

### Homework Assignment 3, Theory Part

**Problem 1.** Formulate expressions of predicate logic, making use of basic integer arithmetic operation and relations, capturing the following meaning.

(i) Predicates:  $p(X)$ ,  $X$  is a prime number,  $t(X,Y)$ ,  $X,Y$  are a pair of twin primes.

(ii) Statements: there are infinitely many prime numbers, there are infinitely many pairs of twin primes.

Provide justifications.

Hint: Express infinitely many as arbitrary large.

**Problem 2.** Illustrate, with representative examples of decorated parse trees, solutions of PLP Exercises 4.7, 4.8 (Quiz 5 practice problems) explaining the attribute flow in the style of PLP Figures 4.2, 4.4.