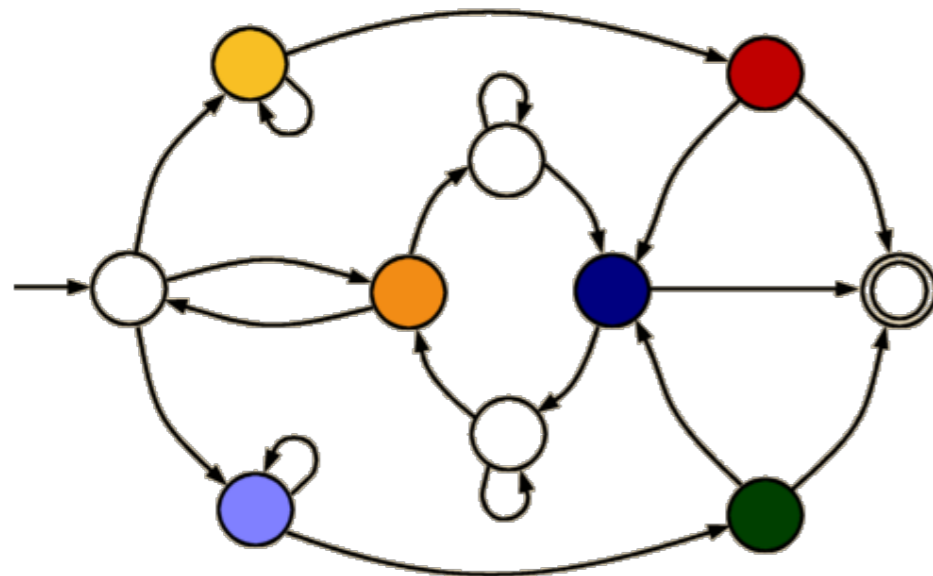# Discrete Event Systems

Introduction

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19 September 2024

Discrete Event Systems

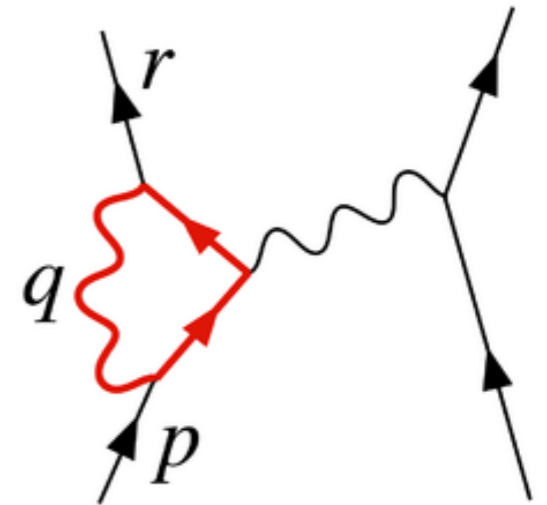# Discrete Event Systems

Why should you care?

Science is often explained by continuous variables

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

Mechanics   Gravitation   Electrodynamic

Science is often explained by continuous variables

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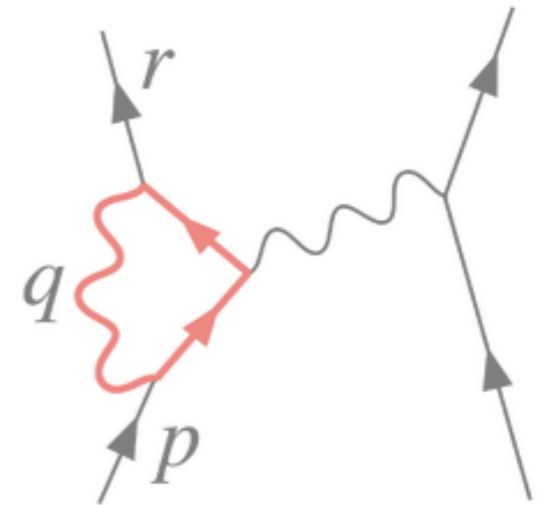
Mechanics   Gravitation   Electrodynamic

