Constructions of REs

Recursive Case: Given that E and F are regular expressions:

- The union $E + F$ is a regular expression.

$$L(\ E + F\ ) =$$

- The concatenation EF is a regular expression.

$$L(\ EF\ ) =$$

- Kleene closure of E is a regular expression.

$$L(\ E^*\ ) =$$

- A parenthesized E is a regular expression.

$$L(\ (E)\ ) =$$

Base Case:

- Constants ϵ and $\varnothing$ are regular expressions.

$$L(\ \epsilon\ ) =$$
$$L(\ \varnothing\ ) =$$

- An input symbol $a \in \Sigma$ is a regular expression.

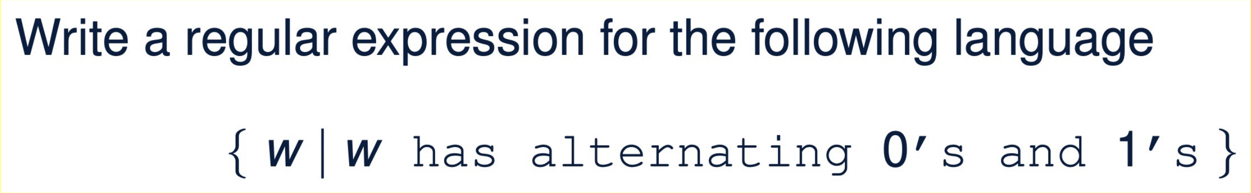
$$L(\ a\ ) =$$

RE Construction: Exercise

Given a **language** L,
derive the following **languages** constructed from **REs**:

1. $\boxed{\varnothing + L}$ 2. $\boxed{\varnothing L}$ 3. $\boxed{\varnothing^*}$ 4. $\boxed{\varnothing^* L}$

RE Specification: Exercise



Write a regular expression for the following language

$$\{\, w \mid w \texttt{ has alternating } 0'\texttt{s and } 1'\texttt{s} \,\}$$

RE: Operator Precedence

- Are RE_1 and RE_2 equivalent?
- A string in $L(RE_1)$ but not in $L(RE_2)$?
- A string in $L(RE_2)$ but not in $L(RE_1)$?

10^* vs. $(10)^*$

$01^* + 1$ vs. $0(1^* + 1)$

$0 + 1^*$ vs. $(0 + 1)^*$

DFA: Exercise

Draw the transition diagram of a DFA which accepts/recognizes the following language:

$\{\ w \mid w \neq \varepsilon \wedge w$ has equal # of alternating 0's and 1's $\}$