10

Consider the following poset:



For elements a and d , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

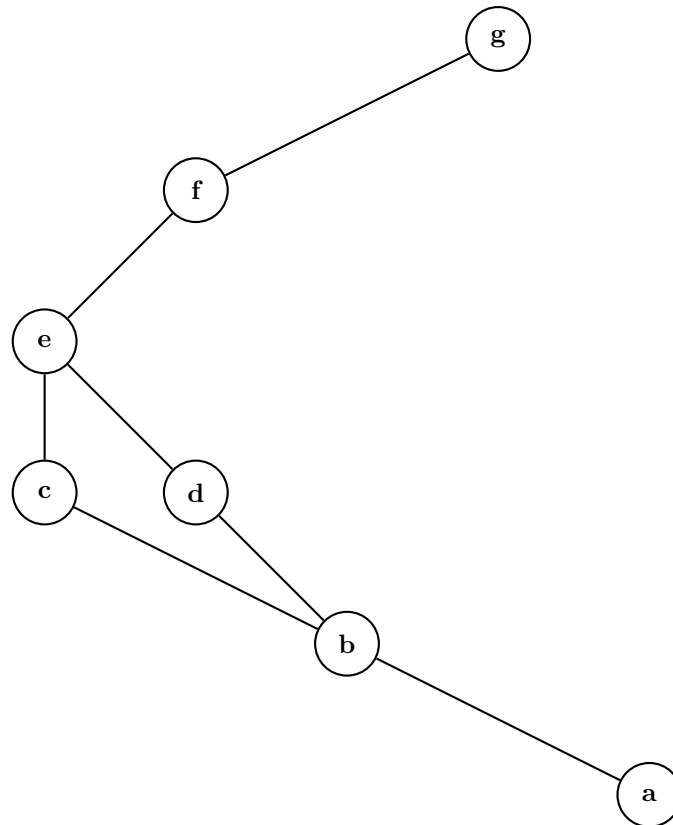
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: d, e
3. LUB: d
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 11

Consider the following poset:



For elements c and g , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

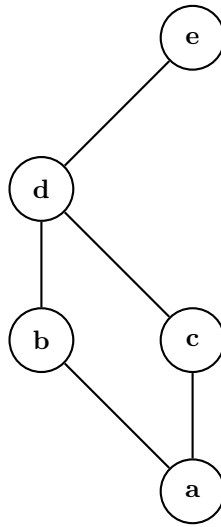
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c
2. Upper bounds: g
3. LUB: g
4. GLB: c
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 12

Consider the following poset:



For elements d and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

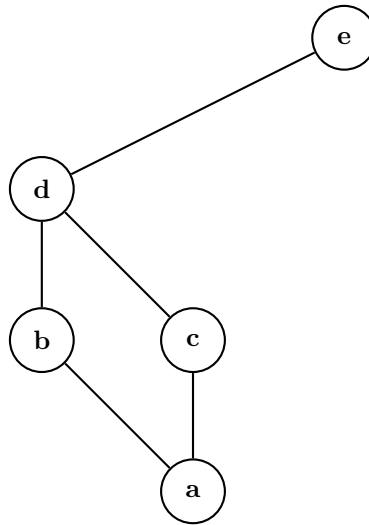
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, c
2. Upper bounds: d, e
3. LUB: d
4. GLB: c
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 13

Consider the following poset:



For elements a and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: c, d, e
3. LUB: c
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 14

Consider the following poset:



For elements a and d , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

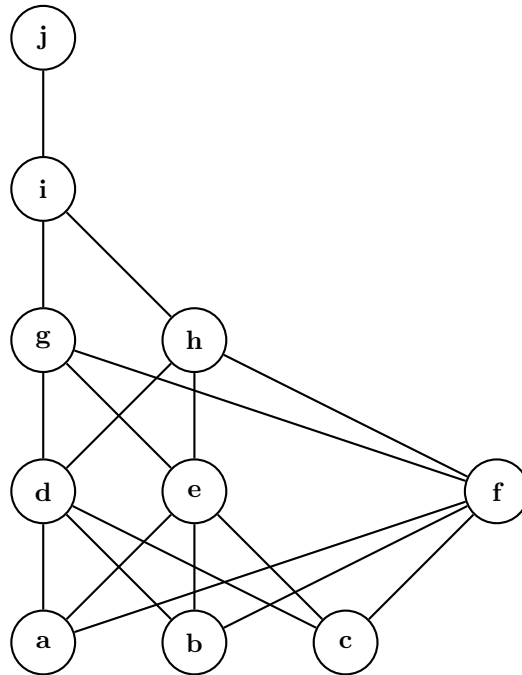
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: d
3. LUB: d
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 15

Consider the following poset:



For elements a and b , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

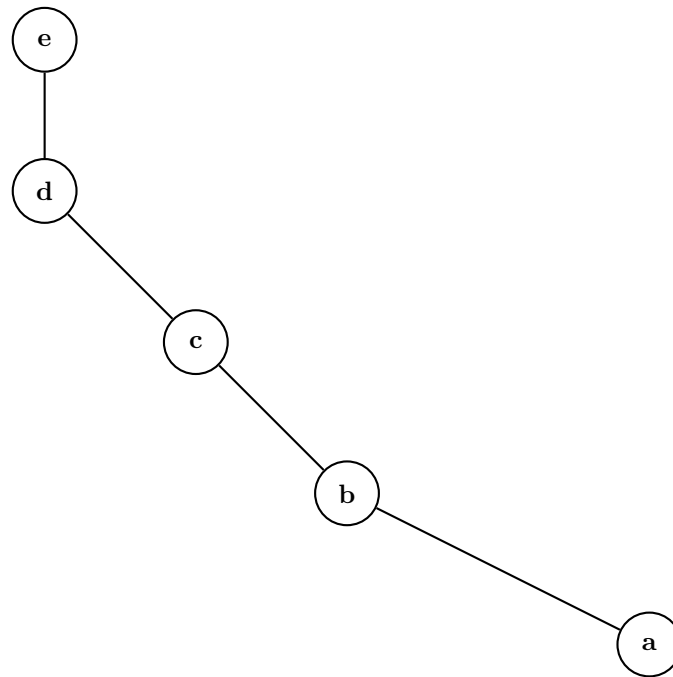
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: Do not exist
2. Upper bounds: d, e, f, g, h, i, j
3. LUB: Does not exist
4. GLB: Does not exist
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 16

Consider the following poset:



For elements a and b , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

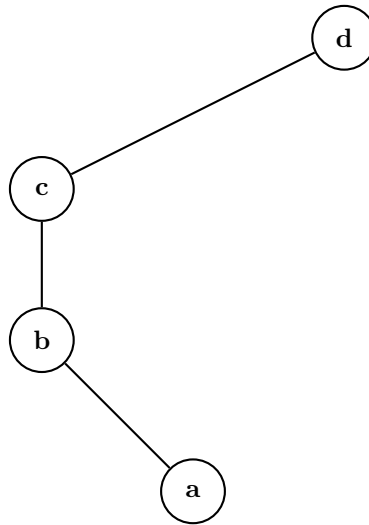
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: b, c, d, e
3. LUB: b
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 17

Consider the following poset:



For elements c and b , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

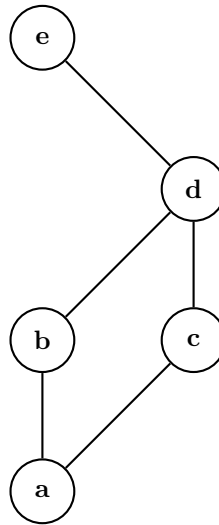
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b
2. Upper bounds: c, d
3. LUB: c
4. GLB: b
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 18

Consider the following poset:



For elements c and e , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

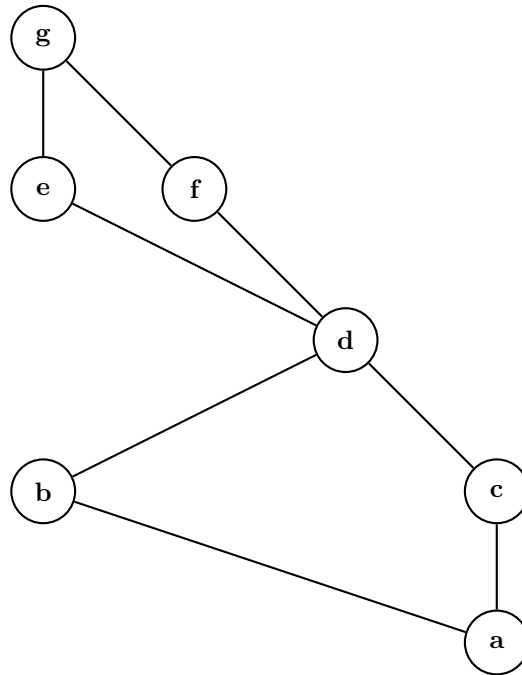
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, c
2. Upper bounds: e
3. LUB: e
4. GLB: c
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 19

Consider the following poset:



For elements g and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

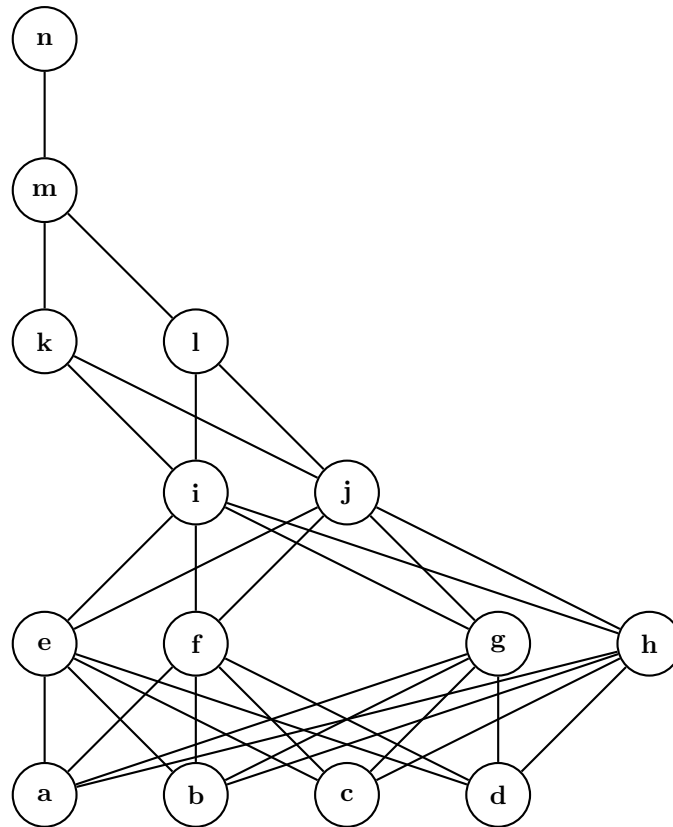
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, c
2. Upper bounds: g
3. LUB: g
4. GLB: c
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 20

Consider the following poset:



For elements f and l , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

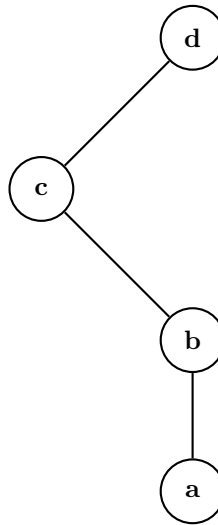
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c, d, f
2. Upper bounds: l, m, n
3. LUB: l
4. GLB: f
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 21

Consider the following poset:



For elements b and a , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

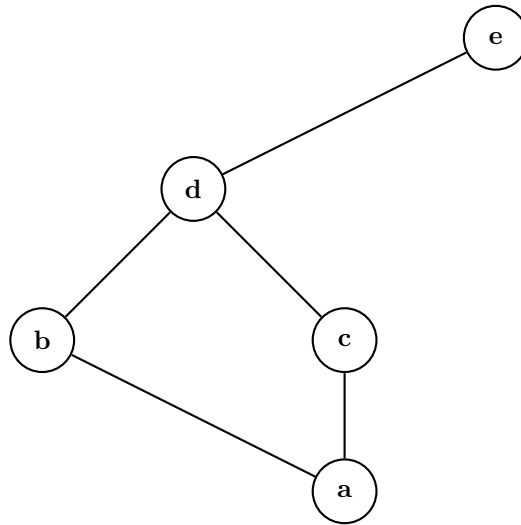
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: b, c, d
3. LUB: b
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 22

Consider the following poset:



For elements a and e , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

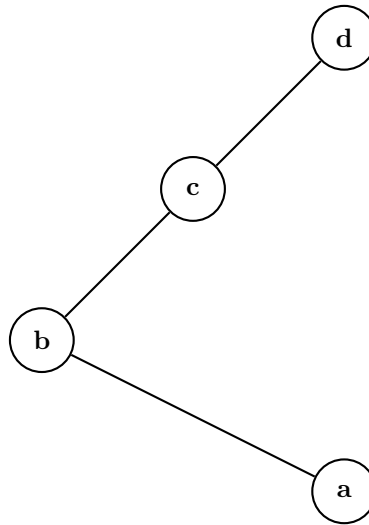
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: e
3. LUB: e
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 23

