**SE-410 Homework 5**

Cameron Stark

1. Draw a truth table to show that ¬(P→ Q) ≡ P∧¬Q

|  |  |  |  |
| --- | --- | --- | --- |
| P | Q | ¬(P→ Q) | P∧¬Q |
| F | F | F | F |
| F | T | F | F |
| T | F | T | T |
| T | T | F | F |

4. Explain the difference between the universal and the existential quantifiers.

Universal are statements that don’t make an existence claim over an item, such as,

“For all x, P(x) holds”

Existential are statements that are not universally true, such as,

“if anything is an x, then for all x, P(x) holds”

5. Express the following statements in the predicated calculus

a. All natural numbers are greater than 10

(∀ ∈x N) (x > 10)

b. There is at least on natural number between 5 and 10

(∃ ∈x N) (5 < x < 10)

c. There is a prime number between 100 and 200

(∃ ∈x U)(100 < x is a prime number < 200)