BRAC University
Dept. of Computer Science and Engineering
Fall 2024
CSE331 - Assignment 1
Deadline: November 21 11:45 PM

1. Construct DFAs that recognize the following languages:
    a. L = { w ∈ $\{0,1\}^*$: w contains “1010” as a substring}
    b. L = { w ∈ $\{a,b\}^*$: “a” occurs in every 4th position}
    c. L = { w ∈ $\{a,b\}^*$: every “b” is followed by at most one “a”}
    d. L = { w ∈ $\{0,1\}^*$: w starts and ends with 1 and length of w is odd}
    e. L = { w ∈ $\{0,1\}^*$: the binary equivalent string is divisible by 3}
2. Construct NFAs that recognize the following languages:
    a. L = { w ∈ $\{0,1\}^*$: w starts with “1010”}
    b. L = { w ∈ $\{0,1\}^*$: 3rd last symbol in w is 1}
    c. L = { w ∈ $\{a,b\}^*$: w ends with “bab”}
    d. L = { w ∈ $\{a,b\}^*$: the count of substring “ab” in w is at least two}
    e. L = { w ∈ $\{0,1\}^*$: w contains “010” as a substring}
3. Write regular expressions for the following languages:
    a. L = { w ∈ $\{0,1\}^*$: length of w is even}
    b. L = { w ∈ $\{a,b\}^*$: w starts and ends with same symbol and the length of w is odd}
    c. L = { w ∈ $\{0,1\}^*$: w contains exactly one “01”}
    d. L = { w ∈ $\{a,b\}^*$: every “b” is followed by at least two “a”s}
    e. L = { w ∈ $\{0,1\}^*$: w starts with “1011”}