Consider the following poset:



For elements b and a , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

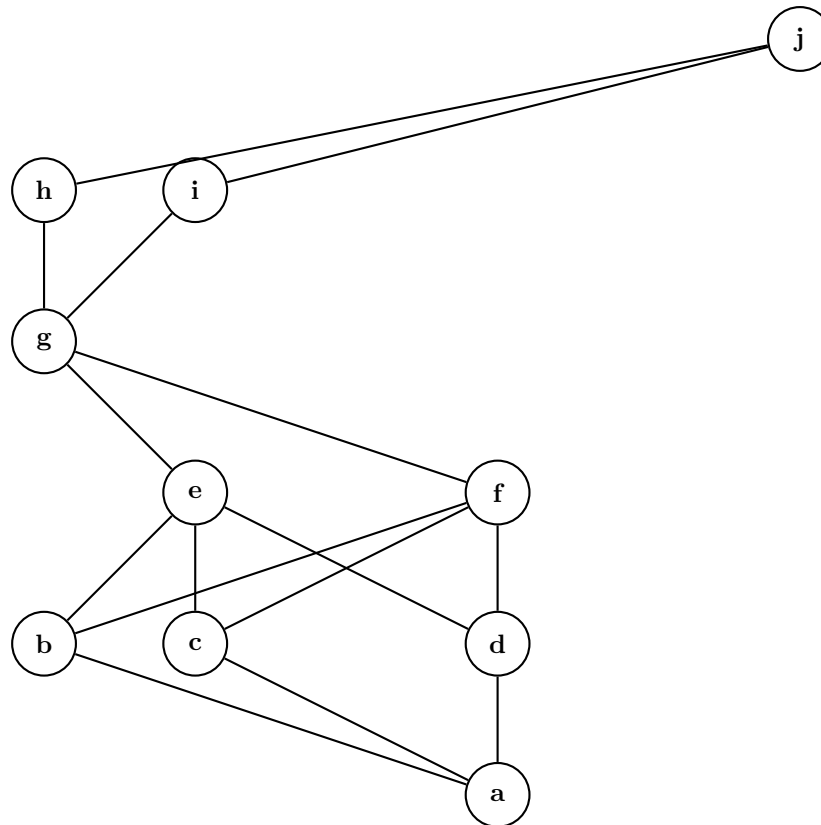
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: b, c, d
3. LUB: b
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 24

Consider the following poset:



For elements j and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

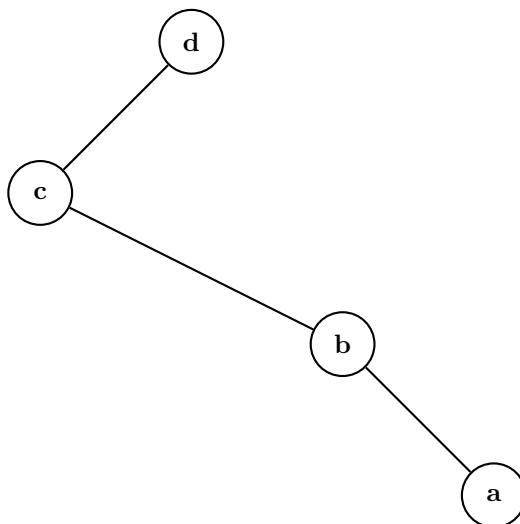
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, c
2. Upper bounds: j
3. LUB: j
4. GLB: c
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 25

Consider the following poset:



For elements c and d , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

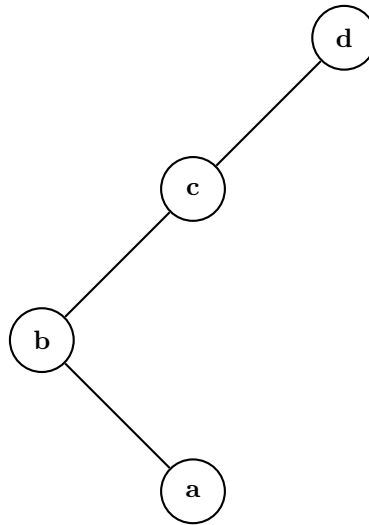
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c
2. Upper bounds: d
3. LUB: d
4. GLB: c
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 26

Consider the following poset:



For elements b and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

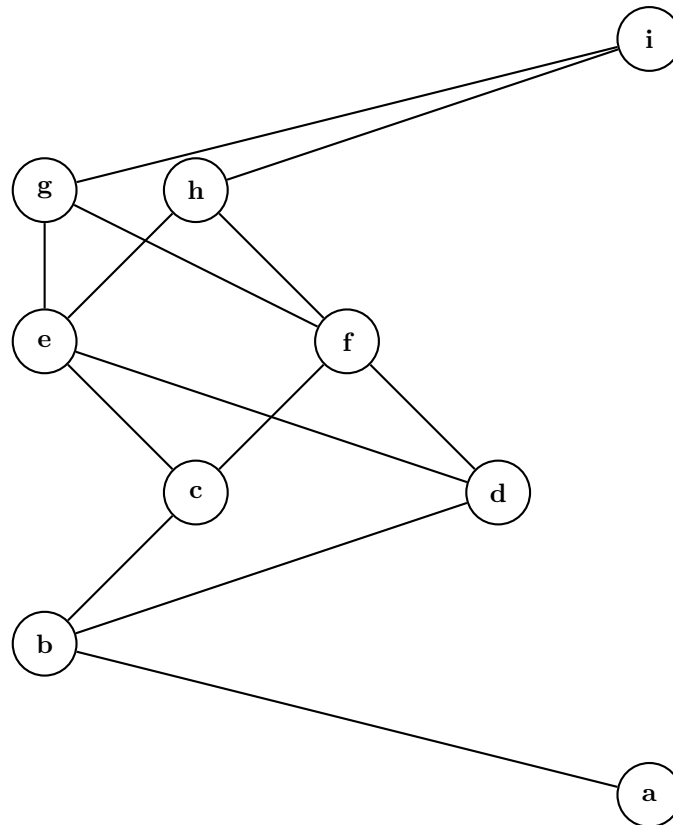
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b
2. Upper bounds: c, d
3. LUB: c
4. GLB: b
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 27

Consider the following poset:



For elements e and d , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

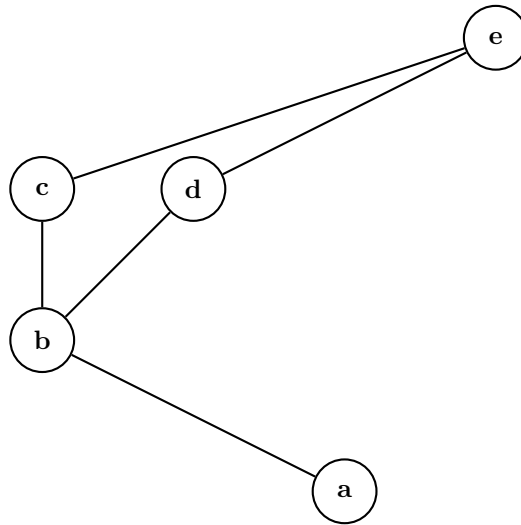
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, d
2. Upper bounds: i, e, g, h
3. LUB: e
4. GLB: d
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 28

Consider the following poset:



For elements c and e , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

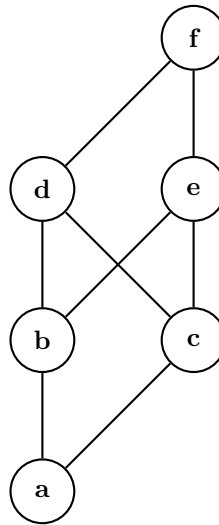
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c
2. Upper bounds: e
3. LUB: e
4. GLB: c
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 29

Consider the following poset:



For elements b and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

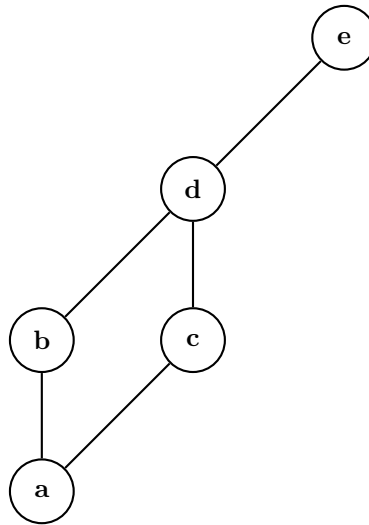
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: d, e, f
3. LUB: Does not exist
4. GLB: a
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 30

Consider the following poset:



For elements d and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

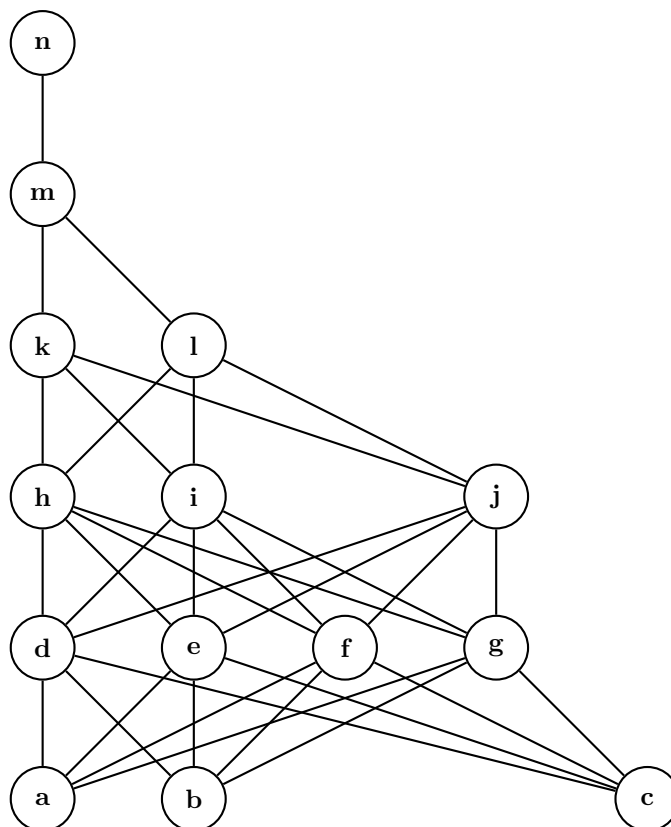
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, c
2. Upper bounds: d, e
3. LUB: d
4. GLB: c
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 31

Consider the following poset:



For elements m and g , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

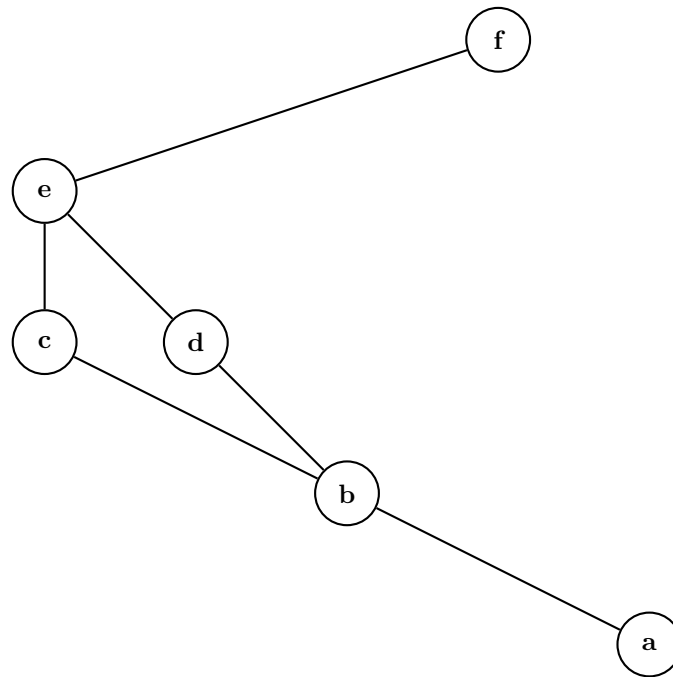
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c, g
2. Upper bounds: m, n
3. LUB: m
4. GLB: g
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 32

Consider the following poset:



For elements c and f , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

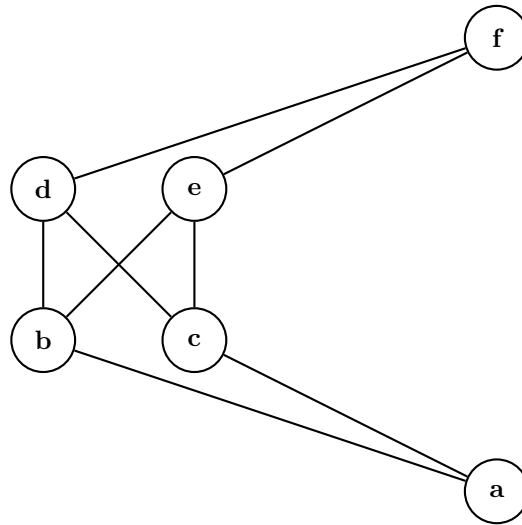
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c
2. Upper bounds: f
3. LUB: f
4. GLB: c
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 33

