Discrete Event Systems

Introduction

Discrete Event Systems

Why should you care?

Discrete Event Systems

Being based on natural phenomena,
Science is often explained by continuous variables

\[ F = \frac{G m_1 m_2}{r^2} \]

Mechanics    Gravitation    Electrodynamic
Being based on natural phenomena, Science is often explained by continuous variables.

\[ F = G \frac{m_1 m_2}{r^2} \]

Many complex systems are not continuous...

solved by differential equations

Somewhere inside Google datacenters

NYC subway system
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

<table>
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<tr>
<th>Model</th>
<th>Analyze</th>
<th>Design</th>
<th>Test</th>
<th>Optimize</th>
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<tbody>
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<td>Discrete Event Systems</td>
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Some examples

- automata & petri nets
- average-, worst-case viewpoint
- out of a specification
- proof system properties
- minimize the system size
There will be 3 professors in the course

Part I
Laurent Vanbever
Automatas

Part II
Roger Wattenhofer
Stochastic process

Part III
Lothar Thiele
Specification model

Week 1-5
Laurent Vanbever
Automatas

Week 6-10
Roger Wattenhofer
Stochastic process

Week 11-13
Lothar Thiele
Specification model

Course organization

Lectures
Thursday 1pm-3pm
@ETZ 9

Exercises
Thursday 3pm-5pm
@ETZ 9

Materials
https://disco.ethz.ch/courses/des/