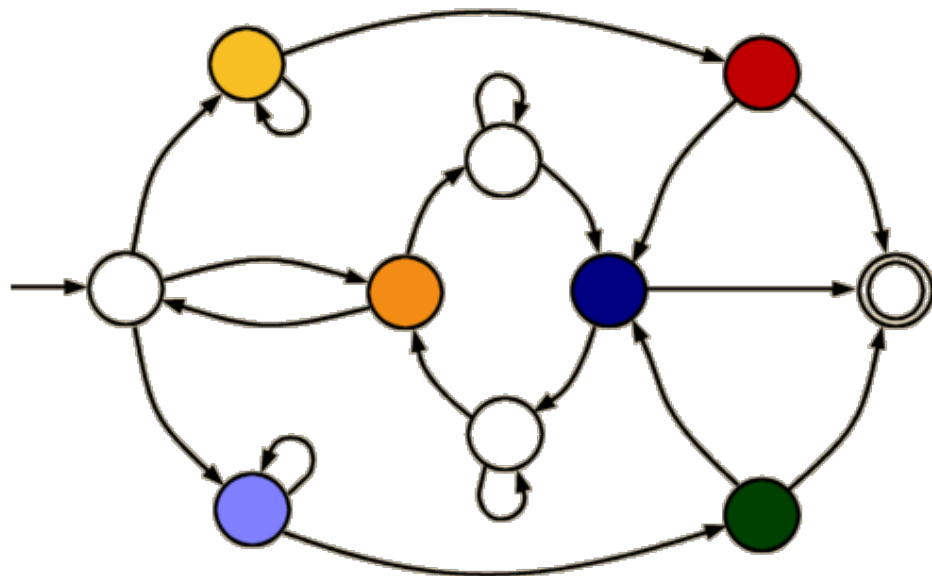


Discrete Event Systems

Introduction



Laurent Vanbever

nsg.ee.ethz.ch

ETH Zürich (D-ITET)

23 September 2021

Discrete Event Systems

Discrete Event Systems

Why should you care?

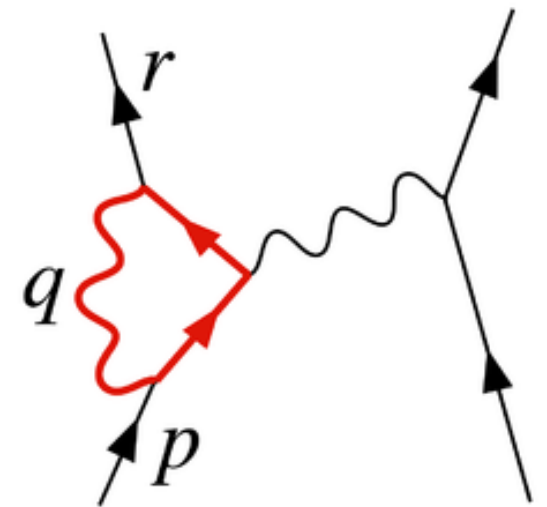
Being based on natural phenomena,
Science is often explained by continuous variables



Mechanics

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

Gravitation



Electrodynamic

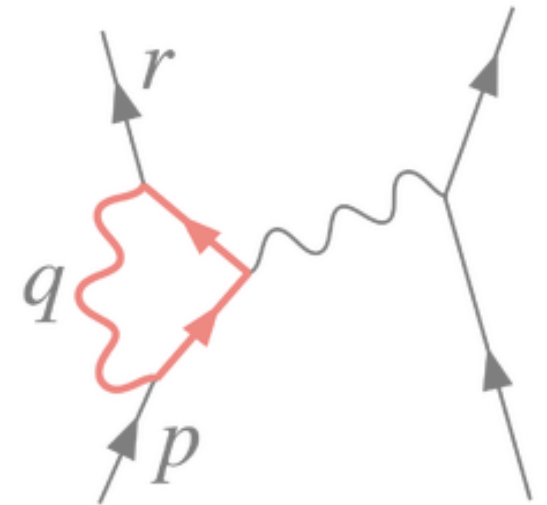
Being based on natural phenomena,
Science is often explained by continuous variables



Mechanics

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

Gravitation



Electrodynamic

solved by differential equations

Many complex systems are not continuous...