Consider the following poset:



For elements a and e , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

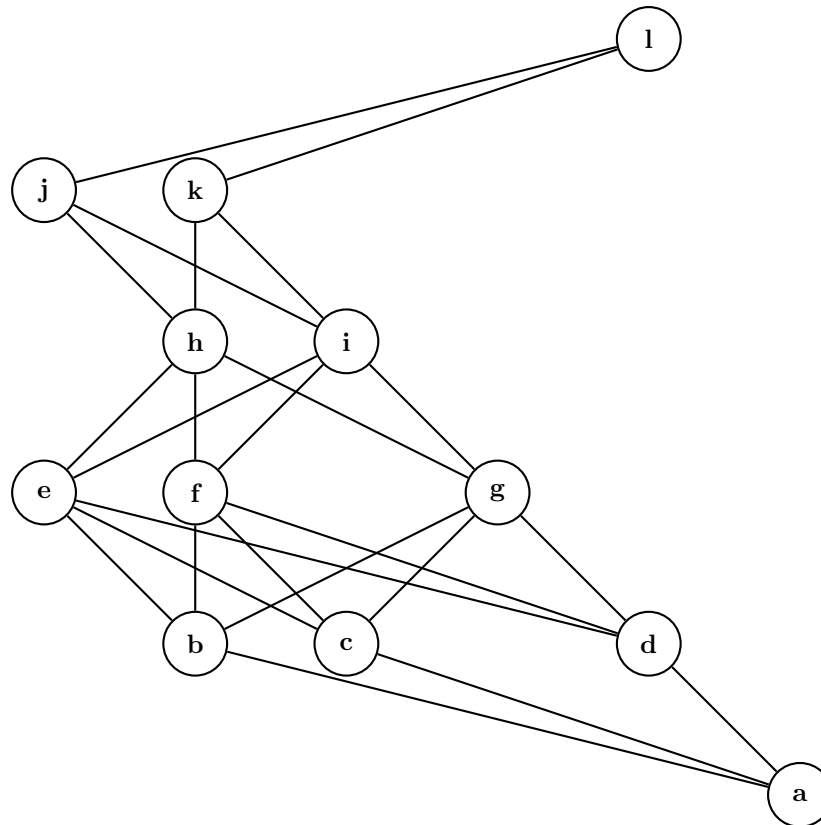
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: e, f
3. LUB: e
4. GLB: a
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 34

Consider the following poset:



For elements g and d , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

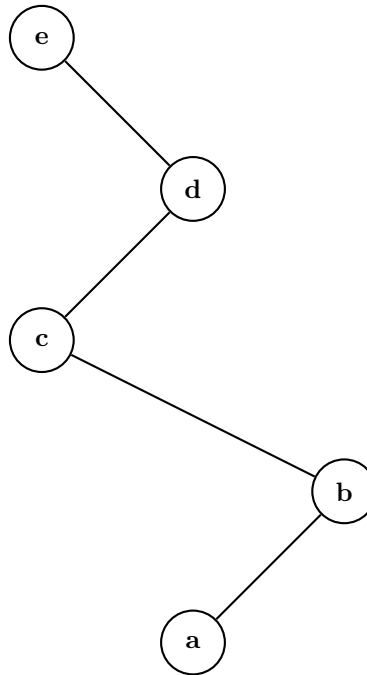
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, d
2. Upper bounds: g, h, i, j, k, l
3. LUB: g
4. GLB: d
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 35

Consider the following poset:



For elements d and e , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

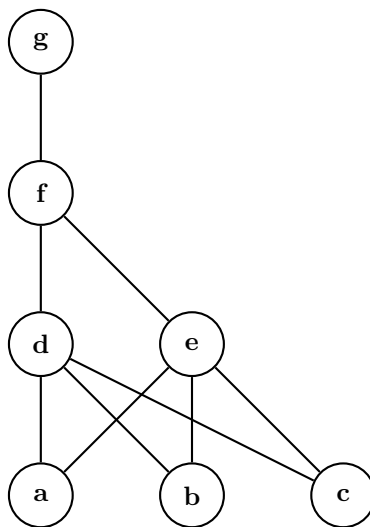
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c, d
2. Upper bounds: e
3. LUB: e
4. GLB: d
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 36

Consider the following poset:



For elements g and d , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

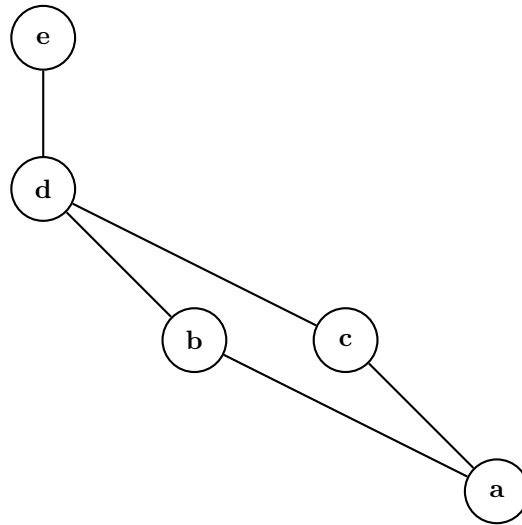
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c, d
2. Upper bounds: g
3. LUB: g
4. GLB: d
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 37

Consider the following poset:



For elements c and b , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

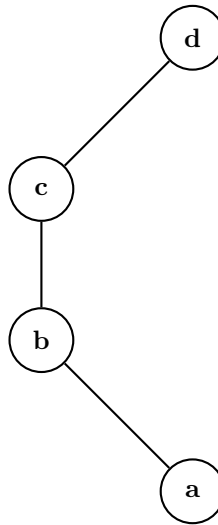
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: d, e
3. LUB: d
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 38

Consider the following poset:



For elements a and b , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

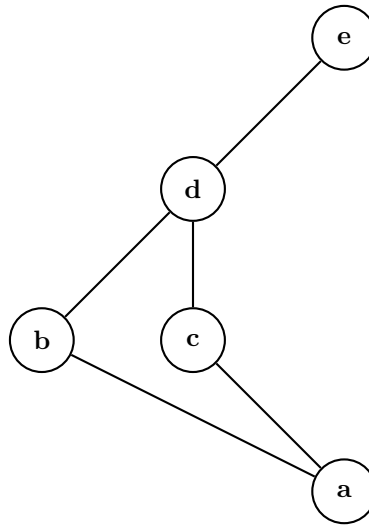
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: b, c, d
3. LUB: b
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 39

Consider the following poset:



For elements c and e , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

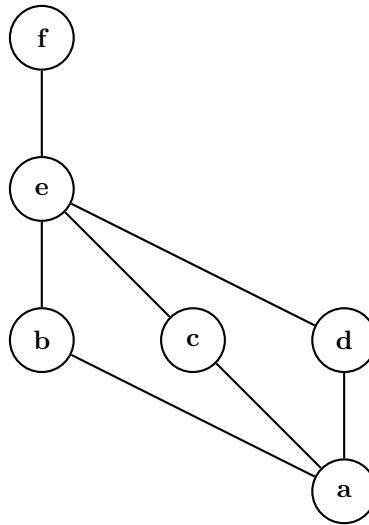
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, c
2. Upper bounds: e
3. LUB: e
4. GLB: c
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 40

Consider the following poset:



For elements e and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

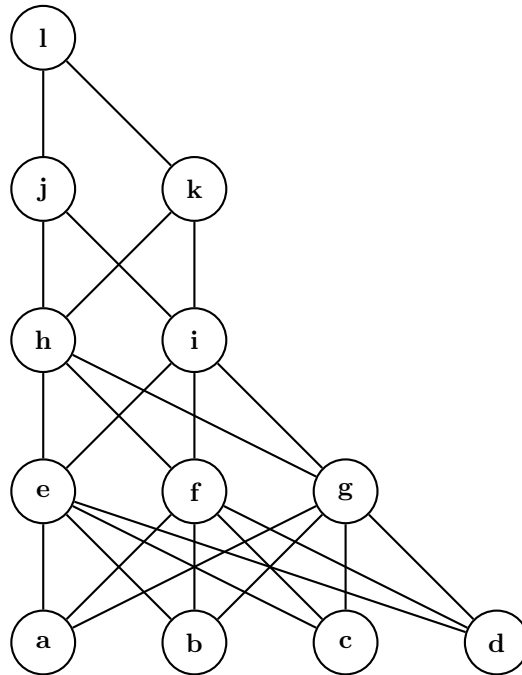
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, c
2. Upper bounds: e, f
3. LUB: e
4. GLB: c
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 41

Consider the following poset:



For elements f and b , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

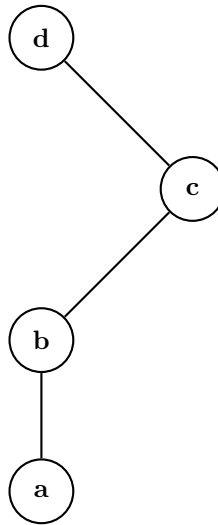
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: b
2. Upper bounds: f, h, i, j, k, l
3. LUB: f
4. GLB: b
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 42

Consider the following poset:



For elements a and d , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

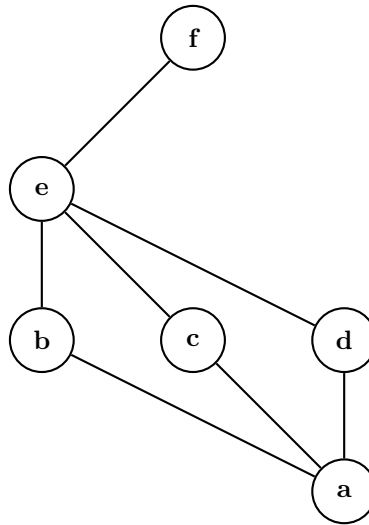
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: d
3. LUB: d
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 43

Consider the following poset:



For elements f and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

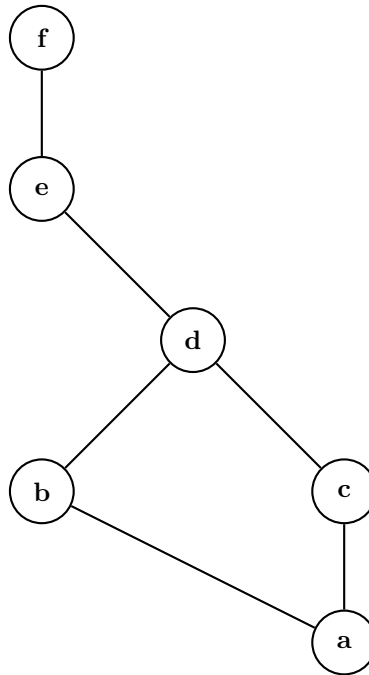
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, c
2. Upper bounds: f
3. LUB: f
4. GLB: c
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 44

Consider the following poset:



For elements b and e , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

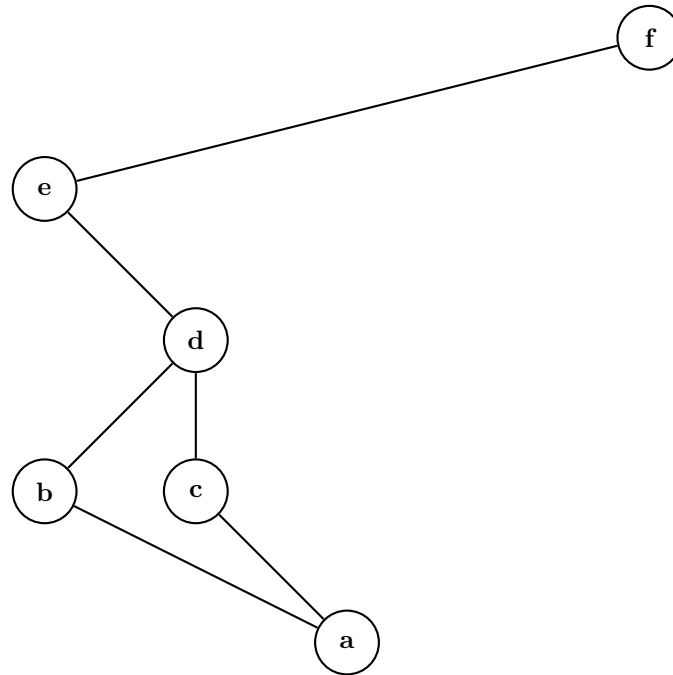
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b
2. Upper bounds: e, f
3. LUB: e
4. GLB: b
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 45

