Homework 3 of Sequence Informatics 2008

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1. Show that the set of infinite binary sequences is not countable. Prove using diagonalization.

2. Show that $|P(\mathbb{N})| = |P(\mathbb{N}) \times P(\mathbb{N})|$.

3. Give an example of an uncountable set S such that $S \subseteq P(\mathbb{N})$, and $P(\mathbb{N}) - S$ is also uncountable.

4. Let S be an uncountable set and let $\mathbb{N} \subset S$. Show that $|S - \mathbb{N}| = |S|$.