Lab Assignment 10

Submit it to iCollege dropbox by **11/18 11:00PM**. Late assignment submissions will receive 50% of the original score.

Question. For each of these relations on the set {1, 2, 3, 4},

a) {(2, 2),(2, 3),(2, 4),(3, 2),(3, 3),(3, 4)}
b) {(1, 1), (1, 2), (2, 1), (2, 2), (3, 3), (4, 4)}
c) {(2, 4), (4, 2)}
d) {(1, 2), (2, 3), (3, 4)}
e) {(1, 1), (2, 2), (3, 3), (4, 4)}
f) {(1, 3), (1, 4), (2, 3), (2, 4), (3, 1), (3, 4)}

(1) Represent each relation with a matrix.

a) {(2, 2),(2, 3),(2, 4),(3, 2),(3, 3),(3, 4)}

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

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

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

c) {(2, 4), (4, 2)}

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

d) {(1, 2), (2, 3), (3, 4)}

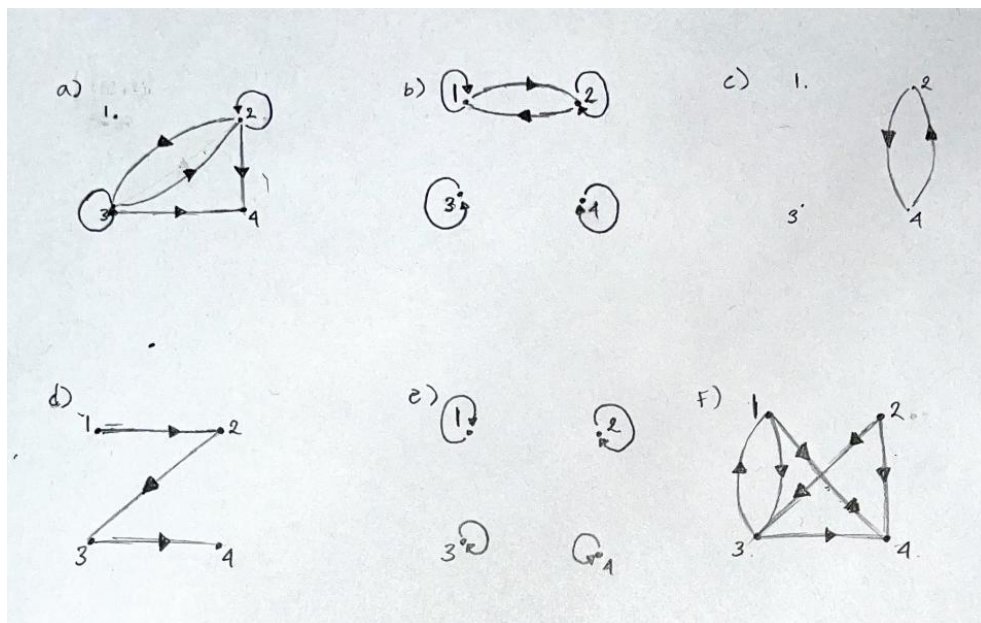$$\begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

e) {(1, 1), (2, 2), (3, 3), (4, 4)}

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

f) $\{(1, 3), (1, 4), (2, 3), (2, 4), (3, 1), (3, 4)\}$

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

(2) Draw the directed graphs.

(3) Based on the matrix or graph, explain whether it is reflexive, whether it is symmetric, whether it is antisymmetric, and whether it is transitive.

a) Transitive
b) Reflexive
c) Symmetric
d) Antisymmetric
e) Reflexive
f) Transitive