Consider the following poset:



For elements f and a , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

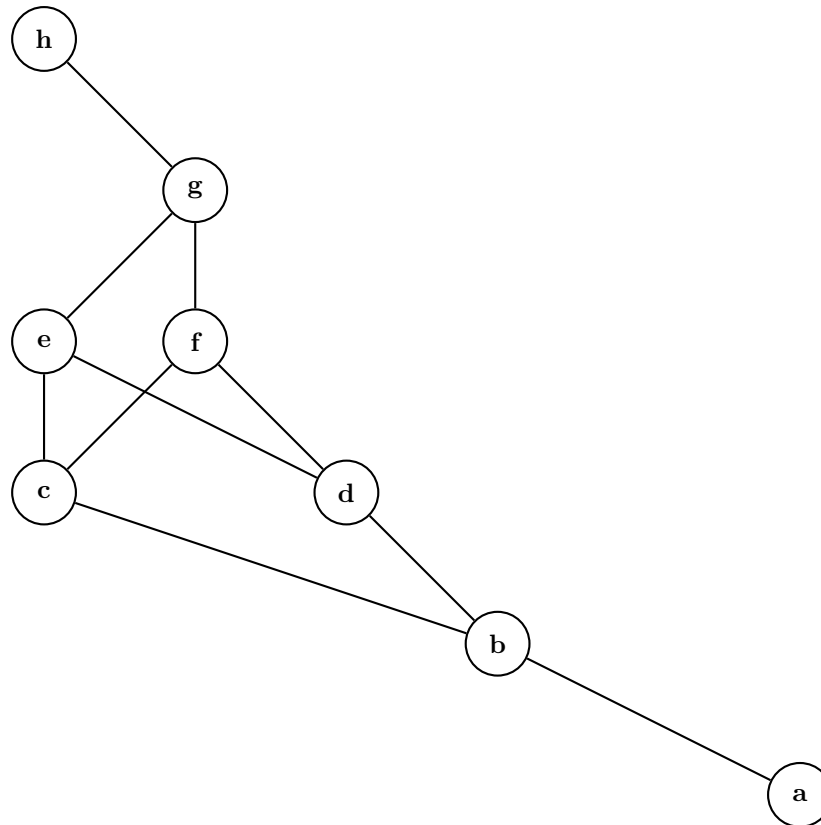
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: f
3. LUB: f
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 46

Consider the following poset:



For elements g and e , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

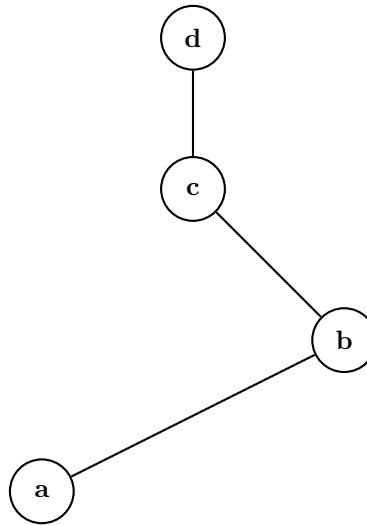
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c, d, e
2. Upper bounds: g, h
3. LUB: g
4. GLB: e
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 47

Consider the following poset:



For elements b and d , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

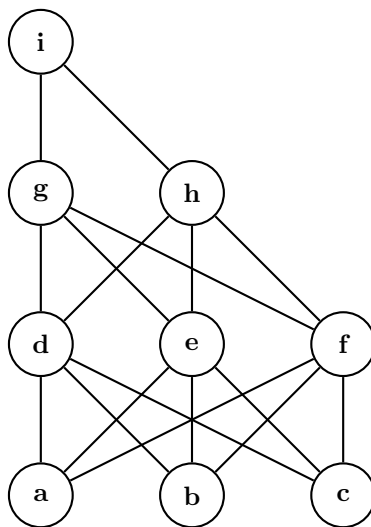
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b
2. Upper bounds: d
3. LUB: d
4. GLB: b
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 48

Consider the following poset:



For elements b and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

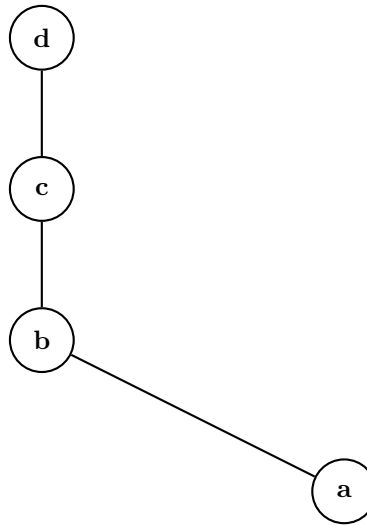
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: Do not exist
2. Upper bounds: d, e, f, g, h, i
3. LUB: Does not exist
4. GLB: Does not exist
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 49

Consider the following poset:



For elements c and b , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

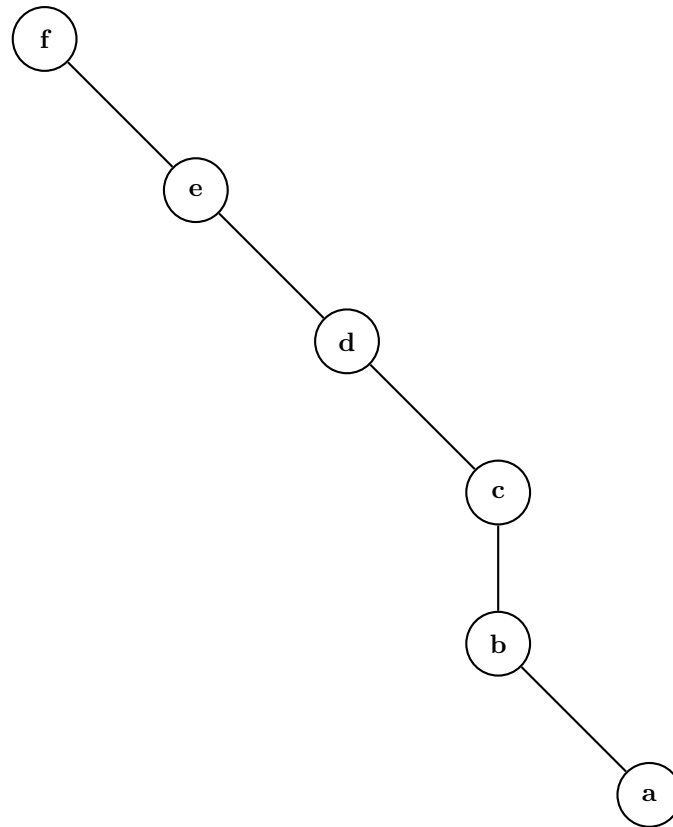
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b
2. Upper bounds: c, d
3. LUB: c
4. GLB: b
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 50

Consider the following poset:



For elements e and d , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

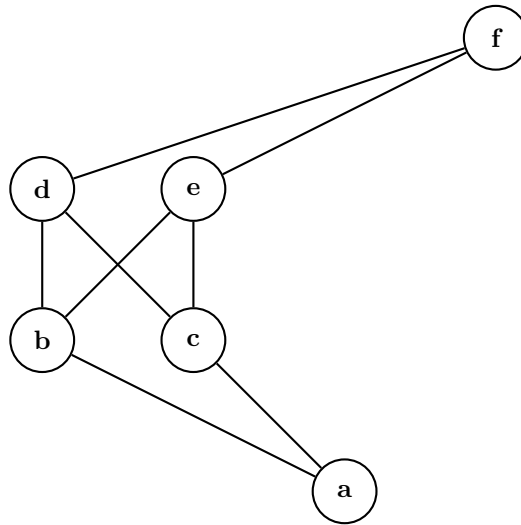
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c, d
2. Upper bounds: e, f
3. LUB: e
4. GLB: d
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 51

Consider the following poset:



For elements d and b , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

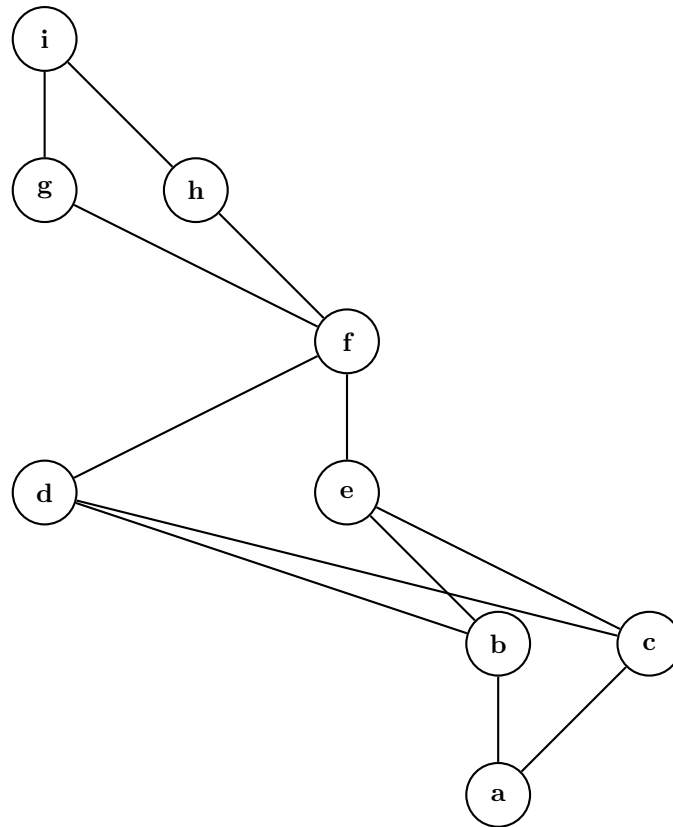
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b
2. Upper bounds: d, f
3. LUB: d
4. GLB: b
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 52

Consider the following poset:



For elements g and b , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

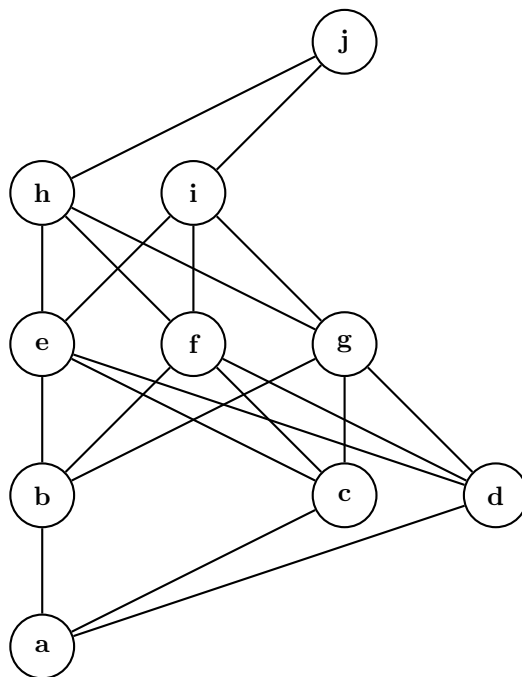
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b
2. Upper bounds: i, g
3. LUB: g
4. GLB: b
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 53

Consider the following poset:



For elements f and h , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

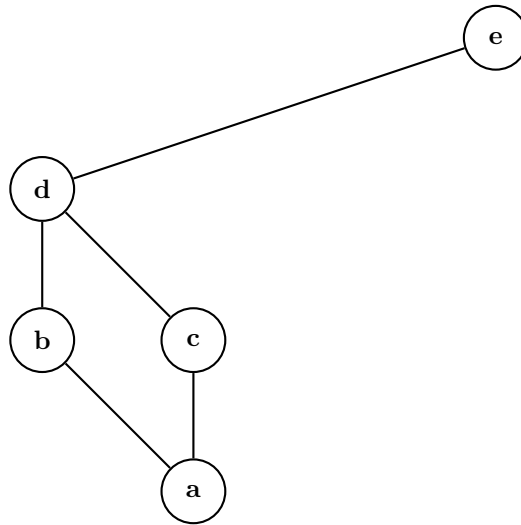
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c, d, f
2. Upper bounds: j, h
3. LUB: h
4. GLB: f
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 54

Consider the following poset:



For elements b and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

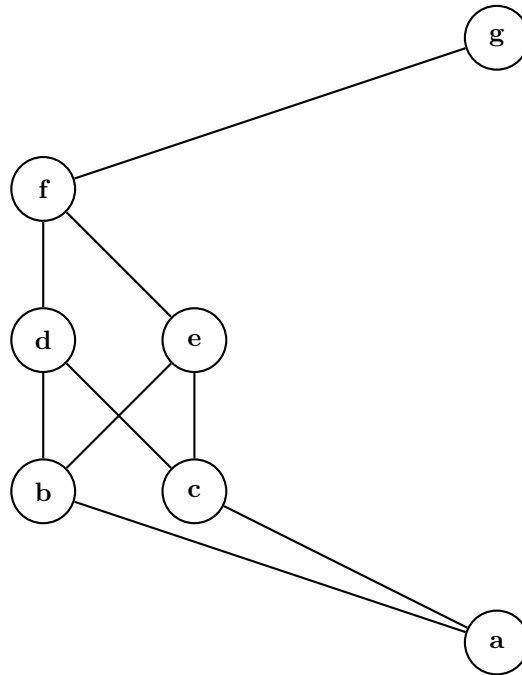
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: d, e
3. LUB: d
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 55

