Computability Assignment
Year 2013/14 - Number 7

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1 Question

A set $C \subseteq \mathbb{N}$ is called *upward closed* iff $\forall x \in C.\ \forall y \in \mathbb{N}\ (y > x \implies y \in C)$.

Provide a characterization of the set $Z = \{X | X \in \mathcal{P}(\mathbb{N}) \wedge X \text{ is upward closed}\}$ (i.e. find a property p such that $Z = \{X | X \in \mathcal{P}(\mathbb{N}) \wedge p(X)\}$, where p could be a conjunction of many "simpler" properties).

1.1 Answer

Write your answer here.

2 Question

A set $X \subseteq \mathbb{N}$ is called *cofinite* iff $\overline{X}$ is finite.

Prove or refute the statement: "if X, $Y \in \mathcal{P}(\mathbb{N})$ are NOT cofinite, then $X \cup Y$ is NOT cofinite".

2.1 Answer

Write your answer here.

3 Question

In what follows, $A \subseteq \mathbb{N}$.

1. Prove that if there exists a bijection $f \in (\mathbb{N} \to A)$, then A is infinite.

2. Can you provide an example of an infinite set A and of a function $f \in (\mathbb{N} \to A)$ which is neither injective nor surjective?

3.1 Answer

Write your answer here.