

CS581 Theory of Computation: Chapter 3 review

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1. Turing recognizable languages - are recognized by some TM.

2. Turing decidable languages - are decided by some TM.

3. Turing Machine

1. Q set of states

2. Σ input alphabet, empty symbol is not a part of Σ

3. Γ stack alphabet, where $\Sigma \subseteq \Gamma$ and blank $\in \Gamma$

4. $\delta : Q \times \Gamma \rightarrow Q \times \Gamma \times \{R, L\}$

5. $q_{start} \in Q$

6. $q_{reject} \in Q$

7. $q_{accept} \in Q$, where $q_{accept} \neq q_{reject}$

4. Multitape Turing Machine

1. Q set of states

2. Σ^k input alphabets, empty symbol is not a part of Σ^k

3. Γ^k stack alphabets, where $\Sigma^k \subseteq \Gamma^k$ and blank $\in \Gamma^k$

4. $\delta : Q \times \Gamma^k \rightarrow Q \times \Gamma^k \times \{R, L, S\}$

5. $q_{start} \in Q$

6. $q_{reject} \in Q$

7. $q_{accept} \in Q$, where $q_{accept} \neq q_{reject}$

5. Non-deterministic Turing Machine

1. Q set of states

2. Σ input alphabets, empty symbol is not a part of Σ

3. Γ stack alphabets, where $\Sigma \subseteq \Gamma$ and blank $\in \Gamma$

4. $\delta : Q \times \Gamma \rightarrow P\{Q \times \Gamma \times \{R, L\}\}$

5. $q_{start} \in Q$

6. $q_{reject} \in Q$

7. $q_{accept} \in Q$, where $q_{accept} \neq q_{reject}$

6. Enumerator

1. Q set of states

2. Σ input alphabets, empty symbol is not a part of Σ

3. Γ stack alphabets, where $\Sigma \subseteq \Gamma$ and blank $\in \Gamma$

4. $\delta : Q \times \Gamma \rightarrow Q \times \Gamma \times \{R, L\} \times \Sigma_\epsilon$

5. $q_{start} \in Q$

6. $q_{print} \in Q$

7. $q_{accept} \in Q$, where $q_{accept} \neq q_{print}$

7. All turing machine modules have equivalent computing power.

8. Algorithm definition: Algorithm = Turing Machine