Consider the following poset:



For elements e and d , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

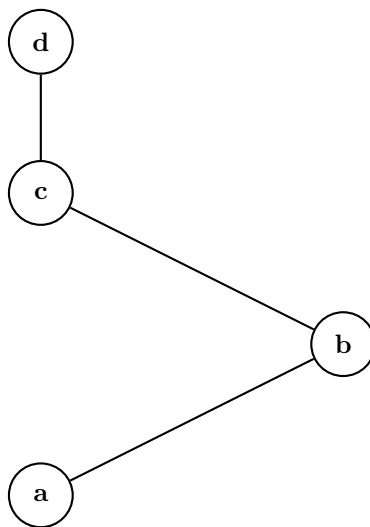
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c
2. Upper bounds: f, g
3. LUB: f
4. GLB: Does not exist
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 56

Consider the following poset:



For elements b and d , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

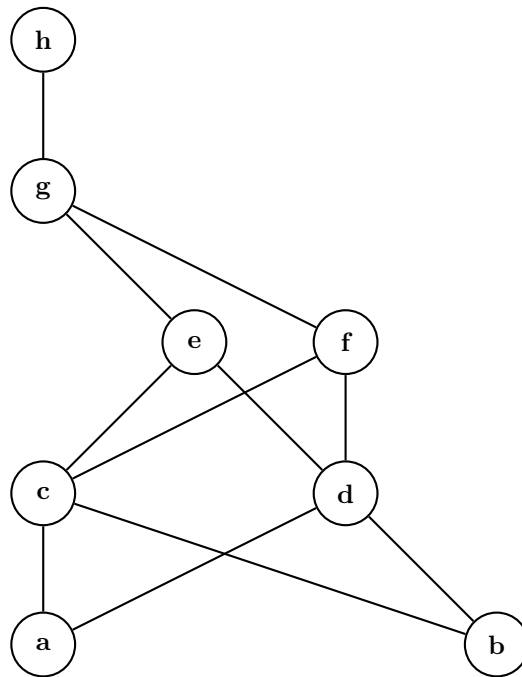
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b
2. Upper bounds: d
3. LUB: d
4. GLB: b
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 57

Consider the following poset:



For elements d and h , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

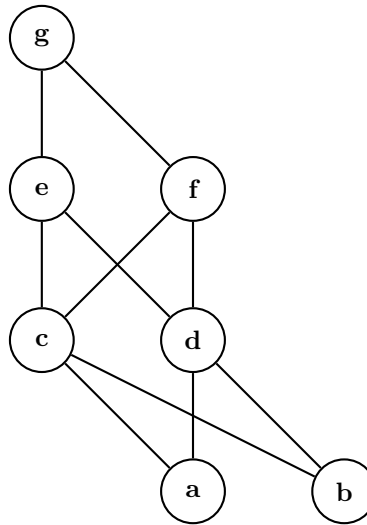
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, d
2. Upper bounds: h
3. LUB: h
4. GLB: d
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 58

Consider the following poset:



For elements e and a , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

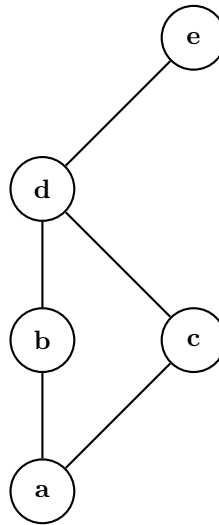
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: e, g
3. LUB: e
4. GLB: a
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 59

Consider the following poset:



For elements d and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

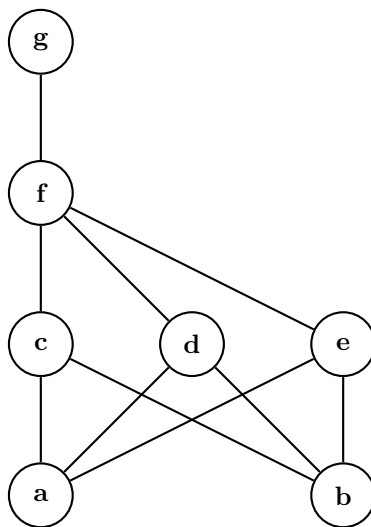
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, c
2. Upper bounds: d, e
3. LUB: d
4. GLB: c
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 60

Consider the following poset:



For elements g and d , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

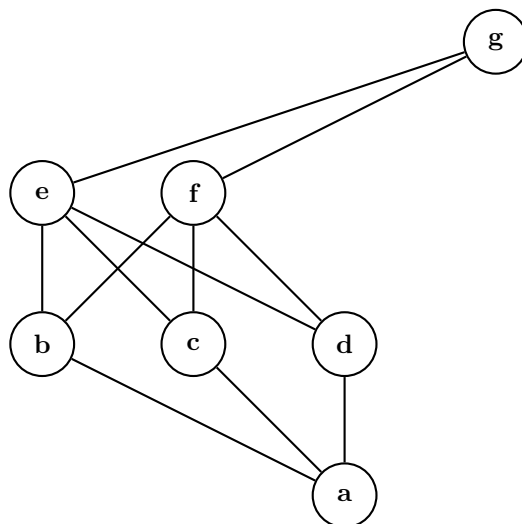
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, d
2. Upper bounds: g
3. LUB: g
4. GLB: d
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 61

Consider the following poset:



For elements f and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

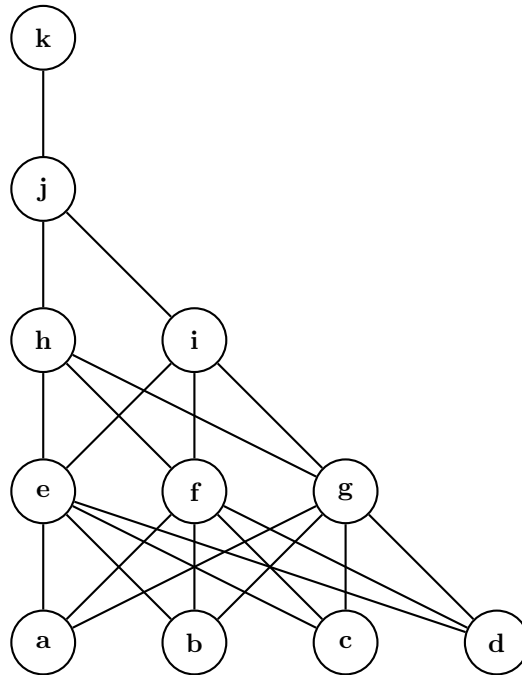
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, c
2. Upper bounds: f, g
3. LUB: f
4. GLB: c
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 62

Consider the following poset:



For elements j and k , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

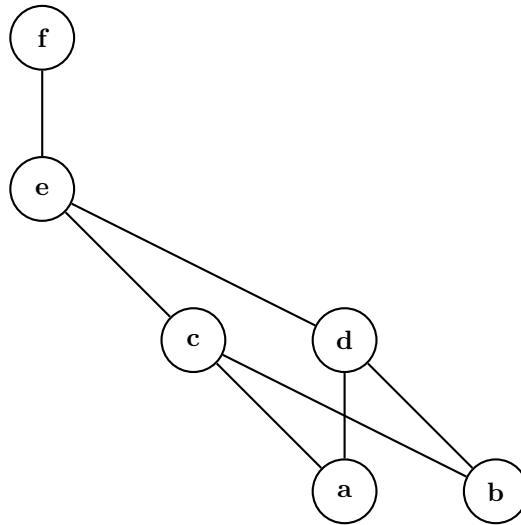
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: $a, b, c, d, e, f, g, h, i, j$
2. Upper bounds: k
3. LUB: k
4. GLB: j
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 63

Consider the following poset:



For elements a and d , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

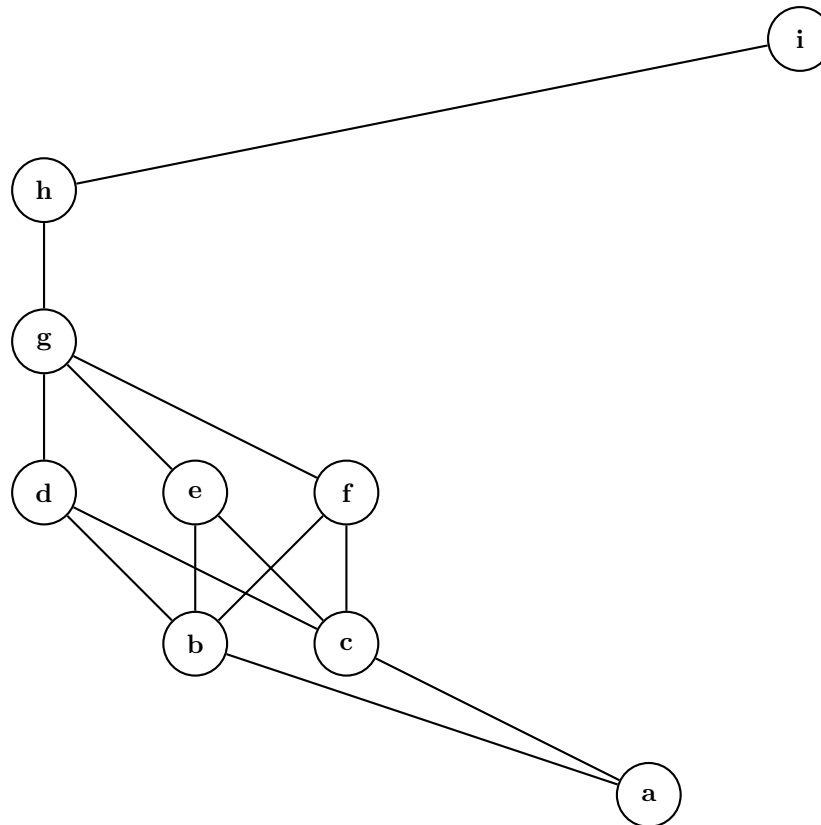
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: d, e, f
3. LUB: d
4. GLB: a
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 64

Consider the following poset:



For elements d and a , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

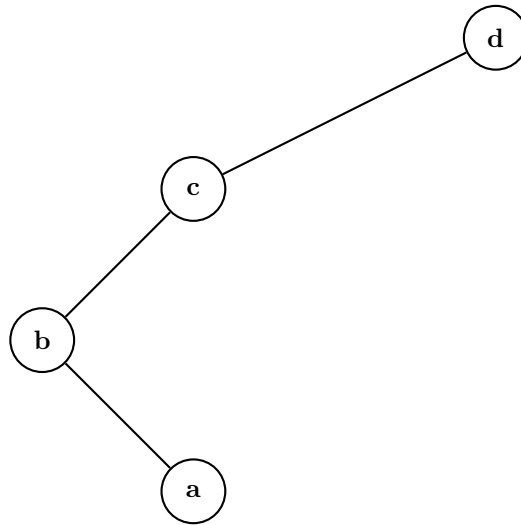
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: i, d, g, h
3. LUB: d
4. GLB: a
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 65

Consider the following poset:



For elements b and d , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

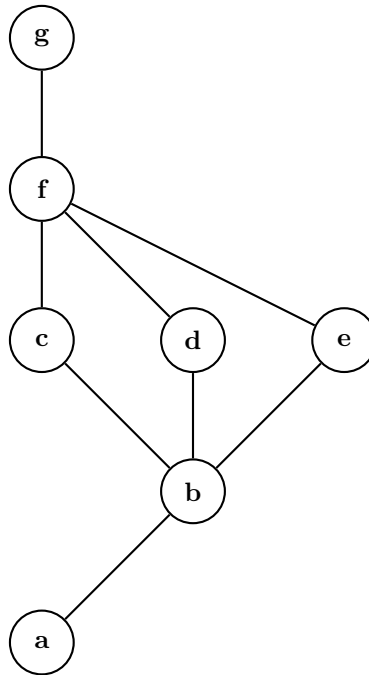
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b
2. Upper bounds: d
3. LUB: d
4. GLB: b
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 66

Consider the following poset:



