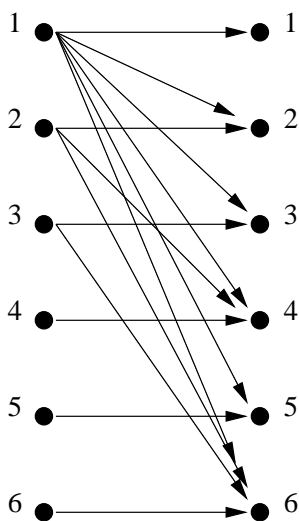


Math 55 - Homework 10 Solutions

7.1

2 a) $(1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (2, 2), (2, 4), (2, 6), (3, 3), (3, 6), (4, 4), (5, 5), (6, 6)$

b)



c)

R	1	2	3	4	5	6
1	x	x	x	x	x	x
2		x		x		x
3			x			x
4				x		
5					x	
6						x

4 a) antisymmetric, transitive b) reflexive, symmetric, transitive c) reflexive, symmetric, transitive d) reflexive, symmetric

40 $\{\}, \{(0, 0)\}, \{(1, 0)\}, \{(0, 0), (1, 0)\}, \{(0, 1)\}, \{(0, 0), (0, 1)\}, \{(1, 0), (0, 1)\}, \{(0, 0), (1, 0), (0, 1)\}, \{(1, 1)\}, \{(0, 0), (1, 1)\}, \{(1, 0), (1, 1)\}, \{(0, 0), (1, 0), (1, 1)\}, \{(0, 1), (1, 1)\}, \{(0, 0), (0, 1), (1, 1)\}, \{(1, 0), (0, 1), (1, 1)\}, \{(0, 0), (1, 0), (0, 1), (1, 1)\}$

- 42 a) $\{(0, 0), (1, 1)\}, \{(0, 0), (1, 0), (1, 1)\}, \{(0, 0), (0, 1), (1, 1)\}, \{(0, 0), (1, 0), (0, 1), (1, 1)\}$
 b) $\{\}, \{(1, 0)\}, \{(0, 1)\}, \{(1, 0), (0, 1)\}$
 c) $\{\}, \{(0, 0)\}, \{(1, 0), (0, 1)\}, \{(0, 0), (1, 0), (0, 1)\}, \{(1, 1)\}, \{(0, 0), (1, 1)\},$
 $\{(1, 0), (0, 1), (1, 1)\}, \{(0, 0), (1, 0), (0, 1), (1, 1)\}$
 d) $\{\}, \{(0, 0)\}, \{(1, 0)\}, \{(0, 0), (1, 0)\}, \{(0, 1)\}, \{(0, 0), (0, 1)\}, \{(1, 1)\},$
 $\{(0, 0), (1, 1)\}, \{(1, 0), (1, 1)\}, \{(0, 0), (1, 0), (1, 1)\}, \{(0, 1), (1, 1)\}, \{(0, 0), (0, 1), (1, 1)\}$
 e) $\{(1, 0)\}, \{(0, 0), (1, 0)\}, \{(0, 1)\}, \{(0, 0), (0, 1)\}, \{(1, 0), (1, 1)\}, \{(0, 0), (1, 0), (1, 1)\},$
 $\{(0, 1), (1, 1)\}, \{(0, 0), (0, 1), (1, 1)\}$
 f) $\{\}, \{(0, 0)\}, \{(1, 0)\}, \{(0, 0), (1, 0)\}, \{(0, 1)\}, \{(0, 0), (0, 1)\}, \{(0, 0), (1, 0), (0, 1)\},$
 $\{(1, 1)\}, \{(0, 0), (1, 1)\}, \{(1, 0), (1, 1)\}, \{(0, 0), (1, 0), (1, 1)\}, \{(0, 1), (1, 1)\},$
 $\{(0, 0), (0, 1), (1, 1)\}, \{(0, 0), (1, 0), (0, 1), (1, 1)\}$

46 a) 2 b) 13 c) 165

54 a-d) $R^2 = R^3 = R^4 = R^5 = \{(i, j) \mid i, j \in \{1, 2, 3, 4, 5\}\}$.