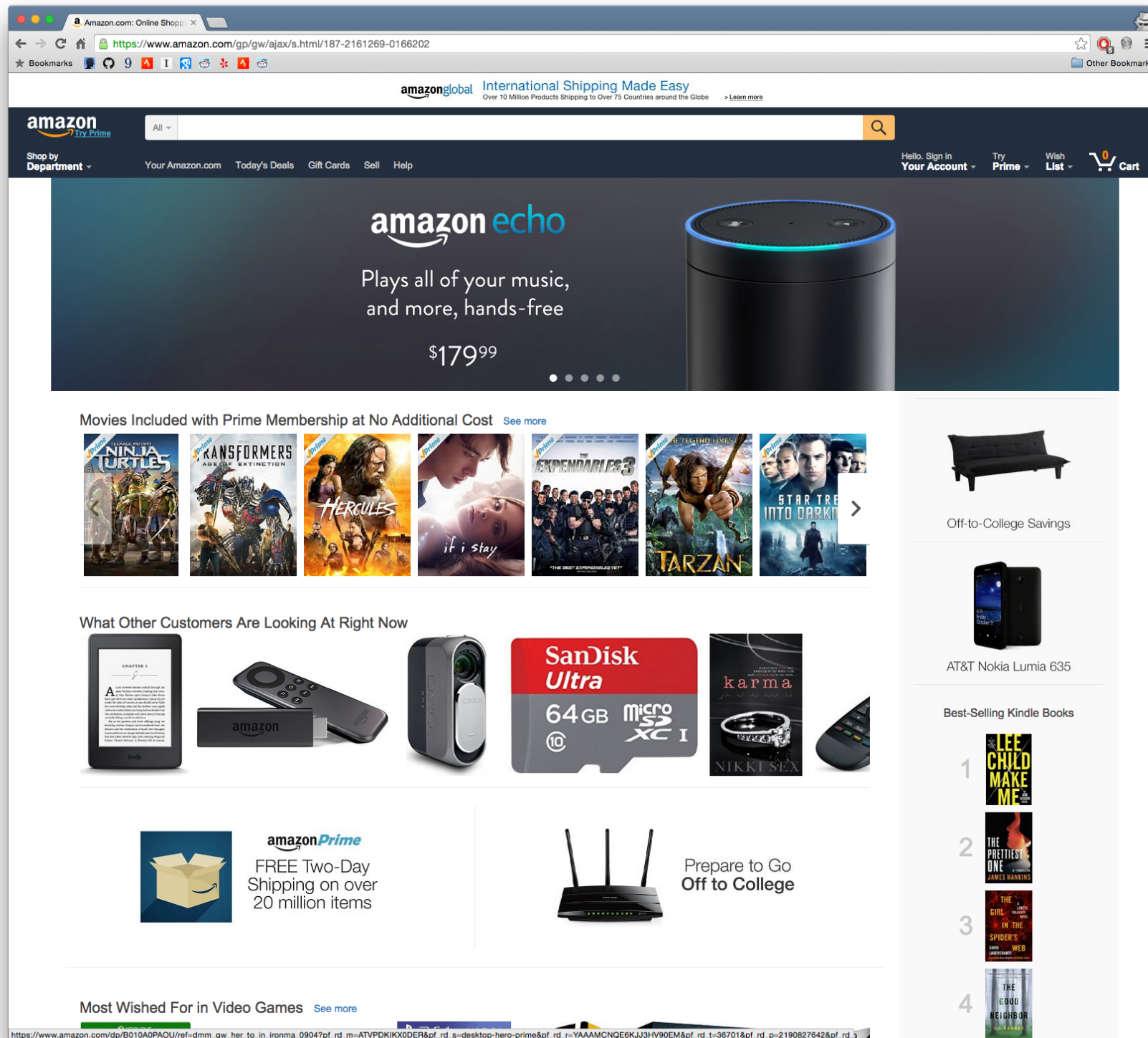
computer
systems

Somewhere inside Google datacenters



transportation systems

NYC subway system



software
systems

amazon.com home page

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



Laurent Vanbever

Automata

Part II



Roger Wattenhofer

Stochastic process

Part III



Romain Jacob

Specification model

Week 1-4



Laurent Vanbever

Automata

Week 5-9



Roger Wattenhofer

Stochastic process

Week 10-13



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/>