

Theory of Computation, CSCI 438 spring 2022
Nondeterministic Turing Machines, reading pages 178-180, March 30th

Non-deterministic TM: Defined as expected. M is as usual,

$$M=(Q,\Sigma,\Gamma,\delta,q_0,q_{\text{accept}},q_{\text{reject}}),$$

except that the signature of delta has changed:

$$\text{deterministic: } Q \times \Gamma \rightarrow Q \times \Gamma \times \{L,R\}$$

$$\text{non-deterministic: } Q \times \Gamma \rightarrow \mathcal{P}(Q \times \Gamma \times \{L,R\})$$

(Page 178)

Note that we haven't included ϵ -transitions but they can easily be simulated if you want.

A string is accepted by a non-deterministic TM if there is some sequence of possible moves that will put the machine in an accept state.