Lab 4

CS 135

Problem 1

Let R be {(1, 1), (2, 1), (3, 2), (4, 3)}.

Find R^2.

Then find R^3.

Then find R^4.
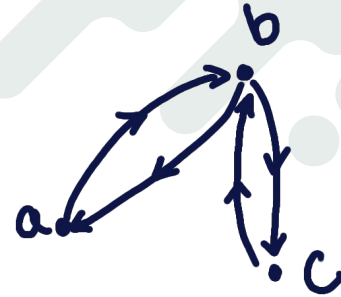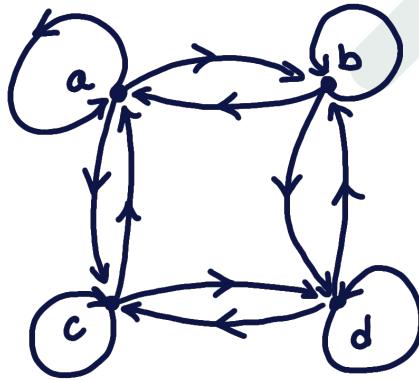
Problem 1 Answer Key

R = {(1, 1), (2, 1), (3, 2), (4, 3)}

$R^2 = R \circ R$ = {(1, 1), (2, 1), (3, 1), (4, 2)}

$R^3 = R^2 \circ R$ = {(1, 1), (2, 1), (3, 1), (4, 1)}

$R^4 = R^3 \circ R$ = {(1, 1), (2, 1), (3, 1), (4, 1)}

Problem 2

Determine whether the following directed graphs are equivalence classes.

Problem 2 Answer Key

1. Yes
2. No
3. No

Problem 3

Let R = {(a, b): a, b ∈ N, rem(a, 2) = rem(b, 2)} (the remainders of both numbers when divided by 2 are equal.

a. Describe the elements of the set $[0]_R$ and $[1]_R$
b. How many distinct equivalence classes of the natural numbers are created by R

Problem 3 Answer Key

a. $[0]_R = \{x \in N: rem(x, 2) = 0\}$

   $[1]_R = \{x \in N: rem(x, 2) = 1\}$

b. 2; [0] and [1]

Racket Time!