

CSC236 winter 2020, quiz week 12₁

first/given name:

last/family name:

utorid:

Show that the language $L = \{a^n b^n c^n \mid n \in \mathbb{N}\}$ is non-regular.

Solution Suppose L is accepted by some DFSA M . By the pigeonhole principle, there must be some distinct values m, n such that $\delta^*(s, a^m) = \delta^*(s, a^n) = q$ for some state q . Consider $\delta^*(q, b^m c^m) = q'$. If q' is accepting, then we mistakenly accept $a^m b^m c^m$. If q' is non-accepting, then we mistakenly reject $a^m b^m c^m$. In either case, we reach a contradiction.