





# Verification in Isabelle/HOL of Hopcroft's algorithm for minimizing DFAs including runtime analysis

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# Outline

### 1. Living in Munich

- 1.1 The city
- 1.2 Technical University of Munich

## 2. Hopcroft's algorithm

- 2.1 DFA minimization by example
- 2.2 Towards a formal definition...

Living in Munich ıblin Netherlands Berlin⊚ London Germany Belgium Prague Czechia Paris Vienna ⊚ Austria France Croatia Marseille Italy ⊚Rome Barcelona

Figure: Location of Munich

Madrid

Living in Munich The ci





Figure: Some photos of Munich













































































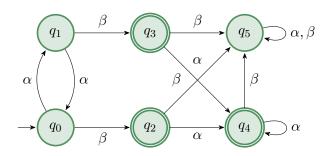
Figure: Technical University of Munich (TUM)

### 1. Living in Munich

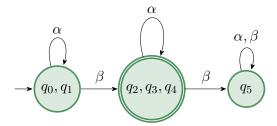
- 1.1 The city
- 1.2 Technical University of Munich

## 2. Hopcroft's algorithm

- $_{\rm 2.1}$  DFA minimization by example
- 2.2 Towards a formal definition...



Splitter	Partition	Workset
_	${q_0, q_1, q_5}{q_2, q_3, q_4}$	$(\alpha, \{q_0, q_1, q_5\}) (\beta, \{q_0, q_1, q_5\})$
$(\beta, \{q_0, q_1, q_5\})$	${q_0,q_1}{q_5}{q_2,q_3,q_4}$	$(\alpha, \{q_0, q_1\}) \ (\alpha, \{q_5\})$
$(\alpha, \{q_0, q_1\})$	${q_0,q_1}{q_5}{q_2,q_3,q_4}$	$(lpha,\{q_5\})$
$(\alpha, \{q_5\})$	${q_0,q_1}{q_5}{q_2,q_3,q_4}$	Ø



Formalization