CS 254: Computability and Complexity	**Anonymous submission**
Problem Set #01	*October 24, 2019*

1. Prove the operation star is closed under recognizable languages:

   For a recognizeable language L, we can create a nondeterministic turing machine M that recognizes L^*.

   We will non-deterministically cut input string w into parts w_1, w_2, ..., w_n and run w_i on M. Since the input is finite we can try every possible cut. If M halts or rejects for any i, then reject. Otherwise, if for every i, M accepts w_i then accept.

   If there is a way to partition w into strings such that w_1, w_2, ..., w_n where $w_i \epsilon L$ then there will be a branch that M will accept.

   Therefore L^* is closed under recognizable languages.