Worksheet 9.4-5

Max's Lecture
MATH 55

July 30, 2019

Exercise A. This isn't really an excercise, just a scenario that would take too long to write on the board. Consider a set of 5 cities. Consider the relation R on this set where $(a, b) \in R$ if and only if there is a direct telephone line connecting a and b. How can we determine whether two cities have (a possibly indirect) link?

Exercise B. Consider the relation on $\{1, 2, 3, 4\}$ given by the pairs $(1, 3), (1, 4), (2, 1), (3, 2)$. Draw a digraph of this relation, and think about how you would write down the transitive closure.

Exercise C. Determine whether the relation R on the set of all integers is an equivalence relation, where $(x, y) \in R$ if and only if:

1. $x|y$
2. $a = b$ or $a = -b$
3. $x = y + 1$ or $x = y - 1$
4. $x \equiv y (\text{mod } 7)$

Exercise D. For each of the two equivalence relations in the exercise above, describe all equivalence classes.