CS 181: Formal Languages and Automata Theory	**Spring 2021**
Homework 9	
Assigned: Saturday 29 May	*Due: Thursday 3 June 11:59pm PDT*

Problem 1

Let alphabet $\Sigma = \{0, 1\}$.
Recall we defined a "run" of a symbol in a string to be a sequence of one or more of the same symbol with no other symbols in-between and no more of that symbol adjacent to it. E.g., the string 01000110 contains exactly the following five runs: 0, 1, 000, 11, and 0.
Consider the following language over Σ:

$$L = \{\ w \in \Sigma^* \mid \text{in } w \text{ none of the runs of 0 are of equal length } \}$$

E.g., L contains 011000001001, and L does not contain 1001000100.

Decide whether L is a finite state language. If so, prove it by any method discussed in class. If not, prove that it is not finite state by any method discussed in class.