Exercício 13

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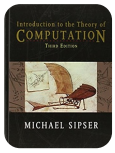

Introduction to the Theory of Computation

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Solução Certificado

Passo 1 1 de 2

For given grammar

$$S \to TT \mid U$$
$$T \to \mathtt{0}T \mid T\mathtt{0} \mid \mathtt{\#}$$
$$U \to \mathtt{0}U\mathtt{00} \mid \mathtt{\#}$$

we specify for each variable which language it generates. First we see that language of variable T is regular language $L(T) = \mathtt{0}^*\mathtt{\#}\mathtt{0}^*$, because before T eventually becomes #, we can add any number of 0's at the beginning and the end, independently. Secondly, language of variable U is obviously $L(U) = \left\{ \mathtt{0}^k\mathtt{\#}\mathtt{0}^{2k} \mid k \geq 0 \right\}$, since number of 0's before and after # is related.

Now we can describe language of the whole grammar. It is the union of languages for TT (which is just concatenation of language of variable T with itself) and U, i.e.

$$L(G) = \mathtt{0}^*\mathtt{\#}\mathtt{0}^*\mathtt{\#}\mathtt{0}^* \cup \left\{ \mathtt{0}^k\mathtt{\#}\mathtt{0}^{2k} \mid k \geq 0 \right\}.$$

We easily prove that $L(G)$ is not regular using pumping lemma with string $\mathtt{0}^p\mathtt{\#}\mathtt{0}^{2p}$, where p is the assumed pumping length. (Or more elegantly, using Myhill-Nerode theorem, try to find infinite pairwise distinguishable set by $L(G)$).

Resultado 2 de 2

Determine the language which is generated by each individual variable, and combine them to obtain language generated by grammar.

Exercício 12

Avaliar esta solução

Exercício 14