For elements f and a , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

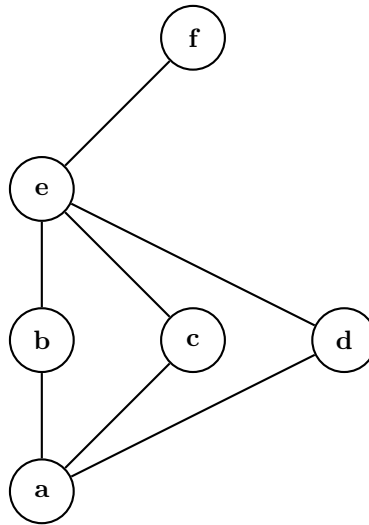
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: f, g
3. LUB: f
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 67

Consider the following poset:



For elements d and b , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

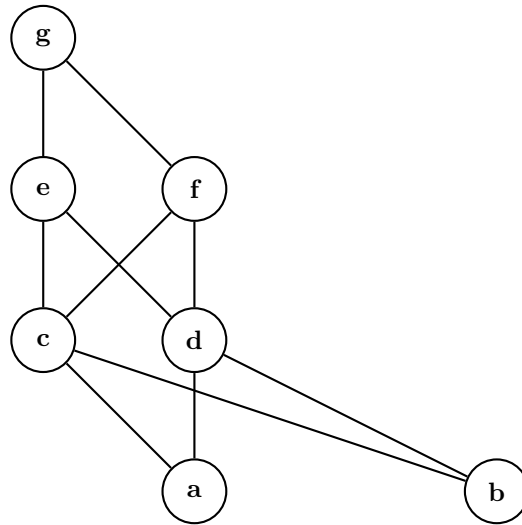
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: e, f
3. LUB: e
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 68

Consider the following poset:



For elements b and a , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

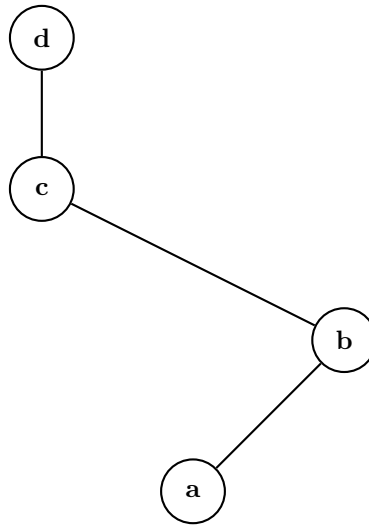
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: Do not exist
2. Upper bounds: c, d, e, f, g
3. LUB: Does not exist
4. GLB: Does not exist
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 69

Consider the following poset:



For elements d and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

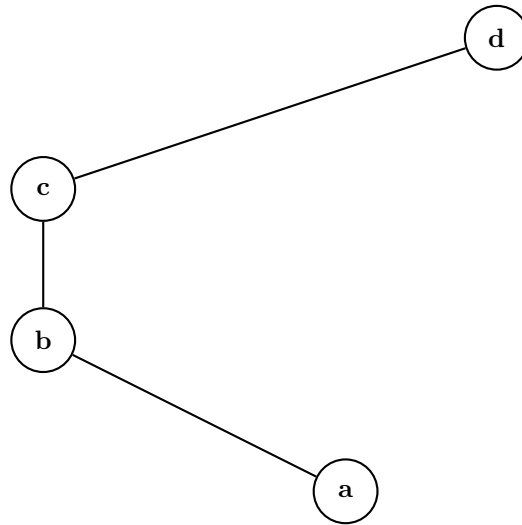
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c
2. Upper bounds: d
3. LUB: d
4. GLB: c
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 70

Consider the following poset:



For elements c and a , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

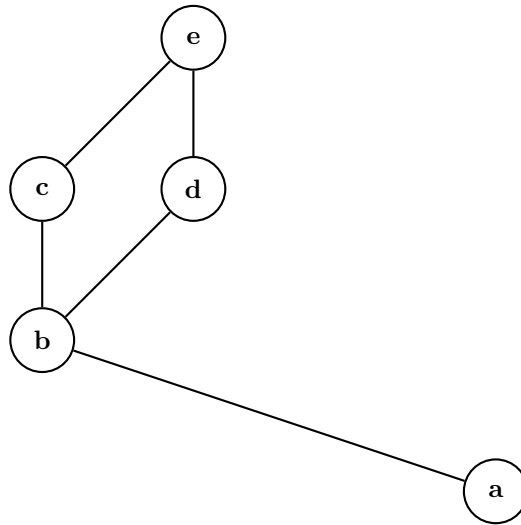
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: c, d
3. LUB: c
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 71

Consider the following poset:



For elements c and a , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

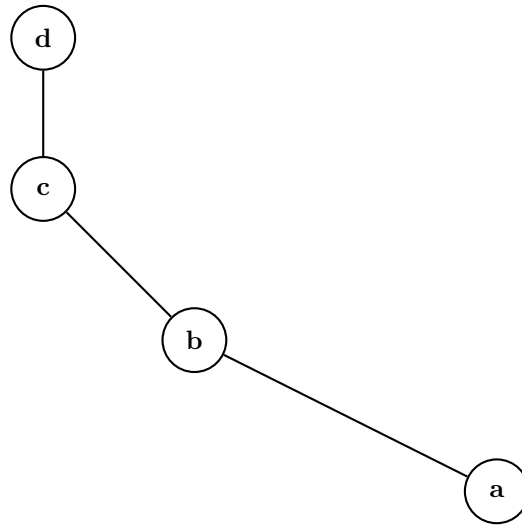
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: c, e
3. LUB: c
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 72

Consider the following poset:



For elements b and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

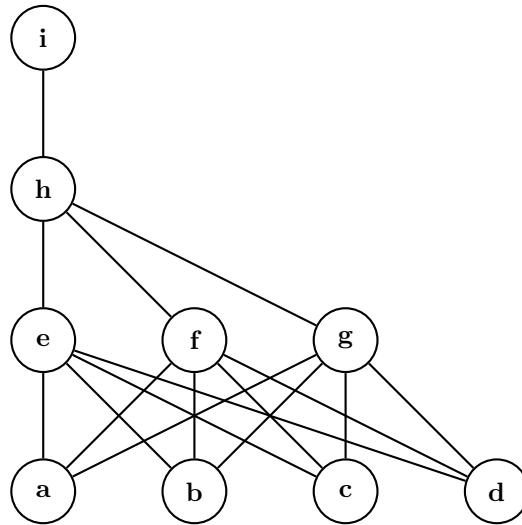
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b
2. Upper bounds: c, d
3. LUB: c
4. GLB: b
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 73

Consider the following poset:



For elements b and i , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

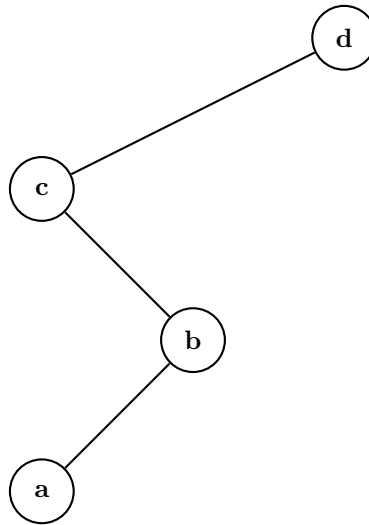
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: b
2. Upper bounds: i
3. LUB: i
4. GLB: b
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 74

Consider the following poset:



For elements b and a , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

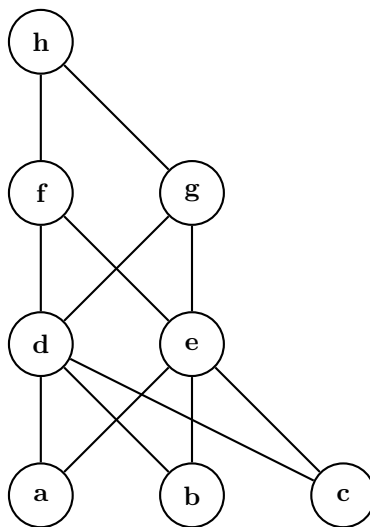
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: b, c, d
3. LUB: b
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 75

Consider the following poset:



For elements c and e , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

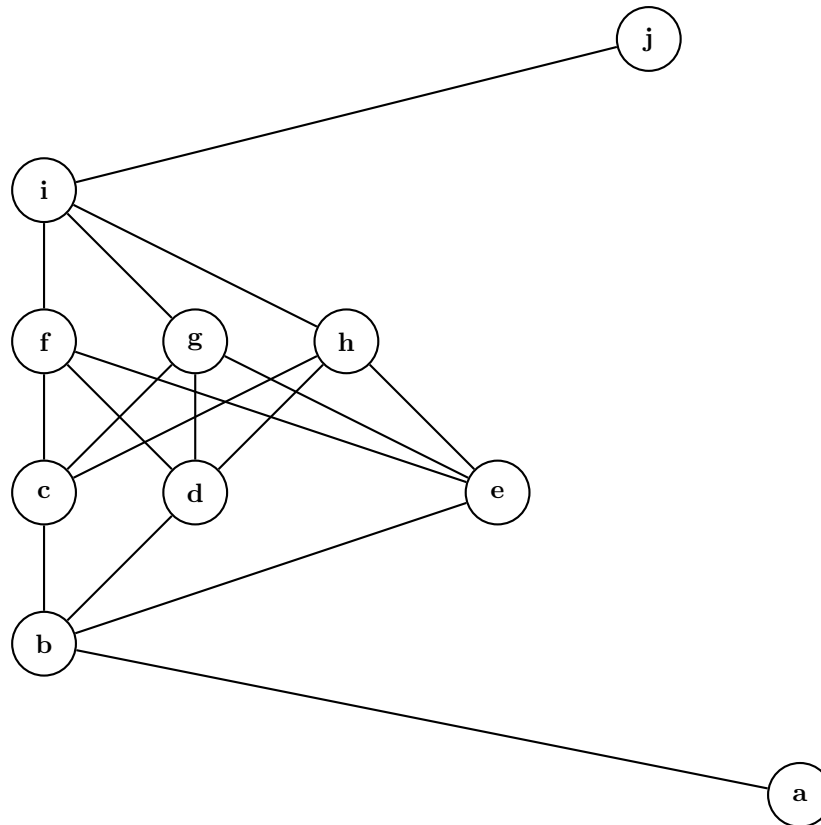
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: c
2. Upper bounds: e, f, g, h
3. LUB: e
4. GLB: c
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 76

Consider the following poset:



For elements a and d , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

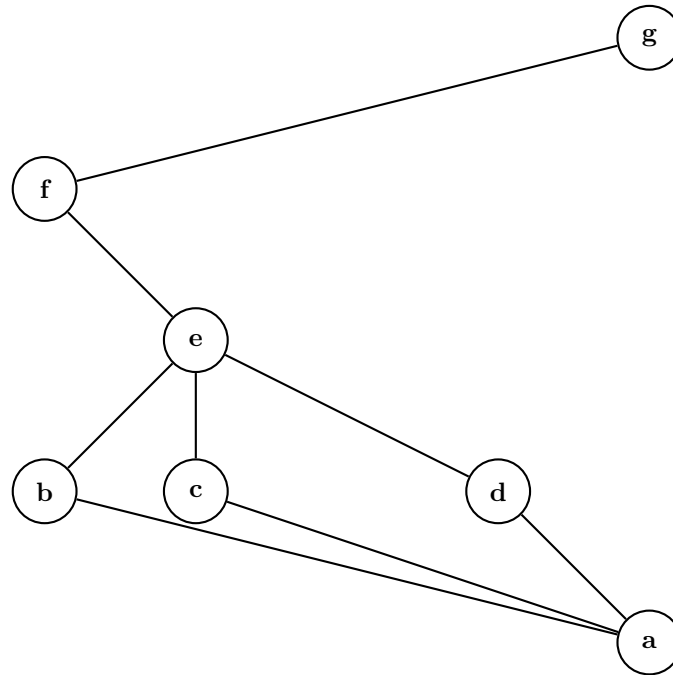
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: d, f, g, h, i, j
3. LUB: d
4. GLB: a
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 77

Consider the following poset:



For elements d and g , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

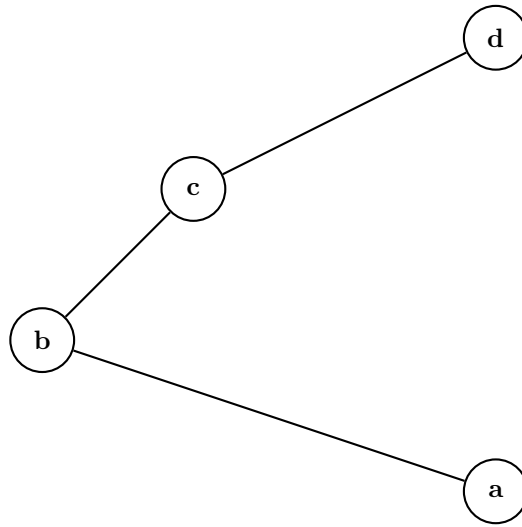
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, d
2. Upper bounds: g
3. LUB: g
4. GLB: d
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 78

