

Proof Theory and Automated Theorem Proving
2013
Exercises
Week 3b

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1 Primitive recursive well-orders

In this exercise you may freely use all coding machinery that we discussed in class.

1. Provide a primitive recursive relation on (a subset) \mathbb{N}^2 so that it defines a well-order of order-type ω ;
2. Provide a primitive recursive relation on (a subset) \mathbb{N}^2 so that it defines a well-order of order-type ω^2 ;
3. Provide a primitive recursive relation on (a subset) \mathbb{N}^2 so that it defines a well-order of order-type ω^ω .

You are allowed to be informal when reasoning that the relations are primitive recursive and in showing that, indeed, they represent the required order-type.

2 Primitive recursive trees

Make Exercise 4.4.13 from the book.