Tutorial II
Discrete Structures (CS21001)

Autumn Semester 2014

August 4, 2014

1. Suppose there is a relation on a set with n elements.
   (a) How many different relations are there?
   (b) How many symmetric relations are there?
   (c) How many relations are there that are both reflexive and symmetric?
2. Show that the relation $R = \{(a, b)|a \equiv b(\text{mod m})\}$ is an equivalence relation. What are the equivalence classes of R?
3. Show that the relation R on a set A is symmetric iff $R = R^{-1}$, where R^{-1} is the inverse relation.
4. Suppose the relation R is symmetric. Show that R^* is symmetric. (Hint : first show $(R \cup S)^{-1} = R^{-1} \cup S^{-1}$)
5. Let R be a relation on a set A. Show that R^n is
   (a) reflexive is R is reflexive.
   (b) transitive is R is transitive.