

Rice's theorem

The following languages are undecidable.

$$\{M \mid L(M) \text{ is regular}\}.$$

$$\{M \mid L(M) \text{ is context-free}\}.$$

$$\{M \mid L(M) = \emptyset\}.$$

The following languages are decidable.

$$\{M \mid M \text{ has more than 10 states}\}.$$

$$\{M \mid M \text{ never moves left on any input}\}.$$

Rice's theorem: A systematic way of proving undecidability of languages.



Property P

Definition

A property P is simply a subset of Turing recognizable languages. We say that a language L satisfies a property P , if $L \in P$.

Examples

Set of regular languages. ✓

Set of context-free languages. ✓

$\{\emptyset\}$. ✓