A. Do Exercise 6.1 in Schneider.

B. Do Exercise 6.2 in Schneider.

C. Suppose that we have sets STUDENT, COURSE, and PROF and relations isTaking $\in$ STUDENT $\leftrightarrow$ COURSE and isTaughtBy $\in$ COURSE $\leftrightarrow$ PROF.

Using the notation on relations, express each of the following:

1. The relation teaches $\in$ PROF $\leftrightarrow$ COURSE that contains the ordered pair $(x, y)$ iff $x$ teaches course $y$.
2. The set of students taking a course being taught by $Sarek \in$ PROF.
3. The relation hasCommonStu $\in$ COURSE $\leftrightarrow$ COURSE that contains the ordered pair $(x, y)$ iff some student is taking both $x$ and $y$.
4. The relation hasCommonStu2 $\in$ PROF $\leftrightarrow$ PROF that contains the ordered pair $(x, y)$ iff some student is taking courses one of which is taught by $x$ and one of which is taught by $y$.

D. Let $S = \{1, 2, 3, 4, 5\}$ and let $U, V, W, X \in S \leftrightarrow S$ be as follows:

$U = \{(1,1), (1,2), (2,2), (2,3), (3,3), (3,4), (4,4), (4,5), (5,5), (5,1)\}$

$V = \{(1,1), (1,2), (1,4), (2,1), (2,2), (2,4), (3,3), (4,1), (4,2), (4,4), (5,5)\}$

$W = \{(1,1), (1,2), (2,2), (3,2), (3,3), (4,4), (5,1), (5,2), (5,3), (5,4), (5,5)\}$

$X = \{\}$

For each relation, tell which properties among reflexivity, symmetry, anti-symmetry, and transitivity it possesses. For any of them that is an equivalence relation, identify its equivalence classes.