

# Programming Project: A simple Translator from Relational Calculus to Relational Algebra and vice versa

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Seminar: Turing Award Winners and their Contribution to Science

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17.12.2020, University of Basel

# Overview

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- Background
- Implementation
- Limitation
- Demo

# Background

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- › Edgar F. Codd proved the equivalence in expression power of RC and RA
- › Therefore they can be translated into one another

# Implementation

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- Python
  - GUI with PySimpleGUI
- .tex file and LaTeX compiled pdf output possible on Linux

# Limitations

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- › Not Codd's Reduction Theorem  $\rightarrow$  correctness of result not proven
- › From RC to RA is a Reduction  $\rightarrow$  explicit joins must be given as arguments when  $RA \rightarrow RC$
- › solution not guaranteed to be best performing

# Demo

**Relational Translator**

Please enter the formula you want to translate (LaTeX format required)

Input Formula: `!= 'paid' \land Month < 10](Orders)\bowtie Customers)`

☒ Alg to Calc ☐ Calc to Alg

Output Formula: `\{Name|o \text{ in Orders } \wedge \text{Status} \neq \text{'paid'} \wedge \text{Month}`

Output Compiled: `generated LaTeX file as output.tex and pdf as output.p`

**Translate**

$$\pi_{Name, Label}(\sigma_{City = 'Basel' \wedge Location = 'Basel' \wedge Status = 'delivered' \wedge Month \geq 9}((Customers) \bowtie (Products) \bowtie (Orders)))$$

**Relational Translator**

Please enter the formula you want to translate (LaTeX format required)

Input Formula: `Basel' \wedge o.Status = 'delivered' \wedge o.Month \geq 9]`

☐ Alg to Calc ☒ Calc to Alg

Output Formula: `\pi_{Name, Label}(\sigma_{City = 'Basel' \wedge Location`

Output Compiled: `generated LaTeX file as output.tex and pdf as output.p`

**Translate**

$$\{Name|o \in Orders \wedge Status \neq 'paid' \wedge Month < 10\}$$

Questions?