Congratulations! You passed!
TO PASS 1% or higher

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GRADE
100%

Interview Questions: Regular Expressions (ungraded)

TOTAL POINTS 3

1. **Challenging REs.** Construct a regular expression for each of the following languages over the binary alphabet or prove that no such regular expression is possible: **1 / 1 point**

   - All strings except 11 or 111.
   - Strings with 1 in every odd-number bit position.
   - Strings with an equal number of 0s and 1s.
   - Strings with at least two 0s and at most one 1.
   - Strings that when interpreted as a binary integer are a multiple of 3.
   - Strings with no two consecutive 1s.
   - Strings that are palindromes (same forwards and backwards).
   - Strings with an equal number of substrings of the form 01 and 10.

   Determine whether the above could be constructed by regular expressions.

   Correct
   Hint: two are not possible (equal number of 0s and 1s; palindromes).

2. **Exponential-size DFA.** Design a regular expressions of length n such that any DFA that recognizes the same language has an exponential number of states **1 / 1 point**

   Exponential-size DFA

   Correct
   Hint: n^{th}-to-the-last bit equals 0.

3. **Extensions to NFA.** Add to NFA.java the ability to handle multiway or, wildcard, and the + closure operator. **1 / 1 point**

   Extensions to NFA

   Correct
   Hint: think about how you need to modify the digraph for multiway or and the + closure operator. What other changes to the algorithm do you need to make?