

# CS 228, Relation Exercises

Name:

Some questions are from **Discrete Mathematics and Its Applications 7e** by Kenneth Rosen.

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- Complete this table for each of the following relations on the set  $\{1, 2, 3, 4\}$ .

Relation	Reflexive	Symmetric	Antisymmetric	Transitive
$\{(2, 2), (2, 3), (2, 4), (3, 2), (3, 3), (3, 4)\}$				
$\{(1, 1), (1, 2), (2, 1), (2, 2), (3, 3), (4, 4)\}$				
$\{(2, 4), (4, 2)\}$				
$\{(1, 2), (2, 3), (3, 4)\}$				
$\{(1, 1), (2, 2), (3, 3), (4, 4)\}$				

- Show that the relation  $R = \emptyset$  on the empty set  $S = \emptyset$  is reflexive, symmetric, and transitive.

- Let  $R$  be the relation on the set of people consisting of pairs  $(a, b)$  where  $a$  is a parent of  $b$ . Let  $S$  be the relation on the set of people consisting of pairs  $(a, b)$  where  $a$  and  $b$  are siblings.

– What is  $R \circ S$ ?

– What is  $R \circ R$ ?

– What is  $R^3$ ?