

Assignment 4 – COMP 523

Language-based security

Brigitte Pientka

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Due Mar 27th 2008

Exercise 1 (20 pts) Write Mini-ML programs for multiplication, exponentiation, subtraction, and a function that returns a pair of (integer) quotient and remainder of two natural numbers. Implement your Mini-ML programs in Twelf.

Exercise 2 (80 pts) In the midterm, you extended the MiniML language with lists. Implement your solution in Twelf. This means you should

5 pts Extend the language of expressions to include list constructors and a case-statement for analyzing lists

15 pts Implement the typing rules for these extensions

20 pts Implement small-step evaluation rules for these extensions

10 pts Implement a type-preservation proof for these extensions

30 pts Implement a progress proof, including canonical forms lemmas you need.