Tab 1

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