

Consider a language,

$$A = \{ \langle M \rangle \mid M \text{ is a DFA which does not accept any string containing an odd number of 1s} \}$$

The language is said to be decidable if there exists a Turing machine for it. Construct a Turing machine for A to check the decidability.

The Turing machine for A is as follows:

I = "On input $\langle M \rangle$ where M is a DFA:

1. Construct a new DFA D_X that accepts any string containing an odd number of 1s.
2. Construct another DFA D_Y such that $L(D_Y) = L(M) \cap L(D_X)$.
3. Check whether $L(D_Y) = \phi$, using the E_{DFA} decider T .
4. If T accepts, accept; otherwise reject."

There exists a Turing machine for A. Therefore, A is decidable.