Problem Set 1

Wilmer Uruchi Ticona

April 11, 2019

1 Problem 1

Translate the following sentences from English to predicate logic. The domain that you are working over is X, the set of people. You may use the functions $S(x)$, meaning that"x has been a student of 6.042," $A(x)$, meaning that "x has gotten an 'A' in 6.042," $T(x)$, meaning that "x is a TA of 6.042," and $E(x, y)$, meaning that "x and y are the same person."

a) There are people who have taken 6.042 and have gotten A's in 6.042

$$\exists x \in X.\ S(x).\ A(x).$$

b) All people who are 6.042 TA's and have taken 6.042 got A's in 6.042

$$\forall x \in X.\ T(x).\ S(x).\ A(x).$$

c) There are no people who are 6.042 TA's who did not get A's in 6.042

$$\exists x \in X.\ T(x).\ \neg A(x)$$

d) There are at least three people who are TA's in 6.042 and have not taken 6.042

$$\exists x_1, x_2, x_3 \in X.\ T(x_1).\ T(x_2).\ T(x_3).\ \neg E(x_1, x_2, x_3).\ \neg S(x).$$