Exercício 7

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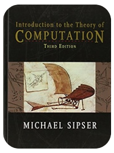

Introduction to the Theory of Computation

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First assume that $\mathcal{B}$ is countable; this means that there is a correspondence $f : \mathbb{N} \rightarrow \mathcal{B}$, i.e. we can arrange elements of $\mathcal{B}$ in list as $b_1, b_2, \ldots$. Remember that elements of $\mathcal{B}$ are infinite sequences over $\{\mathtt{0}, \mathtt{1}\}$.

Now we arrive at contradiction, by constructing an element of $\mathcal{B}$ which can not be on this list, using a diagonalization method. So, construct sequence b as follows: let the n-th digit in sequence b be the one which is not n-th digit in sequence b_n.

Now we prove that b is not on the list. Assume the contrary, i.e. $b = b_k$ for some $k \in \mathbb{N}$. Diagonalize! Look at the k-th digit of b. By assumption, it should be different from $k - th$ digit of b_k, i.e. different from itself! This contradiction proves that b is not on the list, i.e. there is no list of elements in $\mathcal{B}$, which means that it is uncountable.

Resultado

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Classical diagonalization trick, look at **Theorem 4.17**.

Exercício 6

Avaliar esta solução

Exercício 8