

Make Business Processes great again...

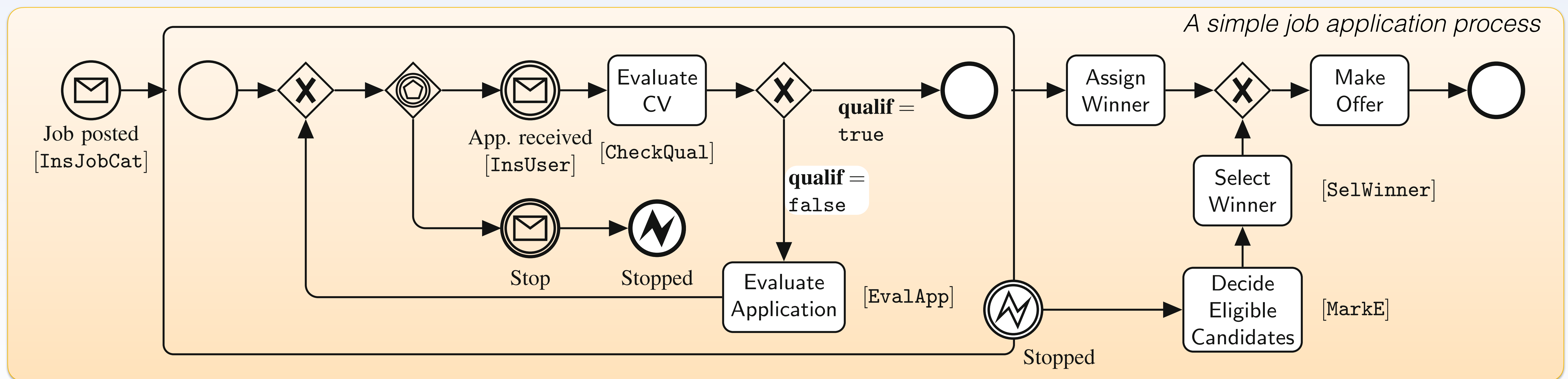
... using Formal Methods ($=^{\wedge} \cup ^{\wedge} =$)

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section of Software System Engineering



Business Process



Processes consist of control-flows organised amongst activities in order to reach company goals. Activities and decision logic are arbitrarily complex, and can access and manipulate company's **databases**.

Formal Methods

“Mathematical” approaches to software and system development which support the rigorous **specification**, **design** and **verification** of complex systems.

Examples of interesting tasks:

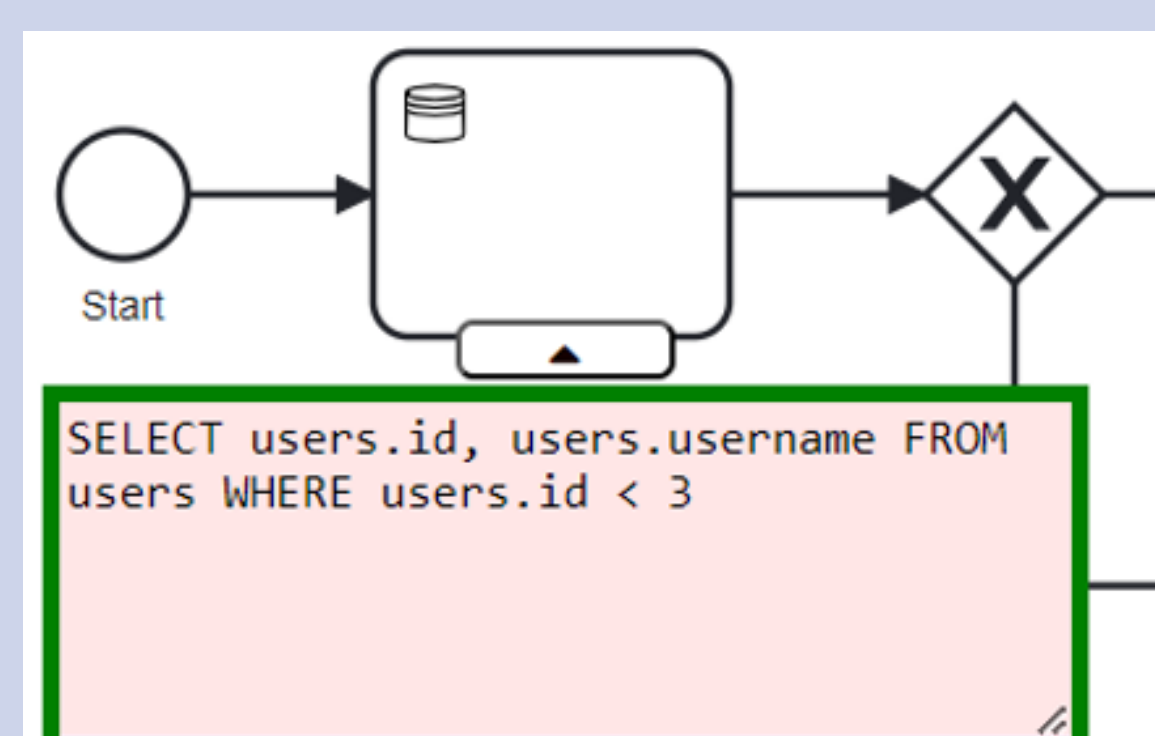
- understand and rigorously specify the system (abstraction) **Modeling**
- be able to analyse the system executions **Simulation / Monitoring**
- guarantee that the original system design is respected, desired correctness properties are met and the system can run correctly **Verification**
- make system specifications executable **Enactment**

Some success stories

Modeling

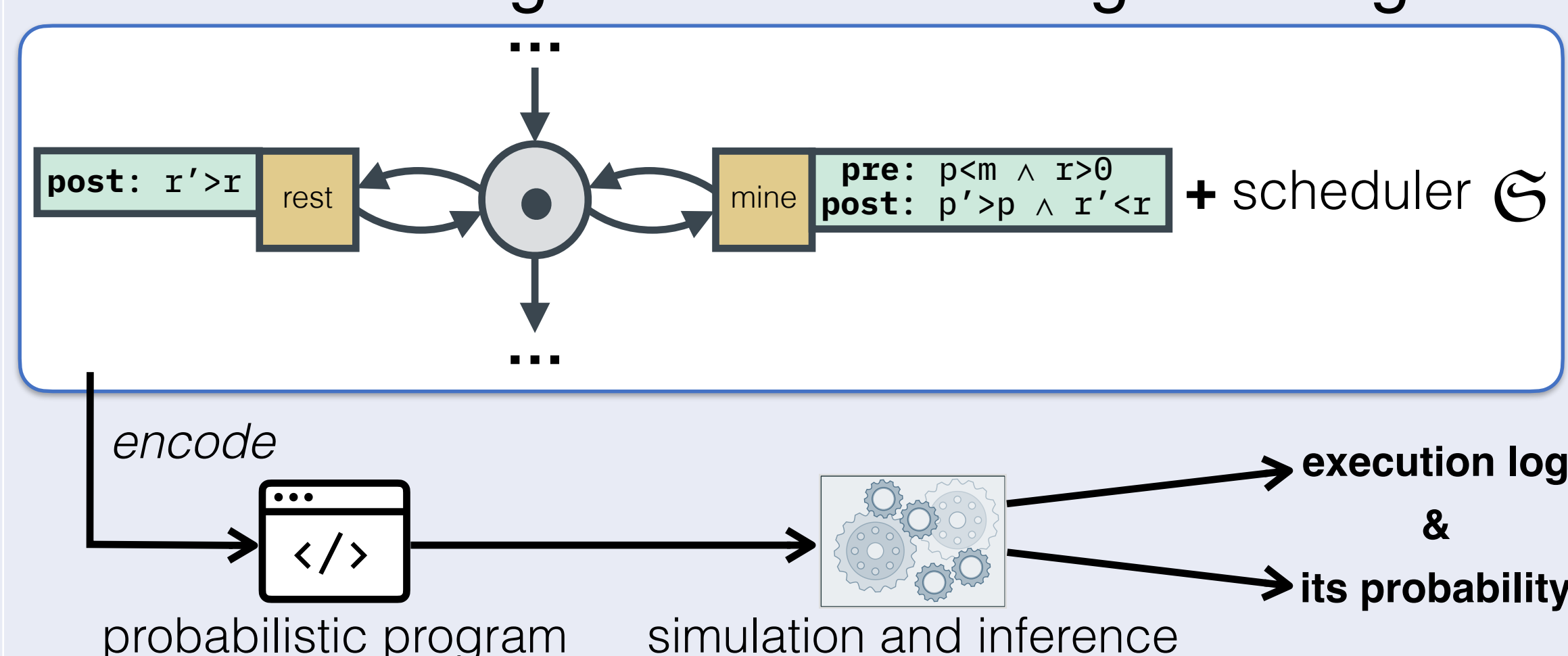
Formalisation of data-aware processes → proper execution semantics for BPMN with CRUD support

- [BPMN.io](https://bpmn.io) extension
- PDMML support (a process-aware SQL dialect)
- DB dynamic linking



Simulation

Simulation of Data Petri Nets with probabilistic schedulers using Probabilistic Programming



What is missing?

General claim:

- Prototypes for modeling, simulation, monitoring, verification and enactment
- Studying adoption in practice
- Benchmarks



Specifically for YOU:

- Efficient monitoring/simulation for hybrid processes
- Web-app for modeling and verification of BPMN with DMN (based on bpmn.io)
- Simulator for data-aware BPMN building on an available prototype
- Petri net modeling/analysis tools