California State University, Sacramento
College of Engineering and Computer Science

Computer Science 28: Discrete Mathematics

Spring 2020 – Assignment #3 – Quantified Logic & Induction

About

Homework will be due Monday, April 20 by Midnight. I will go over the solution on Tuesday and no homework will be accepted after that.

Submit your homework by taking photos of your work (done by hand) and e-mail it to: dcook@csus.edu. Please feel free to have more than one solution per photo. Please don't upload them to Canvas.
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Quantified Logic

1. Convert the following statement to a quantified expression.

   All my cats are asleep.

   Then, convert it into an equivalent statement (where exists and for-all are switched). Finally, convert the answer back to English

2. Convert the following statement into a quantified expression:

   Everyone, who has seen Rick and Morty and has a sense of humor, likes Szechuan Sauce.

3. Simplify the following Quantified Statement. The result should have **no** negation symbols.

   $\neg \forall_x \exists_x (\neg B(x) \wedge P(x))$

Induction

4. Prove the following using induction (show your work - both steps):

   If x ≥ 2 then 2 + 4 + 6 + ... + 2n = n (n + 1)

5. Prove the following using induction (show your work - both steps):

   If x ≥ 1 then $n^2 + n$ is even