Assignment 1.1 Regular Expressions
Give regular expressions (containing terminals, parenthesis, '|', and '*) where '|' is used at most once such that the language of the regular expression satisfies the given constraints.

1. Language includes:
   - ca
   - ccccc
   - cca
   but does not include:
   - ccc
   - cccccc
   - a

2. Language includes:
   - abc
   - abca
   - abcabc
   but does not include:
   - abcab
   - abcaa
   - a

3. Language includes:
   - j
   - iiiij
   - ixxxxxxxxj
   - ixxiiij
   but does not include:
   - jj
   - xij

Assignment 1.2 Languages of Regular Expressions
Give the languages described by the following regular expressions.
For example \( [a^+] = \{a^n \mid n \in \mathbb{N}\} \)

1. \([x^*y^*]\)
2. \([(a|b|\epsilon)c(a|\epsilon)]\)
3. \([(x|y^*)z]\)

Assignment 1.3 Automata Implementation
Come up with an implementation of the following given automata in Java. Do not make use of any “fancy” library, i.e., YOU should do the implementation ;-)
Assignment 1.4 Thompson’s Algorithm

Using Thompson’s Algorithm, transform the following regular expressions to NFAs.

1. $ab^*c$
2. $(b|a)^*b$
3. $(b|ab)b(a|b)^*$

Assignment 1.5 Berry-Sethi Algorithm (Naive Approach)

Give the transitions for the naive Berry-Sethi approach for the expression $r^+$ where $r$ is any regular expression.