Theory of Computation

homework 1
Due: 9/29/2015

Problem 1 The TM on p. 30 of the slides halts with a "yes" if the input string contains two consecutive 1's; otherwise, it halts at "no". That program assumes the input alphabet $\Sigma = \{ 0, 1, \bigsqcup, \triangleright \}$. Now, write a TM program for the same problem when $\Sigma = \{ 0, 1, 2, \bigsqcup, \triangleright \}$.

Problem 2 Explain why the following Turing machine does not decide the language of polynomials with integer coefficients which have integer roots: The input represents a polynomial over variables $x_1, \ldots, x_n$ with integer coefficients.

1. Examine all possible integer values of $x_1, \ldots, x_n$.
2. Evaluate the polynomial on all of them.
3. If any of them evaluates to 0, accept; else reject.