

Homework 14 Section 9.6

1.d) Reflexive: yes Antisymmetric: yes transitive: yes.

So R is a partial order.

1.e) It is not antisymmetric so it's not partial order

4.a) NO, since it's not antisymmetric 4.b) NO, not reflexive

4.c) Yes, it's reflexive, antisymmetric, transitive 4.d) NO, not reflexive

8.b) Yes, diagonal only has 1's, $m_{ij}=1$, $m_{ji}=1$ only if $i=j$

8.c) NO, not transitive $m_{43}=0$ not 1

10.) NO, not transitive since no arrow $c \rightarrow d$.

18.a) chuck < quacking < quick < quicksand < quicksilver

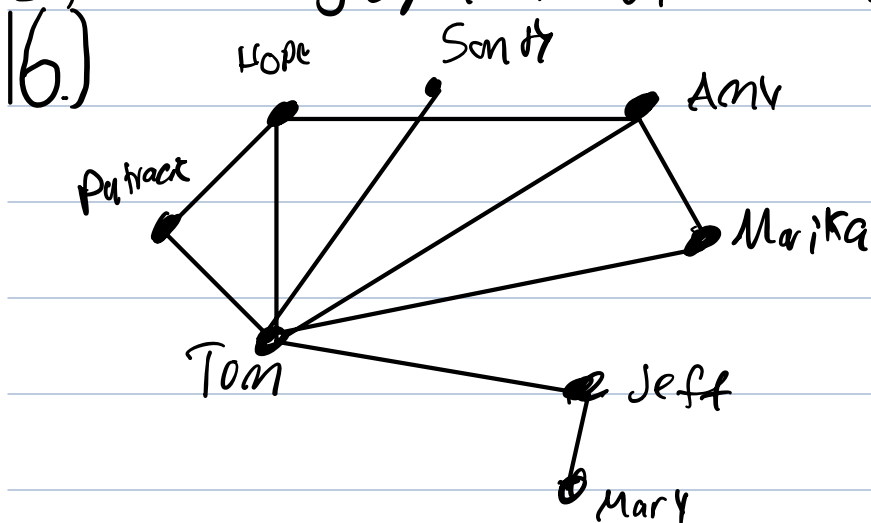
18.b) open < opened < opener < opera < operant

18.c) zero < zoo < zoological < zoology < zoom

Section 10.1

4.) undirected edges, multiple edges, no loops. Multigraph

8.) multiple edges, loops by a and e. Directed Multigraph



31.) Simple directed graph. $V =$ all courses at University. E : pre-requisite

Section 10.2

2.) Vertices: 5 edges: 13. $\deg(a, b, c) = 6$. $\deg(d) = 5$ $\deg(e) = 3$
There is no isolated or pendant vertices

4.a) 6 edges, degree total 12 ✓ 4.b) 13 edges, degree total 26 ✓

4.c) 12 edges, degree total 24 ✓

9.) Vertices: 5 edges: 13. $\deg^-(a) = 6$ $\deg^+(a) = 1$ $\deg^-(b) = 1$ $\deg^+(b) = 5$
 $\deg^-(c) = 2$ $\deg^+(c) = 5$ $\deg^-(d) = 4$ $\deg^+(d) = 2$ $\deg^-(e) = 0$ $\deg^+(e) = 0$

22.) Yes, graph is bipartite

25.) No, since d has 3 degrees

58.) $V = \{a, b, c, d, e, f\}$

$E = \{(a, b), (b, c), (b, d), (c, d), (d, e), (d, f), (e, f), (f, a), (f, b)\}$

Section 10.3

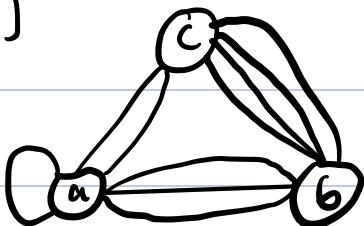
2.)

vertex	Adjacent vertices
a	b, d
b	a, d, e
c	d, e
d	a, b, c
e	b, c

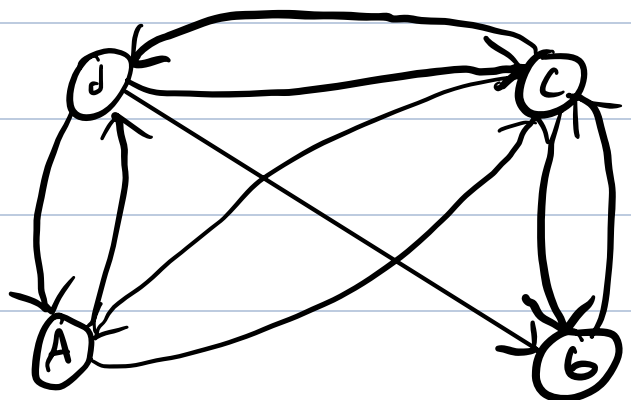
6.)

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

16.)



11.)



40.) No, V_2 has degree 4 and that isn't in U

42.) Yes $\begin{matrix} 3, 4, 2, 4, 3 \\ 3, 2, 4, 3, 4 \end{matrix}$

Section 10.4:

4). Yes, you can reach any 2 vertices by a path

6.) exercise 3: 3 connected components

exercise 4: 1 connected component

exercise 5: 2 connected components

12.a) Weakly connected since only has 1 connected component

12.b) Strongly connected, since there is a path from each vertex to every other.

12.c) Neither, no path from d to c. 2 connected components.

20.) Not isomorphic since circuits have different degrees