

Problem Set 10

Practice questions in Grimaldi

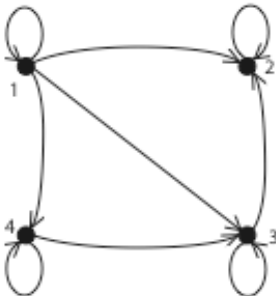
7.1 – Q1-10, 17

7.3 – Q1-8, 10

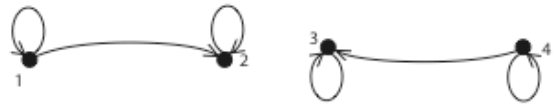
More difficult questions:

1. Given set $A=\{0,1\}$
 - a) List all the relations on A .
 - b) Which of the relations listed in (a) are reflexive?
 - c) Which of the relations listed in (a) are antisymmetric?
 - d) Which of the relations listed in (a) are transitive?
2. A computer is programmed to generate one random relation on $A=\{1\dots 10\}$. What is the probability that this relation is a function? is a reflexive relation? is a antisymmetric relation?
3. Determine whether the following directed graphs represent a partial order. If so, draw the associated Hasse diagram; if not, explain why not.

a)



b)



4. Given the poset $(\{3, 5, 9, 21, 15, 24, 45, 360\}, |)$ where " $|$ " is the *divides* symbol.
 - a) Draw the corresponding Hasse diagram
 - b) Find the maximal and minimal elements
 - c) Find the maximum and minimum element (if one exists)
 - d) Find the upper bounds of $\{3,5\}$. Which one is the least upper bound (if one exists)?
 - e) Find the lower bounds of $\{15,45\}$. Which one is the greatest lower bound (if one exists)?