Boolos and Jeffrey - HW2

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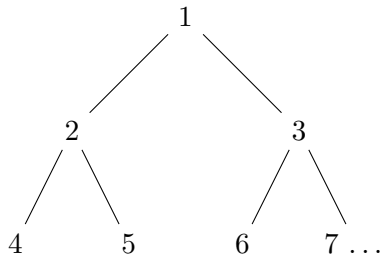
1   All nodes lead to Rome.

Proposition:

The set of nodes of an infinite binary tree is enumerable.

Conclusion:

Proof. Starting from the single origin node at the first level $d = 1$ the amount of nodes on each level is 2^d. The nodes can be counted simply starting at the origin like so:

$\square$

2   What a long, strange trip it's been.

Proposition:

The set of infinite paths beginning at the origin down an infinite binary tree is *not* enumerable.

Conclusion:

(in progress)

3   ℕ *into* ℕ

Proposition:

Where ℕ is the set of positive integers, prove that the set of all *one-to-one*, *total* functions from ℕ *into* ℕ is not enumerable.

Conclusion:

(in progress)

4   ℕ *onto* ℕ

Proposition:

Where ℕ is the set of positive integers, prove that the set of all *one-to-one*, *total* functions from ℕ *onto* ℕ is not enumerable.

Conclusion:

(in progress)