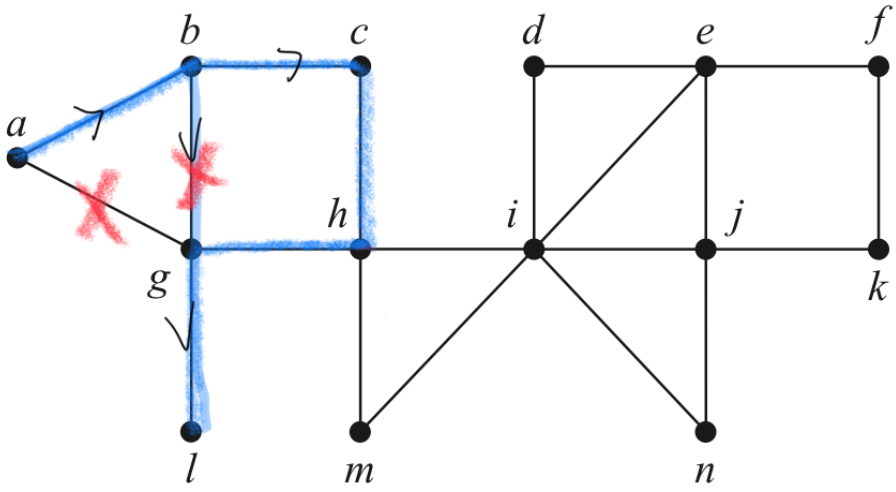
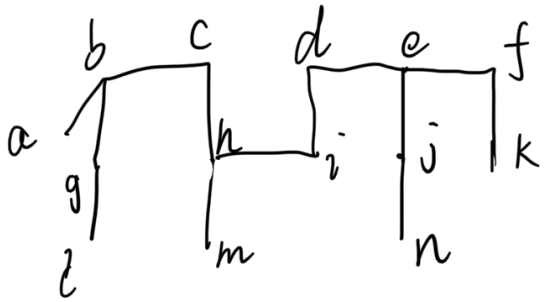
Homework08

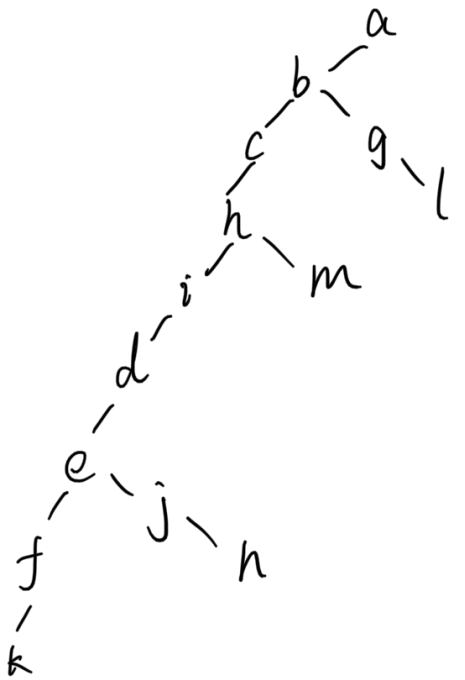
In Exercises 13–15 use depth-first search to produce a spanning tree for the given simple graph. Choose a as the root of this spanning tree and assume that the vertices are ordered alphabetically.

14.