7.2

2 $(1, 1, 2, 3), (1, 1, 3, 2), (1, 2, 3, 1), (1, 3, 2, 1), (2, 3, 1, 1), (3, 2, 1, 1), (1, 2, 1, 3),$
 $(1, 3, 1, 2), (2, 1, 3, 1), (3, 1, 2, 1), (2, 1, 1, 3), (3, 1, 1, 2)$

4 a) Course b) Course_number c) Course_number d) Departure_time

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Airline	Flight_number	Destination
Nadir	122	Detroit
Acme	221	Detroit
Acme	122	Anchorage
Acme	323	Honolulu
Nadir	199	Detroit
Acme	222	Denver
Nadir	322	Detroit

7.3

4 a) (1, 1), (1, 2), (1, 4), (2, 1), (2, 3), (3, 2), (3, 3), (3, 4), (4, 1), (4, 3), (4, 4)

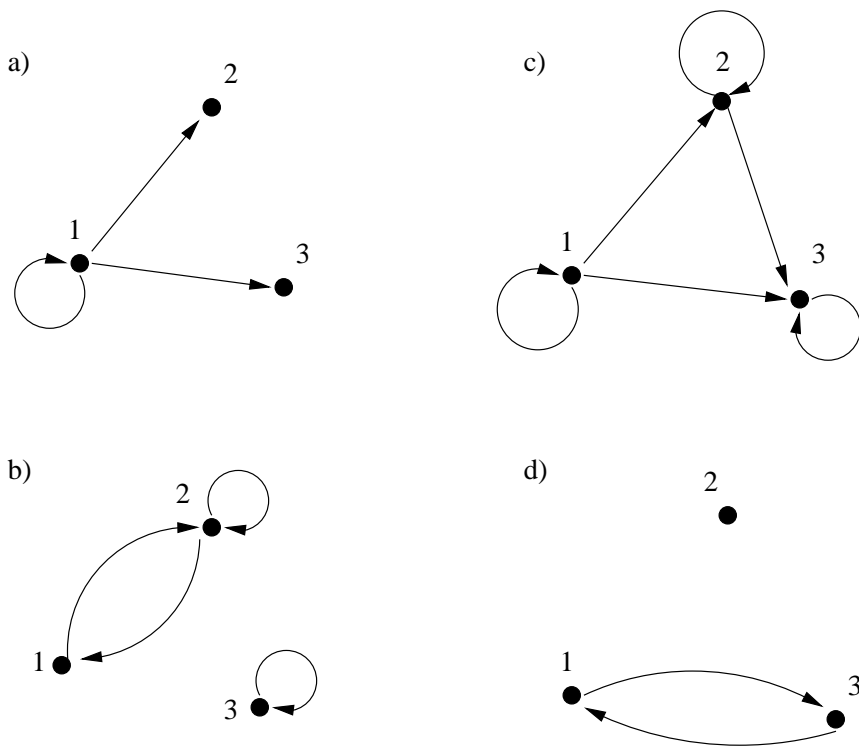
b) (1, 1), (1, 2), (1, 3), (2, 2), (3, 3), (3, 4), (4, 1), (4, 4)

c) (1, 2), (1, 4), (2, 1), (2, 3), (3, 2), (3, 4), (4, 1), (4, 3)

8 a) symmetric b) antisymmetric, reflexive c) symmetric, irreflexive

14 a) $\begin{bmatrix} 0 & 1 & 0 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ b) $\begin{bmatrix} 0 & 1 & 0 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 0 & 1 & 1 \\ 1 & 1 & 1 \\ 0 & 1 & 0 \end{bmatrix}$ d) $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ e) $\begin{bmatrix} 0 & 0 & 0 \\ 1 & 0 & 0 \\ 0 & 1 & 1 \end{bmatrix}$

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26 (a, a), (a, b), (b, b), (b, a), (c, c), (c, a), (c, d), (d, d)