# Com S 330 HW02

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Recitation Section 1
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1. Rosen, Section 1.4: Exercise 10 (a) (b) (d)
2. Rosen, Section 1.4: Exercise 14 (a) (d)
3. Rosen, Section 1.4: Exercise 24 (a) (c)
4. Rosen, Section 1.4: Exercise 46 (b)
5. Are $\forall x(P(x) \rightarrow Q(x))$and$\forall x P(x) \rightarrow Q(x)$logically equivalent?If yes, give a proof. If no, give a counterexample.
6. Rosen, Section 1.5: Exercise 10 (a) (d)
7. Rosen, Section 1.5: Exercise 12 (i) (n)
8. Rosen, Section 1.5: Exercise 36 (d)
9. Lehman et al. Problem 3.32
10. Define predicates and prove the following using the appropriate rules of inference:
    (a) Beth, an ISU student, visited Brazil this summer. Everyone who visited Brazil this summer watched the World Cup. Therefore, an ISU student watched the World Cup.
    (b) Some music majors are also computer science majors. Every music major can play the piano. There is a computer science major who can play the piano.

11. Consider the following argument: *Every computer science major takes discrete mathematics. Anyone who takes discrete mathematics understands logic. No one who understands logic will lose arguments. Therefore, no computer science majors will lose arguments.*

    (a) Prove the argument using the rules of inference in Tables 1 and 2 of the book.

    (b) Prove the **universal transitivity** rule, which states that if $\forall x(P(x) \rightarrow Q(x))$ and $\forall x(P(x) \rightarrow R(x))$

    (c) Now, prove the previous argument using the **universal transitivity** rule.

12. State whether the following arguments are correct. Explain your answer briefly.

    (a) All freshmen live in the dorms. Joe is not a freshman. Therefore, Joe does not live in the dorms.

    (b) Ben likes all comedies. Ben likes Hunger Games. Therefore, Hunger Games is a comedy.