Consider the following poset:



For elements d and b , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

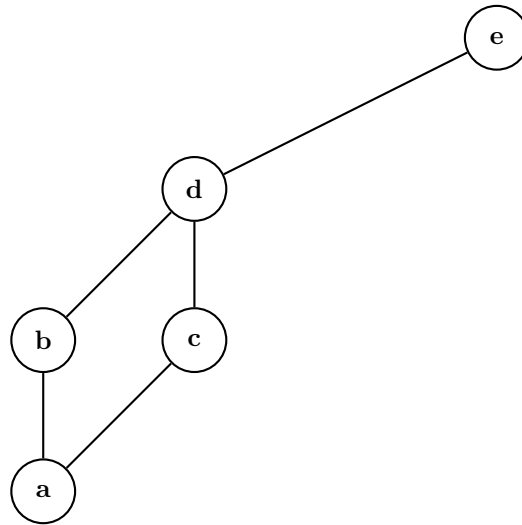
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b
2. Upper bounds: d
3. LUB: d
4. GLB: b
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 79

Consider the following poset:



For elements d and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

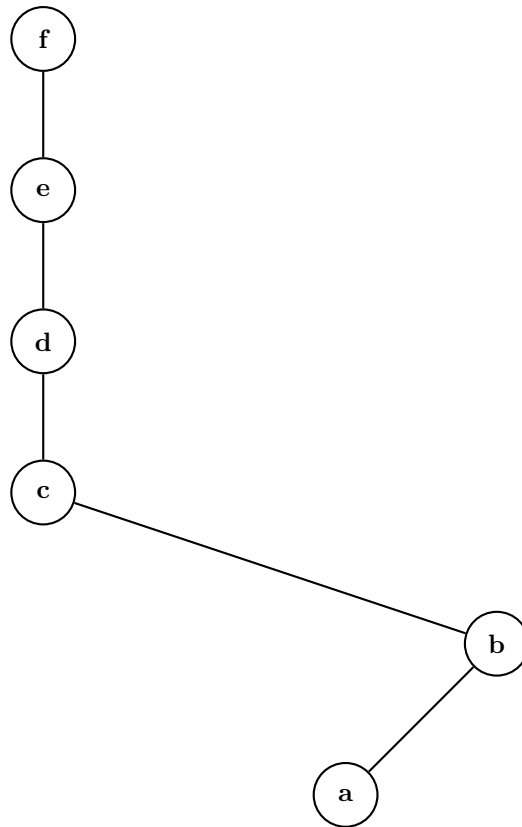
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, c
2. Upper bounds: d, e
3. LUB: d
4. GLB: c
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 80

Consider the following poset:



For elements b and e , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

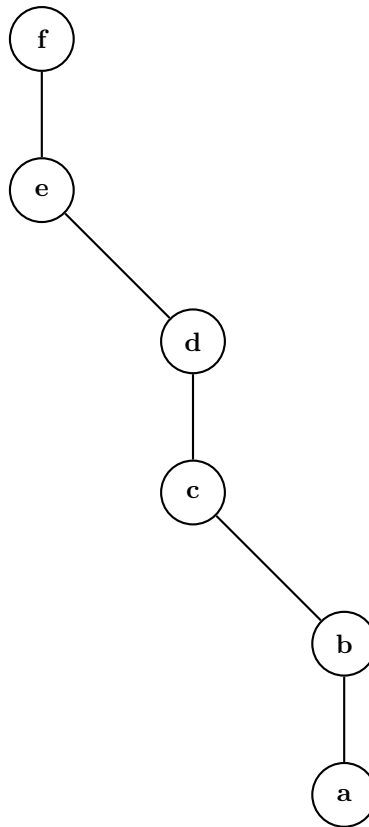
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b
2. Upper bounds: e, f
3. LUB: e
4. GLB: b
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 81

Consider the following poset:



For elements e and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

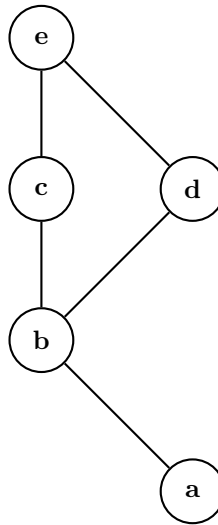
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c
2. Upper bounds: e, f
3. LUB: e
4. GLB: c
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 82

Consider the following poset:



For elements a and b , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

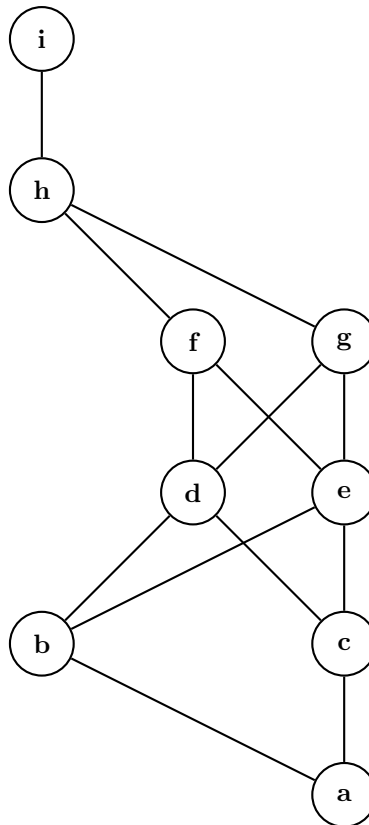
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: b, c, d, e
3. LUB: b
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 83

Consider the following poset:



For elements e and i , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

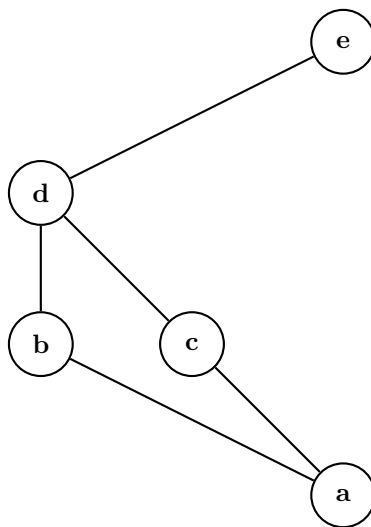
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c, e
2. Upper bounds: i
3. LUB: i
4. GLB: e
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 84

Consider the following poset:



For elements d and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

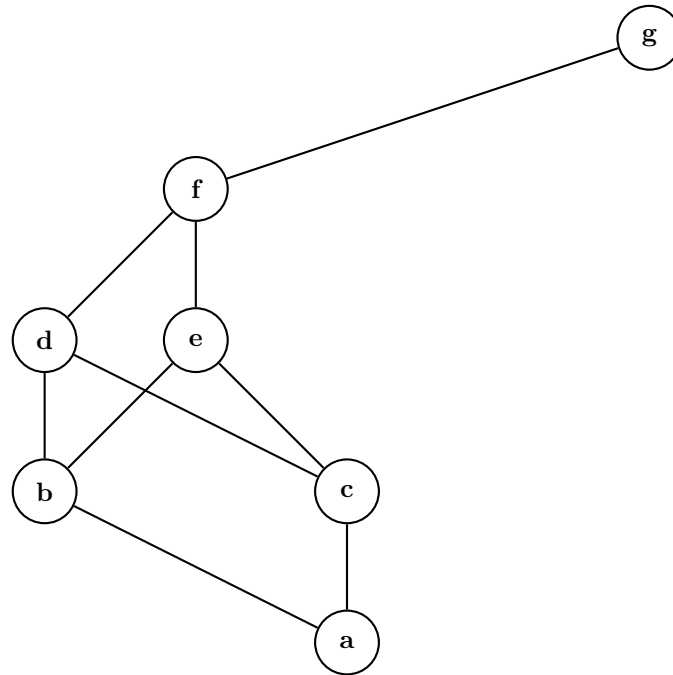
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, c
2. Upper bounds: d, e
3. LUB: d
4. GLB: c
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 85

Consider the following poset:



For elements c and f , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

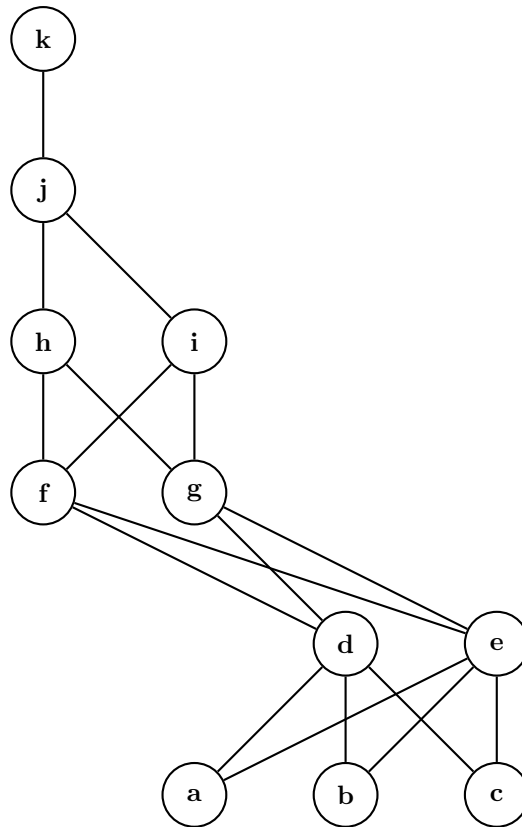
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, c
2. Upper bounds: f, g
3. LUB: f
4. GLB: c
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 86

Consider the following poset:



For elements f and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

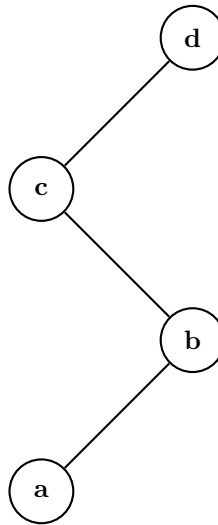
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: c
2. Upper bounds: f, h, i, j, k
3. LUB: f
4. GLB: c
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 87

Consider the following poset:



For elements a and b , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

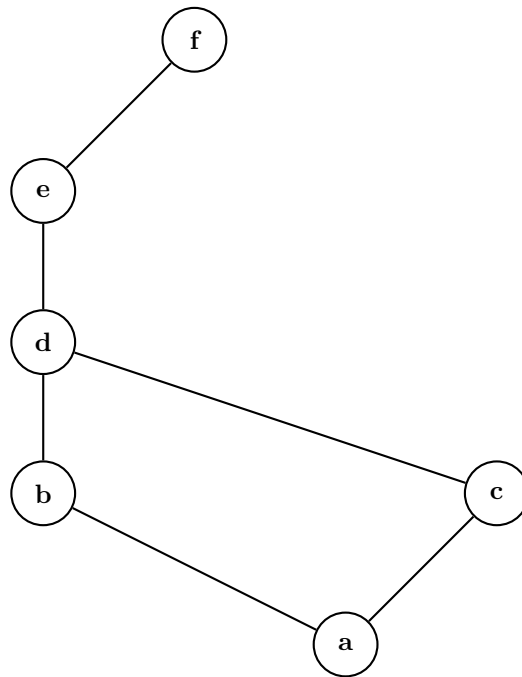
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: b, c, d
3. LUB: b
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 88

Consider the following poset:



For elements f and b , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

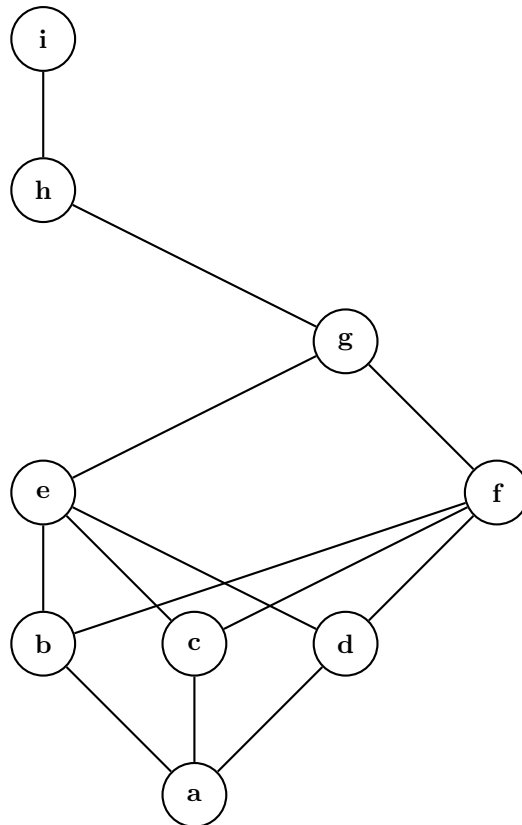
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b
2. Upper bounds: f
3. LUB: f
4. GLB: b
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 89

Consider the following poset:



For elements a and i , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

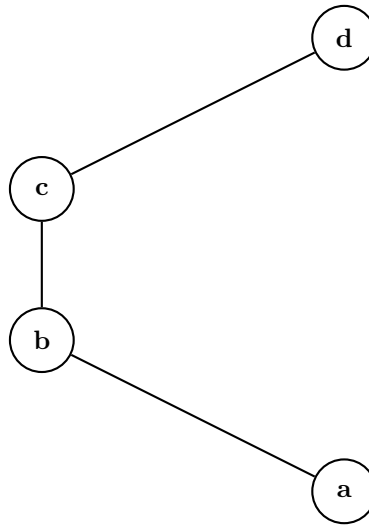
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: i
3. LUB: i
4. GLB: a
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 90

Consider the following poset:



For elements c and a , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

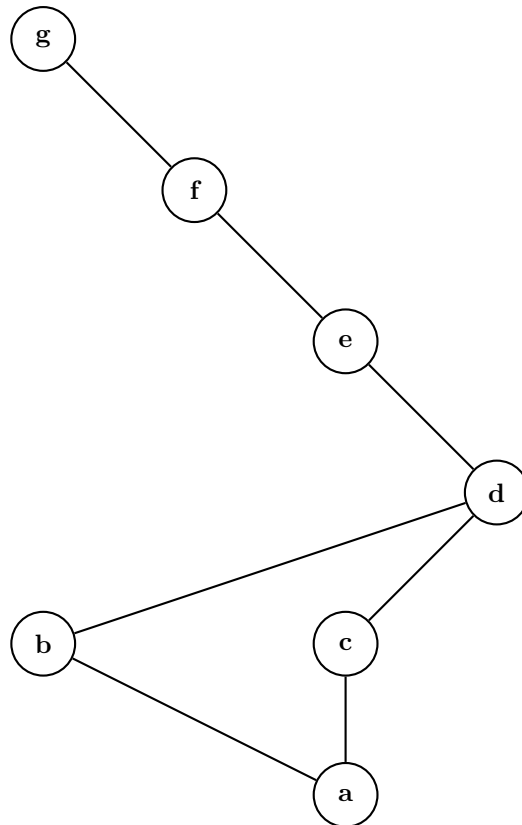
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: c, d
3. LUB: c
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 91

Consider the following poset:



For elements c and e , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

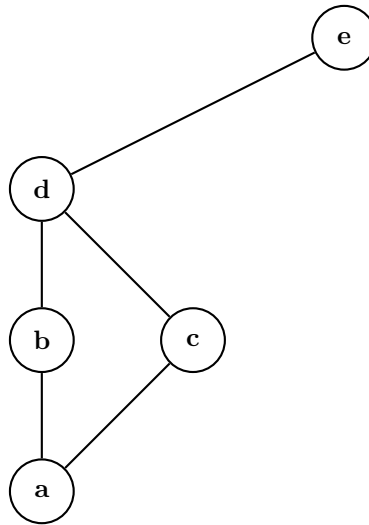
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, c
2. Upper bounds: e, f, g
3. LUB: e
4. GLB: c
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 92

Consider the following poset:



For elements e and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

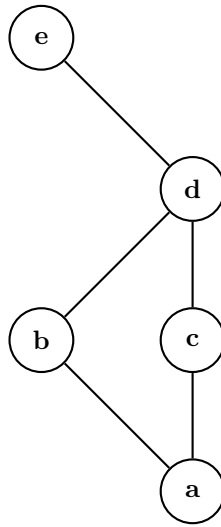
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, c
2. Upper bounds: e
3. LUB: e
4. GLB: c
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 93

Consider the following poset:



For elements d and e , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

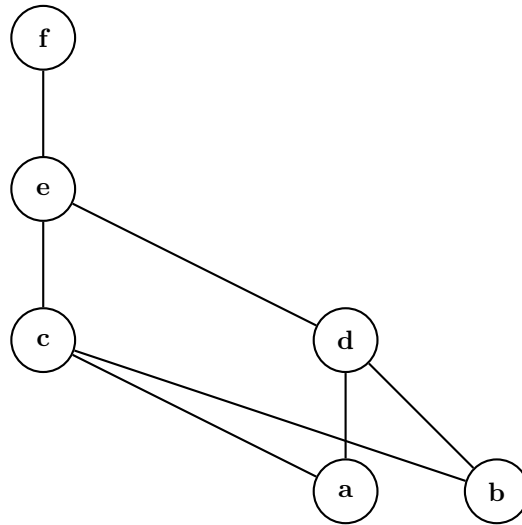
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c, d
2. Upper bounds: e
3. LUB: e
4. GLB: d
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 94

Consider the following poset:



For elements d and e , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

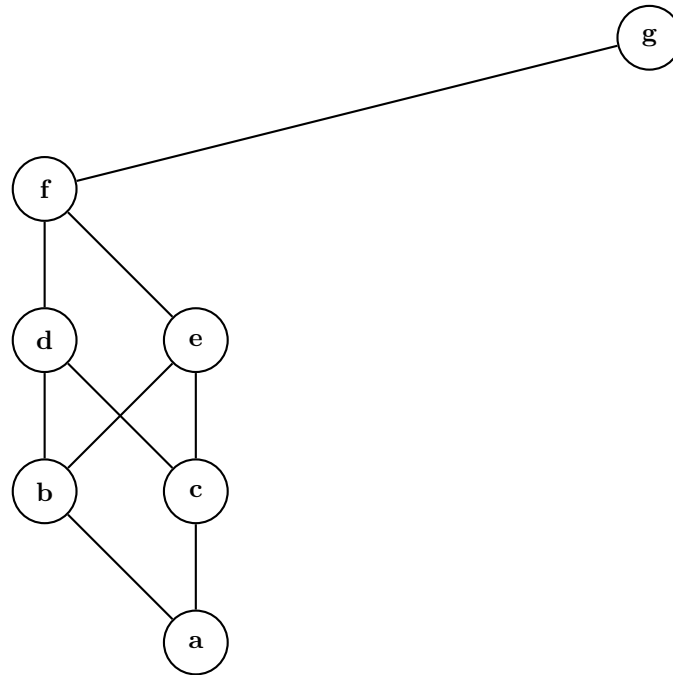
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, d
2. Upper bounds: e, f
3. LUB: e
4. GLB: d
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 95

Consider the following poset:



For elements e and a , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

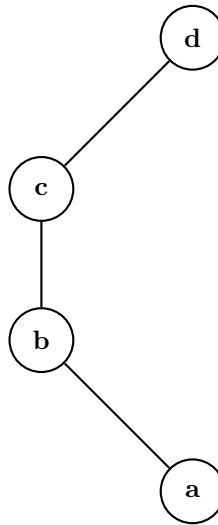
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: e, f, g
3. LUB: e
4. GLB: a
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 96

Consider the following poset:



For elements b and c , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

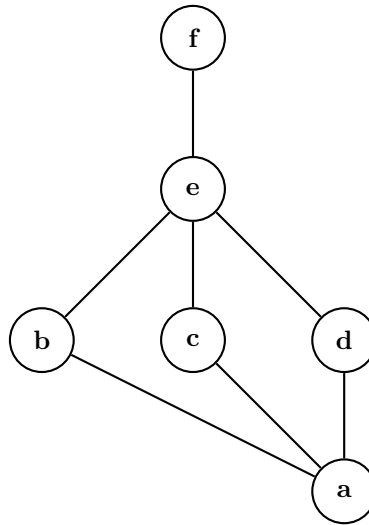
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b
2. Upper bounds: c, d
3. LUB: c
4. GLB: b
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 97

Consider the following poset:



For elements d and f , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

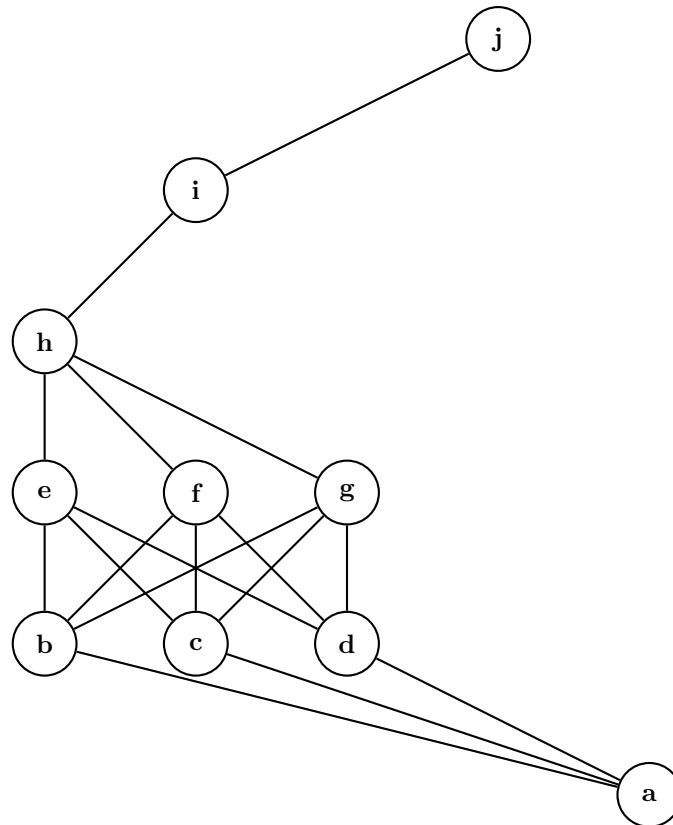
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, d
2. Upper bounds: f
3. LUB: f
4. GLB: d
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 98

Consider the following poset:



For elements f and i , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

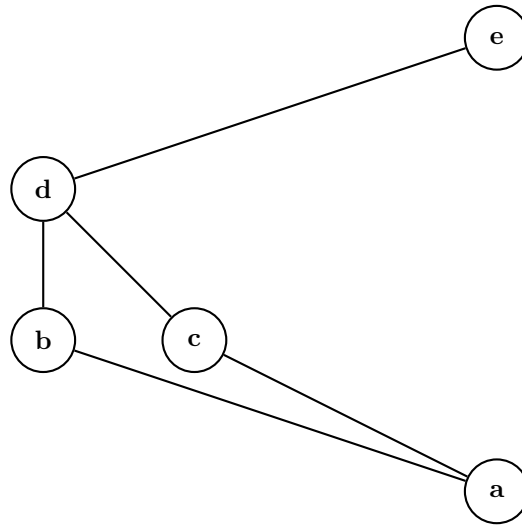
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c, d, f
2. Upper bounds: i, j
3. LUB: i
4. GLB: f
5. Meet-semilattice: No
6. Join-semilattice: No
7. Lattice: No

Exercise 99

Consider the following poset:



For elements a and d , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

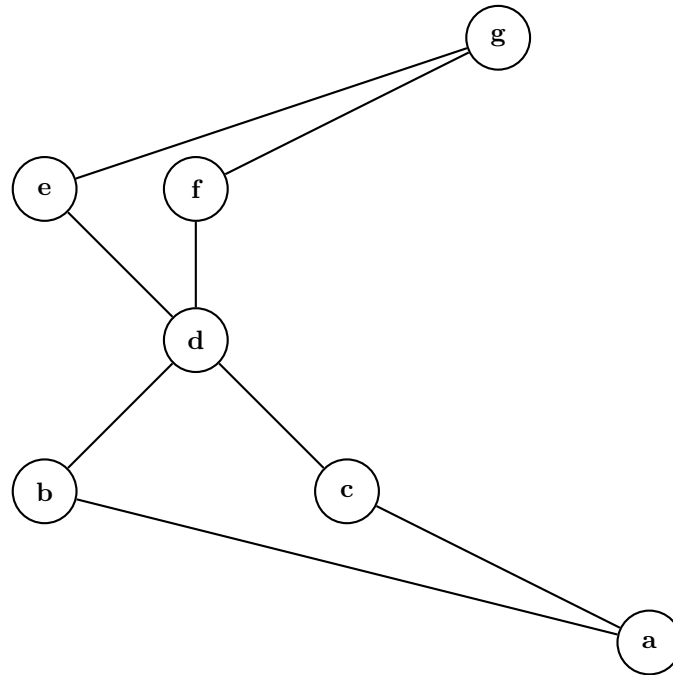
5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a
2. Upper bounds: d, e
3. LUB: d
4. GLB: a
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes

Exercise 100

Consider the following poset:



For elements d and f , answer the following questions:

1. What are the lower bounds?
2. What are the upper bounds?
3. What is the greatest lower bound (GLB)?
4. What is the least upper bound (LUB)?

Additional questions:

5. Is this poset a meet-semilattice?
6. Is this poset a join-semilattice?
7. Is this poset a lattice?

Solutions:

1. Lower bounds: a, b, c, d
2. Upper bounds: f, g
3. LUB: f
4. GLB: d
5. Meet-semilattice: Yes
6. Join-semilattice: Yes
7. Lattice: Yes