Discrete Event Systems

Introduction
Discrete Event Systems
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Why should you care?
Being based on natural phenomena, Science is often explained by continuous variables

\[ F = G \frac{m_1 m_2}{r^2} \]
Being based on natural phenomena, Science is often explained by continuous variables solved by differential equations.

\[ F = G \frac{m_1 m_2}{r^2} \]
Many complex systems are not continuous...
Somewhere inside Google datacenters

computer systems
transportation systems

NYC subway system
amazon.com home page

software systems
Those systems are determined by **discrete events**

- Customers requests
- Telephone calls
- Train arrivals
- Incoming data
- Equipment failures
  ...

In this course, you’ll learn how to

Model

Analyze

Design Discrete Event Systems

Test

Optimize
Design

Model

Analyze

Test

Optimize

some examples

automata & petri nets

average-, worst-case viewpoint

out of a specification

proof system properties

minimize the system size
There will be 3 lecturers in the course

Part I
Laurent Vanbever
Automata

Part II
Roger Wattenhofer
Stochastic process

Part III
Lana Josipović
Specification model
Week 1-4
Laurent Vanbever
Automata

Week 5-9
Roger Wattenhofer
Stochastic process

Week 10-13
Lana Josipović
Specification model
## Course organization

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>Thursday 2pm–4pm @HG D 7.2</td>
</tr>
<tr>
<td>Exercises</td>
<td>Thursday 4pm–6pm @HG D 7.2</td>
</tr>
<tr>
<td>Materials</td>
<td><a href="https://disco.ethz.ch/courses/des/">https://disco.ethz.ch/courses/des/</a></td>
</tr>
</tbody>
</table>