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Homework 14

CISP440

1 Find regular expressions describing exactly each of the following strings (on A = {a, b} unless otherwise stated

A. All strings of a's of odd length.

a(aa)*

B. All strings of length exactly 4.

(....)

C. All strings of a, b, and c that begin with a or c and end with b.

[ac].*b

D. All strings with at least two b's.

.*b+.*b+.*

E. All strings with at least one a and at least one b.

```
(.*(b+.*a+).*)|(.*(a+.*b+).*)
```

F. All strings that contain at least one double letter.

```
.*a2.*|.*b2.*
```

G. All strings that do not contain a double letter.

H. All strings that contain the patterns aba or bab or both.

```
.*aba.*|.*bab.*
```

I. All strings with an even number of a's

```
^[^a]*(a[^a]*a[^a]*)*$
```

2 Describe in English, the strings that are defined by the following regular expressions:

A. `a*ba*ba*`

This would match with any string starting with zero or any number of a's, followed by one b, followed by zero or any number of a's, followed by one b, followed by zero or any number of a's. In other words,a string with exactly 2 b's and any number of a's.

B. `(a+b)*(aa+bb)`

This regular expression has two capture groups. The first matches with one or more a's followed by a b, with that pattern repeating 0 or more times. The second capture group matches with at least 2 a's, followed by exactly 2 b's.

3 Indicate which of the following strings would match the regular expression above.

I should note that I can't find the meaning of λ in the context of regexes anywhere online or in the textbook... B is the only string that matches the regular expression.

4 Circle the first letter in each string above that does not match the requirements of the regular expression.

baaabbaaa(b)
baaabaaaab * matches
baaa(a)abbaa
aaabaa() needs another a to match.

5 What is the shortest possible string that WOULD NOT match the regular expression?

ab

6 ...that would match the regex?

aaabaaa