Section 9.6

Exercise 9

The directed graph is not a partial order as it is not transitive since there is an edge $a \to b$ and $b \to c$ but no edge $b \to c$.

Exercise 18

b) open, opened, opener, opera, operand

Exercise 27

(a, a),(a, g),(a, d),(a, e),(a, f),
(b, b),(b, g),(b, d),(b, e),(b, f),
(c, c),(c, g),(c, d),(c, e),(c, f),
(d, d),
(e, e),
(f, f),
(g, d),(g, e),(g, f),(g, g)

Exercise 32

- Elements l and m are maximal elements
- Elements a, b and c are minimal elements
- There is no greatest element
- There is no least element
- k, l and m are upper bounds of $\{a, b, c\}$
- The least upper bound of $\{a, b, c\}$ is k
- There is no lower bound for $\{f, g, h\}$
- Because of g) there is no greatest lower bound

Section 10.2

Exercise 18

For a graph with n where $n \leq 2$ vertices the degree of one of those vertices can be at most of degree $n-1$ and at least of degree 1, this means we have $n-1$ different possible degrees. For n vertices and a maximum of $n-1$ unique degrees, at least two of them must have the same degree.

Exercise 22

The graph is bipartite where a, c is on one side, and b, d, e on the other.

Exercise 26

a) K_n is bipartite only for $n = 2$

b) C_n is bipartite for $n \leq 4$ and n is even.

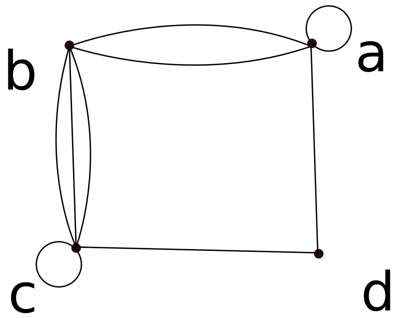
c) W_n is not bipartite for any n.

Exercise 55

A regular graph of degree 4 with n vertices has $\frac{4n}{2}$ edges, which means the number of nodes is half the number of edges, which is 5 nodes in this case.

Section 10.3

Exercise 17



Exercise 19

$$\begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 1 & 1 & 1 \\ 1 & 0 & 0 & 0 \end{bmatrix}$$

Exercise 23