REGULAR EXPRESSION PRACTICE SHEET

AUTOMATA & COMPUTABILITY (CSE331)

> Pattern Matching

- Starting with 01
- Ending with 01
- Containing 100 as a substring
- Having 100 as a subsequence
- String that ends with 3 consecutive 1s
- Starts with 101 and ends with 10
- Doesn't contain 101
- Doesn't contain 00
- Doesn't contain 111
- Doesn't contain 000
- Doesn't contain 11
- Doesn't contain 01 as a substring
- 000 appears after every 1

Character Frequency and Count

- Even number of 1s
- At least one 1
- Exactly two 1s
- At most one a, $\sum$ = {a, b}
- Length of w is even
- Length of w is odd
- Length of |w| = 4
- Length of w is 3k+2, where k is an integer
- Number of 1s divisible by 3
- Even number of 0s
- The number of 0s is odd
- Number of 0s divisible by 4
- Number of 1s between every pair of consecutive 0s is odd
- Set of binary numbers divisible by 4
- w contains at least one 1 and one 0
- Exactly one appearance of 00 in w

- 0s and 1s always come in pairs
- Same number of 01 or 10, starts and ends with the same number
- Parity of 0 and 1 is different
- Contains at least 2 0s and at least one 1

String Length and Structure

- Length of w is 3k+2, where k is an integer
- |w| not divisible by 3
- Length divisible by 3 and 4
- w is a non-empty string whose characters alternate between as and bs
- Length of |w| = 4
- Length of w is even
- Length of w is odd
- Set of strings where the 10th symbol (from the end) is a 1
- String alternates 0s and 1s
- Length of w is odd or even

Character Alternation/Positioning

These regular expressions describe the position and alternation of specific characters.

- L3: Every third position in w is 1
- L4: Every 1 is followed by at least two 0s
- L5: L3 ∩ L4 (Intersection of L3 and L4)
- Every second position in w is 0
- w contains two bs separated by exactly 5 characters
- 0 at the third-last position
- 0 at every odd position
- w is a non-empty string whose characters alternate between as and bs
- w contains at least one 1 and one 0

Character Sequences and Constraints

- Every run of 0s has at least length 3
- 1 doesn't appear after 000
- Strings that neither have consecutive 1s nor consecutive 0s
- May have consecutive 1s or 0s, but not both
- Either doesn't have consecutive 0s or consecutive 1s
- Doesn't contain consecutive 1s or consecutive 0s

Set or Specific Character Matching

- ∑ = {a, ., @}, where a represents any letter (email format: first.middle.last@g.bracu.ac.bd)
- ∑ = {0, 1, 2}, the last letter appears at least twice in w
- ∑ = {a, b, c}, each character appears only once
- First and last character are the same, ∑ = {a, b}
- w is a non-empty string whose characters alternate between as and bs

Specific Condition Matching

- Email format: first.middle.last@g.bracu.ac.bd, ∑ = {a, ., @}, where a represents any letter.
- w contains at least one 1 and one 0
- 0 followed by at least 3 1s
- Doesn't contain 101
- 0 at every odd position
- w contains at least one 1 and one 0