solved by differential equations
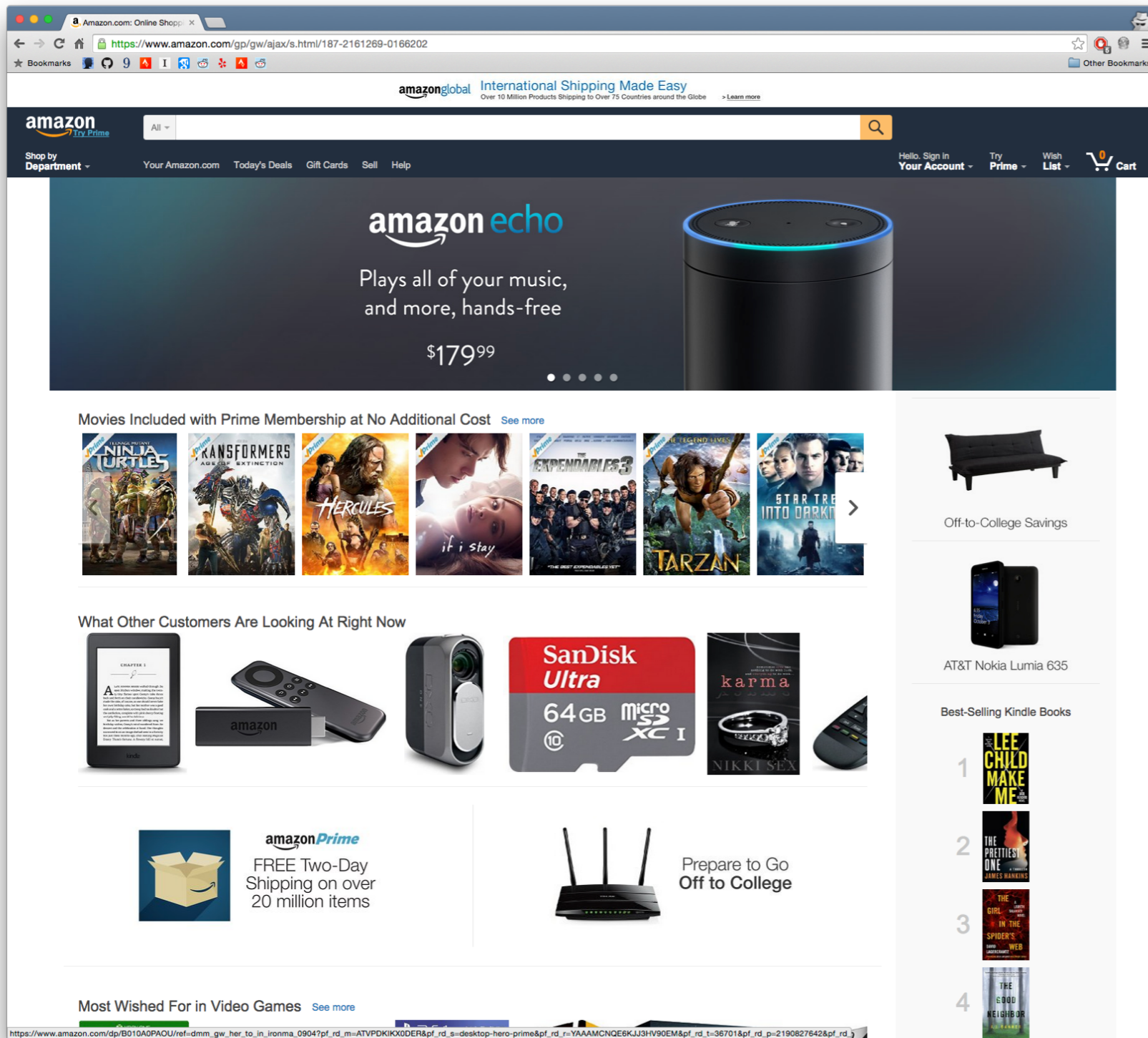
Many complex systems are not continuous…

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

Part II

Part III

Laurent Vanbever

Barbara Keller

Lana Josipović

Automata

Stochastic process

Specification model

Week 1-5

Week 6-10

Week 11-14

Laurent Vanbever

Barbara Keller

Lana Josipović

Automata

Stochastic process

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/