

Tutorial 2

COMP 355: Introduction to Theoretical Computer Science

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Outline

1 Languages

2 DFA

Contents of the section

1 Languages

2 DFA

Operations

Let $\Sigma = \{0, 1\}$

Example 1: Σ^1

Operations

Let $\Sigma = \{0, 1\}$

Example 1: $\Sigma^1 = \{0, 1\}$

Operations

Let $\Sigma = \{0, 1\}$

Example 1: $\Sigma^1 = \{0, 1\}$

Example 2: Σ^2

Operations

Let $\Sigma = \{0, 1\}$

Example 1: $\Sigma^1 = \{0, 1\}$

Example 2: $\Sigma^2 = \{00, 01, 10, 11\}$

Operations

Let $\Sigma = \{0, 1\}$

Example 1: $\Sigma^1 = \{0, 1\}$

Example 2: $\Sigma^2 = \{00, 01, 10, 11\}$

Example 3: $|01|$

Operations

Let $\Sigma = \{0, 1\}$

Example 1: $\Sigma^1 = \{0, 1\}$

Example 2: $\Sigma^2 = \{00, 01, 10, 11\}$

Example 3: $|01| = 2$

Operations

Let $\Sigma = \{0, 1\}$

Example 1: $\Sigma^1 = \{0, 1\}$

Example 2: $\Sigma^2 = \{00, 01, 10, 11\}$

Example 3: $|01| = 2$

Example 4: $|\epsilon|$

Operations

Let $\Sigma = \{0, 1\}$

Example 1: $\Sigma^1 = \{0, 1\}$

Example 2: $\Sigma^2 = \{00, 01, 10, 11\}$

Example 3: $|01| = 2$

Example 4: $|\epsilon| = 0$

Concatenation

Let $x = 01101$ and $y = 110$, then:

1 xy

Concatenation

Let $x = 01101$ and $y = 110$, then:

① $xy = 01101110$

Concatenation

Let $x = 01101$ and $y = 110$, then:

① $xy = 01101110$

② yx

Concatenation

Let $x = 01101$ and $y = 110$, then:

① $xy = 01101110$

② $yx = 11001101$

Language

Example 1: The language of all words consisting of n 0's followed by n 1's, for some $n \geq 0$:

Language

Example 1: The language of all words consisting of n 0's followed by n 1's, for some $n \geq 0$: $\{\epsilon, 01, 0011, 000111, \dots\}$

Language

Example 1: The language of all words consisting of n 0's followed by n 1's, for some $n \geq 0$: $\{\epsilon, 01, 0011, 000111, \dots\}$

Example 2: The empty language:

Language

Example 1: The language of all words consisting of n 0's followed by n 1's, for some $n \geq 0$: $\{\epsilon, 01, 0011, 000111, \dots\}$

Example 2: The empty language: \emptyset

Language

Example 1: The language of all words consisting of n 0's followed by n 1's, for some $n \geq 0$: $\{\epsilon, 01, 0011, 000111, \dots\}$

Example 2: The empty language: \emptyset

Example 3: The language consisting of only the empty string:

Language

Example 1: The language of all words consisting of n 0's followed by n 1's, for some $n \geq 0$: $\{\epsilon, 01, 0011, 000111, \dots\}$

Example 2: The empty language: \emptyset

Example 3: The language consisting of only the empty string: $\{\epsilon\}$

Contents of the section

1 Languages

2 DFA

Example 1

For the following DFA determine:

- The alphabet set.

Example 1

For the following DFA determine:

- The alphabet set.
- Its transition table.

Example 1

For the following DFA determine:

- The alphabet set.
- Its transition table.
- Its Language.

Example 1

For the following DFA determine:

- The alphabet set.
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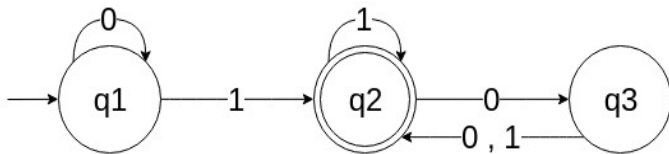


Figure: Example 1 DFA

Example 2

Build a DFA that identifies the non-negative multiples of 3.

- What is the set of alphabet?

Example 2

Build a DFA that identifies the non-negative multiples of 3.

- What is the set of alphabet?
- What is the transition diagram?

Example 2

Build a DFA that identifies the non-negative multiples of 3.

- What is the set of alphabet?
- What is the transition diagram?
- What is the transition table?

Example 3

Build a DFA that identifies the non-negative multiples of 5.

- What is the set of alphabet?

Example 3

Build a DFA that identifies the non-negative multiples of 5.

- What is the set of alphabet?
- What is the transition diagram?

Example 3

Build a DFA that identifies the non-negative multiples of 5.

- What is the set of alphabet?
- What is the transition diagram?
- What is the transition table?

Example 4

Build a DFA that identifies the non-negative powers of 2.

- What is the set of alphabet?

Example 4

Build a DFA that identifies the non-negative powers of 2.

- What is the set of alphabet?
- What is the transition diagram?

Example 4

Build a DFA that identifies the non-negative powers of 2.

- What is the set of alphabet?
- What is the transition diagram?
- What is the transition table?