Regular Expressions

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Intended Learning Outcomes

Come up with compilation rules from Regular Expressions to NFAs.

Languages

- Formal languages: Languages that have a formal definition.
- What Formal Languages do you know?

Define Regular Expressions

- **Empty** string: ϵ
- Some letter: α
- Some expression: \mathcal{R}
- Concatenation: $\mathcal{R}_0\mathcal{R}_1$
- Pattern to find: sos

Inputs

- No match: something
- A match: ab

Compilation

$$\mathcal{C}(s,s',\epsilon) \mapsto \begin{array}{c} s & \xrightarrow{\epsilon} & s' \\ \\ \mathcal{C}(s,s',\alpha) \mapsto \begin{array}{c} s & \xrightarrow{\alpha} & s' \\ \\ \mathcal{C}(s,s',\mathcal{R}_0\mathcal{R}_1) \mapsto \begin{array}{c} s & \xrightarrow{\mathcal{C}(s,s'',\mathcal{R}_0)} & \\ s' & \xrightarrow{\mathcal{C}(s'',s',\mathcal{R}_1)} & \\ s' & \xrightarrow{\mathcal{C}(s'',s'',\mathcal{R}_1)} & \\ \end{array}$$