

California State University, Sacramento College of Engineering and Computer Science

**Computer Science 28: Discrete Mathematics** 

Assignment #2 - Relations & Logic

## **About**

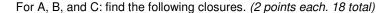
Homework should be ready to turn-in at the beginning of lecture.

If you cannot turn-in your work in class, then you may submit your homework at Riverside Hall 3018 instead, but you must time-stamp and write "Cook CSc 28" across the top of your submission.

## Relations

Given the sets over the domain {a, b, c, d}:

$$A = \{ (a, a), (b, b), (d, d), (b, a) \}$$
 $B = \{ (a, c), (c, c), (c, a), (d, a) \}$ 
 $C = \{ (a, c), (a, d), (c, b), (c, c) \}$ 



- 1. Reflexive
- 2. Symmetric
- 3. Transitive

## Logic

1. Simplify the following using a truth table. (10 points)

$$\neg ((p \land q) \rightarrow (p \lor q))$$

2. Show if the following is equivalent to  $\neg p \land \neg q$ . Use <u>Boolean math</u>. Label each law that you apply. (10 points)

$$\neg (p \lor (\neg p \land q))$$

3. Simply the following using Boolean Math. Label each law that you apply. (10 points)

$$b \wedge a \vee e \wedge c \wedge \neg e \vee \neg a \wedge b$$

4. Write out and prove (or disprove) the following statement. (12 points)

"If I'm sleepy, then I'll drink coffee or tea. I'll never drink tea. Therefore, if I'm sleepy, then I'll drink coffee"

Convert the English sentence to an argument (short notation). Then, use a truth table to prove/disprove it:

