

Regular Expressions

Basis:

ε is a regular expression. The empty string itself matches the pattern (and nothing else does).

\emptyset is a regular expression. No strings match this pattern.

a is a regular expression, for any $a \in \Sigma$ (i.e. any character). The character itself matching this pattern.

Recursive

If A, B are regular expressions then $(A \cup B)$ is a regular expression matched by any string that matches A or that matches B [or both].

If A, B are regular expressions then AB is a regular expression. matched by any string x such that $x = yz$, y matches A and z matches B .

If A is a regular expression, then A^* is a regular expression. matched by any string that can be divided into 0 or more strings that match A .

7

More Examples

$(0^*1^*)^*$

0^*1^*

$(0 \cup 1)^*(00 \cup 11)^*(0 \cup 1)^*$

$(00 \cup 11)^*$

10

More Practice

You can also go the other way

Write a regular expression for "the set of all binary strings of odd length"

Write a regular expression for "the set of all binary strings with at most two ones"

Write a regular expression for "strings that don't contain 00"

12

What **can't** regular expressions do?

Can you write a regular expression for all binary palindromes?

Can you write a regular expression for all binary palindromes of length at most 100?

17