

# Proof that all natural numbers are interesting

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## Abstract

Printable version of a sample proof that uses Lamport's proof style [1], illustrating how structured proofs can be converted to HTML pages via  $\LaTeX$ 2HTML enriched with extensions for Lamport's proof style.

**Theorem** All natural numbers are interesting.

ASSUME:  $n$  a natural number.

PROVE:  $n$  is interesting.

⟨1⟩1. A number is interesting if it is the smallest number not in an interesting set.

PROOF: By definition of interesting.

⟨1⟩2. CASE:  $n = 0$

PROOF: By ⟨1⟩1, since 0 is the smallest natural number not in  $\emptyset$ .

⟨1⟩3. CASE: 1.  $n > 0$

2.  $n - 1$  is interesting

PROOF: By ⟨1⟩1, since case assumption ⟨1⟩ implies that  $\{k : k \leq n - 1\}$  is interesting.

⟨1⟩4. Q.E.D.

PROOF: Steps ⟨1⟩2 and ⟨1⟩3, assumption ⟨0⟩, and mathematical induction.

## References

- [1] Leslie Lamport, 1993, How to write a proof. In *Global Analysis of Modern Mathematics*, pp. 311–321. Publish or Perish, Houston, Texas, February 1993. A symposium in honor of Richard Palais' sixtieth birthday (also published as SRC Research Report 94). <http://research.microsoft.com/users/lamport/proofs/src94.ps.Z>