HW 5 CMSC 452. Morally DUE March 4

1. (0 points) What is your name? Write it clearly. Staple your HW. When is the midterm? Where is the midterm? When is the Final?

2. (60 points)
   (a) Show that \{a^{2n}b^{3n} | n \in \mathbb{N}\} is not regular.
   (b) Show that \{w | 3n_a(w) = 2n_b(w)\} is not regular.
   (c) Show that \{a^{n^4} | n \in \mathbb{N}\} is not regular.

3. (40 points) Show that the set of all functions from the Natural to the Primes is uncountable. (HINT: Assume, by way of contradiction, that there is a LIST Of all functions from Naturals to primes: \(f_1, f_2, f_3, \ldots\). YOU need to CONSTRUCT a function \(f\) from Naturals to Primes that is NOT on this list. YOU will want to define \(f(i)\) so that \(f(i) \neq f_i(i)\). KEY- still make sure that \(f\) goes from naturals to primes.)