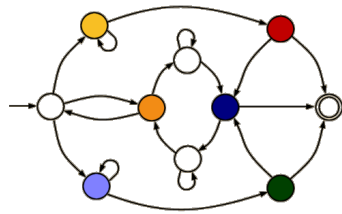# Discrete Event Systems

Introduction

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23 September 2021

Discrete Event Systems

Discrete Event Systems

Why should you care?

Being based on natural phenomena,

Science is often explained by continuous variables
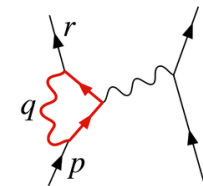

$$F = G\frac{m_1 m_2}{r^2}$$

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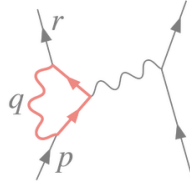
Being based on natural phenomena,
Science is often explained by continuous variables

Many complex systems are not continuous…

Mechanics

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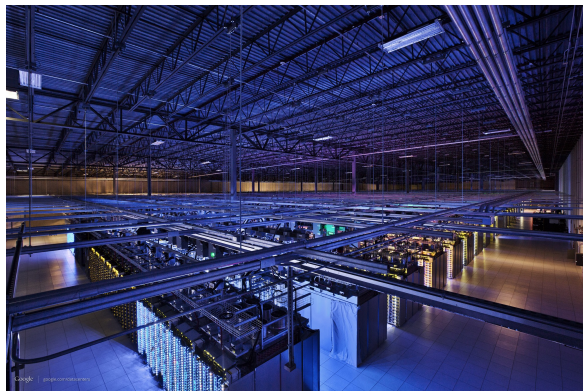

Gravitation

Electrodynamic

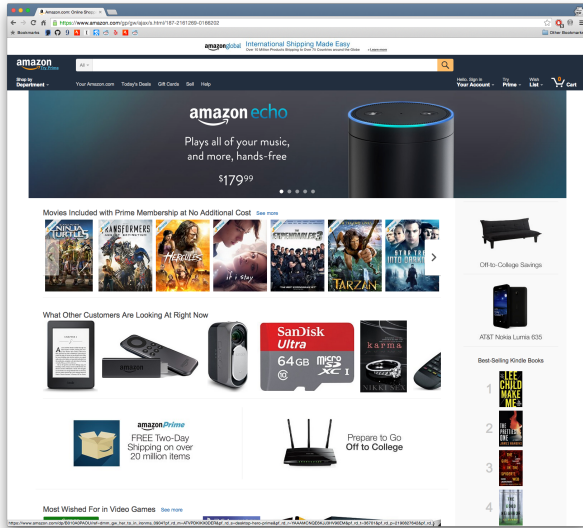solved by differential equations

computer
systems

Somewhere inside Google datacenters

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

some examples

Model	automata & petri nets
Analyze	average-, worst-case viewpoint
Design	out of a specification
Test	proof system properties
Optimize	minimize the system size

There will be 3 lecturers in the course

Part I	Part II	Part III

Laurent Vanbever

Automata

Roger Wattenhofer

Stochastic process

Romain Jacob

Specification model

Laurent Vanbever

Automata

Roger Wattenhofer

Stochastic process

Romain Jacob

Specification model

Course organization

Lectures	Thursday 2pm-4pm
	@HG D 7.2
Exercices	Thursday 4pm-6pm
	@HG D 7.2
Materials	https://disco.ethz.ch/courses/des/