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CS 420/520 Theory of Computation, Spring 2019 at Indiana State University, taught by Jeff Kinne

Quiz 6 - regular languages still

Points - each part is graded as 1 point, half credit is possible.

1) If the following language is regular, give an RE, DFA, or NFA for the language.

If it is not regular, prove it is not regular using the pumping lemma.

L = {strings of 0's and 1's with an even # of 1's and an odd # of 0's}

In the language: 101, 01010, 11000, 011, 000

Not in the language: 1000, 0100, 00, 1

2) If the following language is regular, give an RE, DFA, or NFA for the language.

If it is not regular, prove it is not regular using the pumping lemma.

L = {strings of 0's and 1's of the form 0^n 1^m 0^n | m,n >= 0 (same # 0’s before  
 and after the 1’s)}

In the language: 00100, 111, 010, 00001110000

Not in the language: 0100, 00111000

3) If the following language is regular, give an RE, DFA, or NFA for the language.

If it is not regular, prove it is not regular using the pumping lemma.

L = {w | the even positions in w form a string of a's and b's

with an even # of a's, and the odd positions in w form

a string of a's and b's that begin and end with b}

In the language: ab ab bb ba bb, ab ba aa bb, ab ab

Not in the language: ab bb, aa ab, ab aa

4) Complete the Python3 code to determine if a string input by the user is a valid math

expression involving positive integers, +, \*, -, /

Note - in the language: 1234+234-234\*234, 1234, 2\*4

- not in the language: (23+23)/234, -234, hello, 234k, pi, 2.3, 2 + 3

s = input('Please enter a valid math expression: ')

import re

match = re.match(' ', s)

if match: print('Valid!')

else: print('Not valid. :(')

5) Complete the Python3 code to determine if a string input by the user is a valid

C variable name that has the following rules - must start with a letter; can

contain letters, digits,

and underscore

Note - in the language: hello123, hello, h\_, hello\_there, HI

- not in the language: hello.one, \_hello, 234hello

s = input('Please enter a valid variable name: ')

import re

match = re.match(' ', s)

if match: print('Valid!')

else: print('Not valid. :(')