

## Daily Question

(due October 5, 2005, from Kozen example 19.1) The non-regular set  $a^n b^n$  is generated by the grammar  $G = (N, \Sigma, P, S)$  where

$$\begin{aligned} N &= \{S\} \\ \Sigma &= \{a, b\} \\ P &= \{S \rightarrow aSb \mid \epsilon\} \end{aligned}$$

To prove this, you need to show that every string of the form  $a^n b^n$  is in  $L(G)$  and that every string in  $L(G)$  is of the form  $a^n b^n$ . Prove either of these (**don't** give solutions for both).

Hints (from Kozen):

1. To prove that every string of the form  $a^n b^n$  is in  $L(G)$ , you can use induction on  $n$ .
2. To prove that every string in  $L(G)$  is of the form  $a^n b^n$ , you can use induction on the derivation.