

# Regular Expressions Research Assignment

## 1 Regular Expressions for Languages over $\Sigma = \{a, b\}$

1. All strings starting with 'a' and ending with 'b':
2. All strings containing exactly three 'a's:
3. All strings containing no consecutive identical letters:
4. All strings with length at least 2:

## 2 Languages under Regular Expressions

1.  $r = a(baba)^*$
2.  $r = (a + b)abb(a + b)$
3.  $r = (ab + ba)^*(a + b + \lambda)$
4.  $r = 1(0101)^*$
5.  $r = (aa + bb)^*b$

## NB: Problem-Solving Strategy for Regular Expressions

1. Write down several strings that should be in the language.
2. Look for patterns in these strings.
3. Break down the pattern into components.
4. Combine the components using regular expression operators.
5. Test the solution with both valid and invalid strings.
6. Look for ways to simplify the expression.