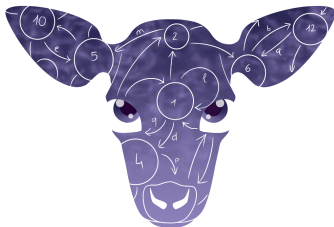# CALF: Categorical Automata Learning Framework

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The L* algorithm (Angluin, 1987)

Finite alphabet A

System behaviour captured by a **regular language** $\mathcal{L} \subseteq A^*$

L* learns *minimal* DFA for $\mathcal{L}$ assuming an *oracle* that answers
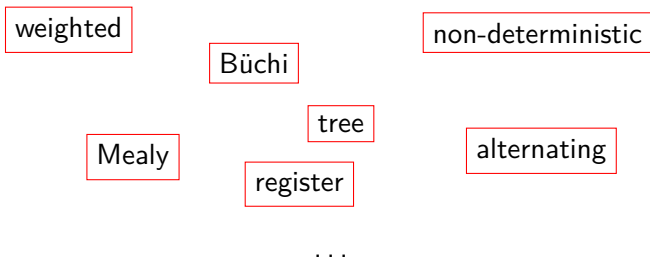
- ▶ **Membership queries**

$$w \in \mathcal{L}?$$

- ▶ **Equivalence queries**

$$\mathcal{L}(H) = \mathcal{L}?$$

Negative result $\implies$ *counterexample*

Problem: ad hoc adaptations

weighted

non-deterministic

Büchi

tree

Mealy

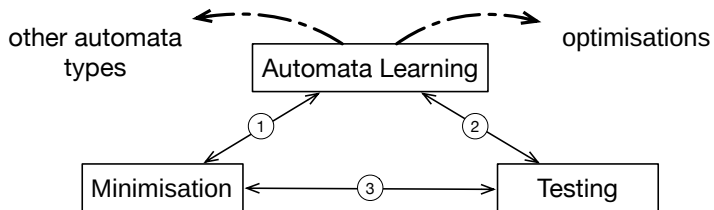alternating

register

. . .

Complex automata $\implies$

▶ Hard to adapt algorithm
▶ Complex correctness proofs

Solution: **category theory**

CALF

Project website: `calf-project.org`