Automata and formal languages
Exercise 1

Answer the following questions and submit your report by next week.

1. Give an example of a relation that is:

    (a) reflexive, transitive, but not symmetric

    (b) reflexive, symmetric, but not transitive

    (c) transitive, symmetric, but not reflexive

2. Consider the relation between two sets defined by:
   $S_1 \equiv S_2$ if and only if $|S_1| = |S_2|$.
   Show that this is an equivalence relation.

3. Let R be an equivalence relation on a set A. For each $a \in A$ the equivalence class of a is denoted by $[a] = \{b : aRb\}$. Show that for all $a, b \in A$, either $[a] = [b]$ or $[a] \cap [b] = \emptyset$.