Tutorial 3 Theory

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12 February 2014

Question 3

3.a

$L = \{(ab)^n a^k | n > k,\ k \geq 0\}$
$n = p + 1,\ k = p$ and $p > 0$.
s = aba; This is a valid string according to to language. Lets divide aba into x, y and x; $\overbrace{a}^{x}\underbrace{b}_{y}\overbrace{a}^{z}$. There is no other way to divide s because x $\neq \epsilon$, y $\neq \epsilon$ and x $\neq \epsilon$. xyz $\in L$ but xy^{i}z $\notin L$ $i \geq 2$ Contradiction. Thus L is not regular.

3.b

$L = \{(a)^n a^k \mid n \neq k\}$