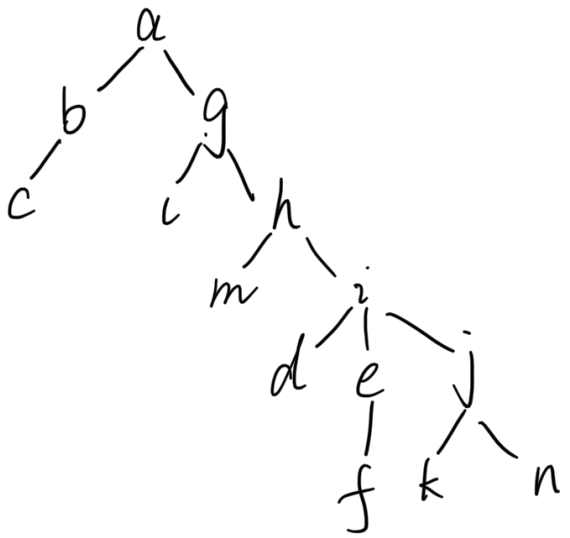
11.4. ex.14





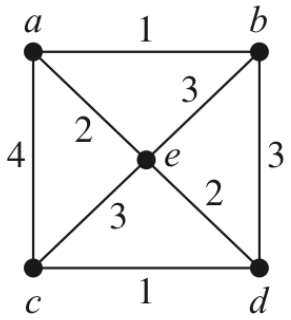
16. Use breadth-first search to produce a spanning tree for each of the simple graphs in Exercises 13–15. Choose *a* as the root of each spanning tree.

11.4. ex.16 (-14)



In Exercises 2–4 use Prim's algorithm to find a minimum spanning tree for the given weighted graph.

2.



11.5 ex.2

sum 6

1. a-b 1.
2. a-e 2
3. e-d 2
4. d-c 1

6. Use Kruskal's algorithm to find a minimum spanning tree for the weighted graph in Exercise 2.

11.5 ex.6

1. a-b 1 sum 6
2. c-d 1
3. a-e 2
4. d-e 2

2. Find the sum-of-products expansions of these Boolean functions.

a) $F(x, y) = \bar{x} + y$ **b)** $F(x, y) = x\,\bar{y}$
c) $F(x, y) = 1$ **d)** $F(x, y) = \bar{y}$

12.2 ex.2.

a) $F(x,y) = \bar{x}\cdot 1 + 1\cdot y = \bar{x}(y+\bar{y}) + (\bar{x}+x)y$

$= \bar{x}y + \bar{x}\bar{y} + \bar{x}y + xy = \bar{x}y + xy + \bar{x}\bar{y}$

b) $F(x,y) = x\bar{y}$

4. Find the sum-of-products expansions of the Boolean function $F(x, y, z)$ that equals 1 if and only if

a) $x = 0$. **b)** $xy = 0$.
c) $x + y = 0$. **d)** $xyz = 0$.

12.2.ex.4

a) $F(x,y,z) = \bar{x} = \bar{x}\cdot 1\times 1 = \bar{x}(y+\bar{y})(z+\bar{z}) =$

$(\bar{x}y + \bar{x}\bar{y})(z+\bar{z}) = \bar{x}yz + \bar{x}y\bar{z} + \bar{x}\bar{y}z + \overline{\bar{x}yz}$

(b $F(xyz) = \overline{(xy)} = \bar{x} + \bar{y} = \bar{x}\cdot 1\times 1 + \bar{y}\times 1\times 1 = \bar{x}(y+\bar{y})(z+\bar{z})$

8. Find a Boolean product of Boolean sums of literals that has the value 0 if and only if $x = y = 1$ and $z = 0$, $x = z = 0$ and $y = 1$, or $x = y = z = 0$. [*Hint:* Take the Boolean product of the Boolean sums found in parts (a), (b), and (c) in Exercise 7.]

12.2 ex. 8

$F(x,y,z) = (\bar{x}+\bar{y}+z)(x+y+z)(x+\bar{y}+z)$

12. Express each of these Boolean functions using the operators $\cdot$ and $^-$.

a) $x + y + z$ **b)** $x + \overline{y}(\overline{x} + z)$

c) $\overline{x + \overline{y}}$ **d)** $\overline{x}(x + \overline{y} + \overline{z})$

12.2 ex. 12

a) $x+y+z = \overline{\overline{x}\,\overline{y}} + z = \overline{\overline{\overline{x}\,\overline{y}}\,\overline{z}}$

$= \overline{\overline{x}\,\overline{y}\,\overline{z}}$

b) $x+\bar{y}(\bar{x}+z) = (\overline{\overline{x}\,\overline{z}})\,\bar{y} + x = \overline{x\overline{z}}\cdot\bar{y} + x$

$= \overline{x} \cdot \overline{\overline{x\overline{z}}\,y}$