MA0301
ELEMENTARY DISCRETE MATHEMATICS
NTNU, SPRING 2021

SET 10

Deadline: Wednesday 14th April, 2021, 23:59.

Exercise 1. *For the graph in figure 11.7, determine:*
a) a walk from b to d that is not a trail.
b) a b − d trail that is not a path.
c) a path from b to d.
d) a closed walk from b to b that is not a circuit.
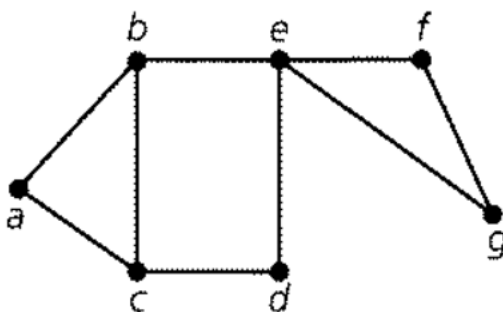*e) a circuit from b to b that is not a cycle.*
f) a cycle from b to b.

Figure 11.7

Exercise 2. *Give an example of a connected graph where removing any edge of G results in a disconnected graph.*

Exercise 3. *Figure 11.10 shows an undirected graph representing a section of a department store. The vertices indicated where cashiers are located; the edges denote unblocked aisles between cashiers. The department store wants to set up a security system where guards are placed at certain cashier locations do that each cashier either has a guard at his or her location or is only one aisle away from a cashier who has a guard. What is the smallest number of guards needed?*
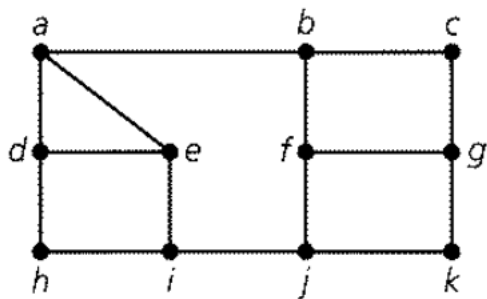
Figure 11.10

Exercise 4. *For each pair of graphs in figure 11.29, determine whether or not the graphs are isomorphic.*
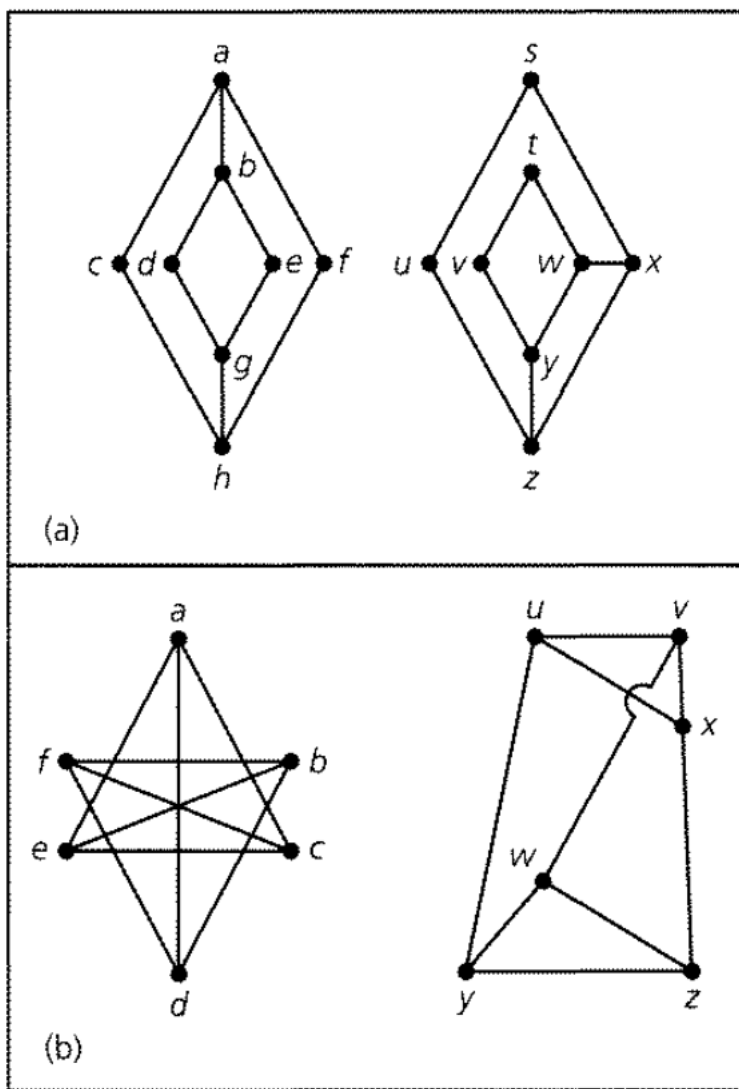

Figure 11.29

Exercise 5. *a) Find an Euler circuit for the graph in figure 11.44.*
b) If the edge $\{d, e\}$ is removed from this graph find an Euler trail for the resulting subgraph.
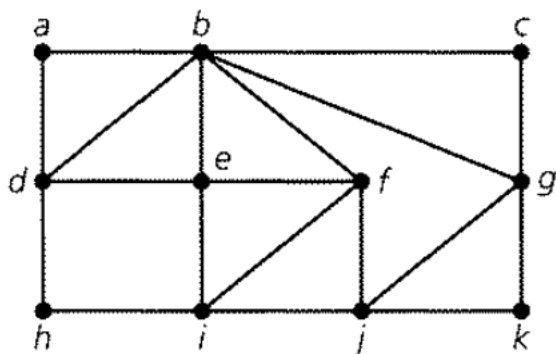

Figure 11.44

Exercise 6. *a) Let $G = (V, E)$ be an undirected graph, with $G_1 = (V_1, E_1)$ a subgraph of G. Under what condition(s) is G_1 not an induced subgraph of G?*
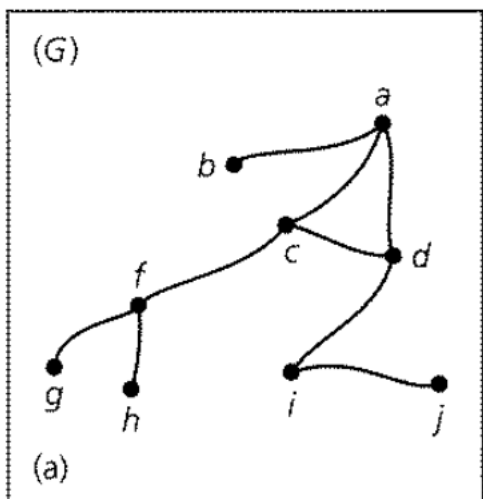*b) For the graph G in figure 11.27a, find a subgraph that is not an induced subgraph.*

Figure 11.27

Exercise 7. *If $G = (V, E)$ is a connected graph with $|E| = 17$ and $deg(v) \geq 3$ for all $v \in V$. What is the maximum value for $|V|$?*