Homework 3

Exercise 0.1 *Suppose L is a regular language with alphabet Σ. Give an algorithm to tell whether L contains at least* 100 *strings.*

Exercise 0.2 *If $w = a_1a_2 \dots a_n$ and $x = b_1b_2 \dots b_n$ are strings of the same length, define $alt(w, x)$ to be the string in which the symbols of w and x alternate, starting with w, that is, $a_1b_1a_2b_2 \dots a_nb_n$. If L and M are languages, define $alt(L, M)$ to be the set of strings of the form $alt(w, x)$, where w is any string in L and x is any string in M of the same length. Prove that if L and M are regular, so is $alt(L, M)$.*

Exercise 0.3 *If L is a language, and a is a symbol, then $a\backslash L$ is the set of strings w such that aw is in L. For example, if $L = \{a, aab, baa\}$, then $a\backslash L = \{\varepsilon, ab\}$. Prove that if L is regular, so is $a\backslash L$.*

Exercise 0.4 *Given the DFA of Table 1, draw the table of distinguishabilities for this automaton and construct the minimum-state equivalent DFA.*

Table 1: DFA to minimize

	0	1
→A	B	E
B	C	F
*C	D	H
D	E	H
E	F	I
*F	G	B
G	H	B
H	I	C
*I	A	E

* Exercises above are from *Introduction to Automata Theory, Languages, and Computation, 3rd Edition*: Exercises 4.2.3, 4.2.7, 4.3.2, 4.4.2