CSCI 510, Fall 2016, Homework # 3

YOUR NAME HERE

Due date: Wednesday, October 26, Midnight

1. Give an implementation-level description of a Turing machine that recognizes the language A over the alphabet $\{0, 1\}$, where

$$A = \{w | w \text{ does not contain the same number of 0s and 1s}\}$$

2. Show that a language is decidable iff some enumerator enumerates the language in the standard string order.

3. A ***queue automaton*** is like a push-down automaton except that the stack is replaced by a queue. A ***queue*** is a tape allowing symbols to be written only on the left-hand end and read only at the right-hand end. Each write operations (we'll call it a *push*) adds a symbol to the left-hand end of the queue and each read operation (we'll call it a *pull*) reads and removes a symbol at the right-hand end. As with a PDA, the input is placed on a separate read-only input tape, and the head on the input tape can move only from left to right. The input tape contains a cell with a blank symbol following the input, so that the end of the input can be detected. A queue automaton accepts its input by entering a special accept state at any time. Show that a language can be recognized by a deterministic queue automaton iff the language is Turing-recognizable.