Chapter 6 Written Homework

Section 6.1 (p. 271): 5-7, 17, 18, 22

5. This graph does not have a path from a to a that passes through each edge exactly one time due to the fact that the vertices are not all even (c and d), preventing this graph from having a Euler Cycle.

6. This graph does not have a path from a to a that passes through each edge exactly one time due to the fact that the vertices are not all even (b and d), preventing this graph from having a Euler Cycle.

7. This graph does not have a path from a to a that passes through each edge exactly one time due to the fact that the vertices are not all even (b and d), preventing this graph from having a Euler Cycle.

17. Bipartite. V1 = {v1, v2, v5} and V2 = {v2, v4}.

18. Bipartite. V1 = {v2, v5, v7} and V2 = {v1, v6, v3, v4, v8, v10, v9}.

22. Not Bipartite.

Section 6.2 (p. 281): 20, 21, 28, 39

20. Simple paths are paths from one vertex to another with no repeated vertices. In this graph, some of the simple paths are (a, b), (a, b, c), (a, b, g, c), (a, b, c, d), (a, b, g, c, d), (a, b, g, f, d), (a, b, c, d, e), (a, b, c, d, f, e), (a, b, c, g, f, d, e), (a, b, c, g, f, e), (a, b, c, d, f), (a, b, c, g, f), (a, b, g, c, d, f), (a, b, g, f), (a, b, g), (a, b, c, g).

21. Connected subgraphs: (a), (a, b), (b, c), (b, g), (c, g), (g, f), (f, d), (d, e), (b, c, g). Simple paths: (a, b), (a, b, c), (a, b, g), (a, b, c, g), (a, b, g, c), (a, b, c, g, f), (a, b, g, f), (a, b, g, f, d), (a, b, c, g, f, d), (a, b, g, f, d, e), (a, b, c, g, f, d, e). Cycles: (a), (b, c, g). Simple Cycles: (a), (b, c, g).

28. No Euler Cycle.

39. *d* and *e* are the only vertices of odd degree.

Section 6.5 (p. 300): 1-3, 7-9, 13, 14

1. The adjacency matrix for the graph of Exercise 1:

	A	B	C	D	E
A	0	1	1	1	1
B	1	0	1	0	0
C	1	1	0	1	1
D	1	0	1	0	1
E	1	0	1	1	0

2. The adjacency matrix for the graph of Exercise 2:

	A	B	C	D	E	F	G
A	0	2	0	0	0	0	0
B	2	0	1	0	1	0	0
C	0	1	1	0	1	0	0
D	0	0	0	1	1	0	1
E	0	1	1	1	0	1	0
F	0	0	0	0	1	0	1
G	0	0	0	1	0	1	0

3. The adjacency matrix for the graph of Exercise 3:

	A	B	C	D	E
A	0	1	0	0	0
B	1	0	0	0	0
C	0	0	0	1	1
D	0	0	1	0	1
E	0	0	1	1	0

7. The incidence matrix of the graph of Exercise 1:

	X1	X2	X3	X4	X5	X6	X7	X8
A	1	0	1	0	1	1	0	0
B	1	1	0	0	0	0	0	0
C	0	1	0	1	1	0	1	0
D	0	0	0	1	0	1	0	1
E	0	0	1	0	0	0	1	1

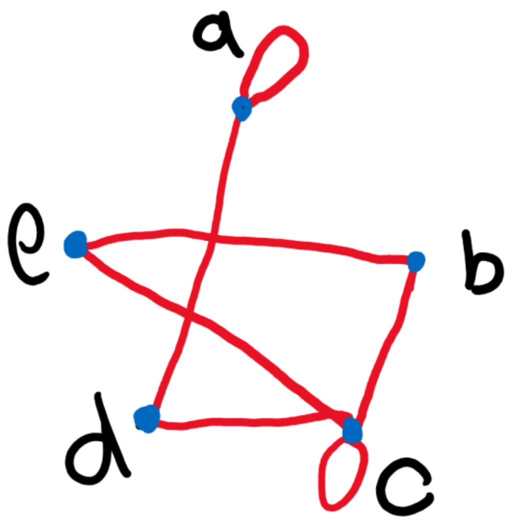
8. The incidence matrix of the graph of Exercise 2:

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
A	1	0	0	0	0	0	0	0	0	0	1
B	1	1	0	1	0	0	0	0	0	0	1
C	0	1	1	0	0	0	0	1	0	0	0
D	0	0	0	0	1	1	1	0	0	0	0
E	0	0	0	1	0	0	1	1	0	1	0
F	0	0	0	0	0	0	0	0	1	1	0
G	0	0	0	0	0	1	0	0	1	0	0

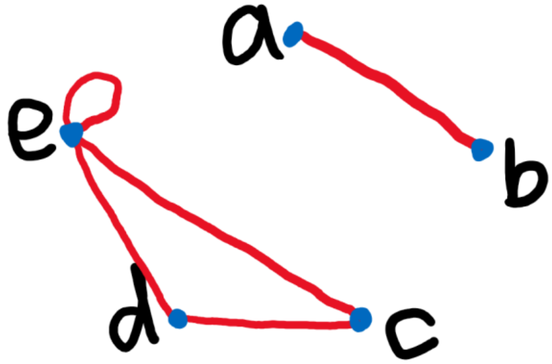
9. The incidence matrix of the graph of Exercise 3:

	X1	X2	X3	X4
A	1	0	0	0
B	1	0	0	0
C	0	1	1	0
D	0	0	1	1
E	0	1	0	1

13. The graph represented by the adjacency matrix in Exercise 13:



14. The graph represented by the adjacency matrix in Exercise 14:



<u>Section 6.6 (p. 305): 1-3</u>

1. The graphs are not isomorphic because they do not have the same number of vertices; graph G1 has 5 vertices, while graph G2 has 6 vertices.

2. The graphs are isomorphic. f(a) = g(1), f(b) = g(3), f(c) = g(5), f(d) = g(7), f(e) = g(2), f(f) = g(4), f(g) = g(6).

3. The graphs are not isomorphic because the graph of G1 has a simple cycle of length 3, while the shortest simple cycle of graph of G2 is of length 4.