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- M **halts** on w if the run on w is finite and ends in a halting configuration C.
- M **accepts** w if it halts in an accepting configuration.
- M **rejects** w if it halts in an rejecting configuration.
- M **recognizes** L if
  - $\forall w \in L, M$ accepts w.
  - $\forall w \notin L, M$ does not accept w.
- L is **recognizable** if there is a Turing machine that recognizes L.
- M **decides** L if
  - $\forall w \in L, M$ accepts w.
  - $\forall w \notin L, M$ rejects w.
- L is **decidable** if there is a Turing machine that decides L.
- Theorem: There exists a language L that is not recognizable/decidable.