Designing Interactive Systems I

Course Introduction

Prof. Dr. Jan Borchers
Media Computing Group
RWTH Aachen University

Winter term 2019/20

http://hci.ac/dis

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Prof. Dr. Jan Borchers

- Studied CS at Karlsruhe (& Imperial)
  - Human-Computer Interaction
- PhD CS, TU Darmstadt (& Linz, Ulm)
  - Interaction with multimedia
  - HCI design patterns
- Assistant professor at Stanford & ETH Zurich
  - Interactive rooms
  - UbiComp user interfaces
- Full professor at RWTH since Oct. 2003
  - Interaction with audio & video
  - Wearable & Tangible UIs, Personal Fabrication, IDEs,…

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Our Team

Krishna Subramanian, M. Sc.
krishna@cs.rwth-aachen.de

Oliver Nowak, M. Sc.
nowak@cs.rwth-aachen.de

They answer all your questions!

Please add this subject line to your mail: **“[DIS1]”**

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Human–Computer Interaction?

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Fac 0 0 | Order# 99004234 | New 99031927 | Report Selection (Prin Vie Fax EMai) | OCB | SSF View | Dupe Load | View Invent | Routing Sheet | Print Bill | Call Log | Cancelled

CUST

Caller JOE | Quote 0
Phn [redacted] | Unknown Shipper:
Terms Prepaid Collect 3rd Party STD
Cust: Hi Fo Holdings, Ltd. HIFO
Inv: Hi Fo Holdings, Ltd. HIFO

PICK-UP

At: Hi Fo Holdings, Ltd. HIFO
Add: 1125 [redacted] STREET SUITE 1200
CSPC VANCOUVER BC V6Z2K8
Ph: [redacted] Fax:
Cont: Est P/U:
Appointment: D: 06-10-02 F: T:

CONSIGNEE

Cons: CANADIAN HARDWARE & H
Add: [redacted] AVENUE SUITE 101
CSPC SCARBOROUGH ON M1B5M4
Ph: [redacted] x Fax: (41[redacted]2
Cont: VM:
Appointment: D: F: T:

COD $0.00
Fee $0.00 Fee Collect
Driver Collect

Mode: Air | From SC: ADT | To SC: ADT

Tariff: CAXR9-00-01
Service: 2D D 194
From: YVR
To: YYZ
Deliver By: 06-12-02 17:00
Clock Stop

Miles	P/U Miles	Del Miles
0	0	0

Broker / Customs Agent
Broker:
Value: 0.00 In: USD
Notified:

Verbal Pod
Notify on POD
Hazmat:

Find CAX#
CAX#: 100670861
Shpr Ref:
B/L:
PO#:
GBL Num:
Cons Ref:
Billing Ref:
Ref 5:
MasterID: 0
MAWB:
Statement: 0
Hold P/U:

Non-Freight:
Manifest Hold:
Print Hold
Rate

SAVED

Charges:	761.50
Discount:	0%
SubTotal:	761.50
Accessorial:	40.00
DV: 0	0.00
FSC: CAX 2.50%	38.08
Total:	839.58
Balance:	839.58

Addend
Closed
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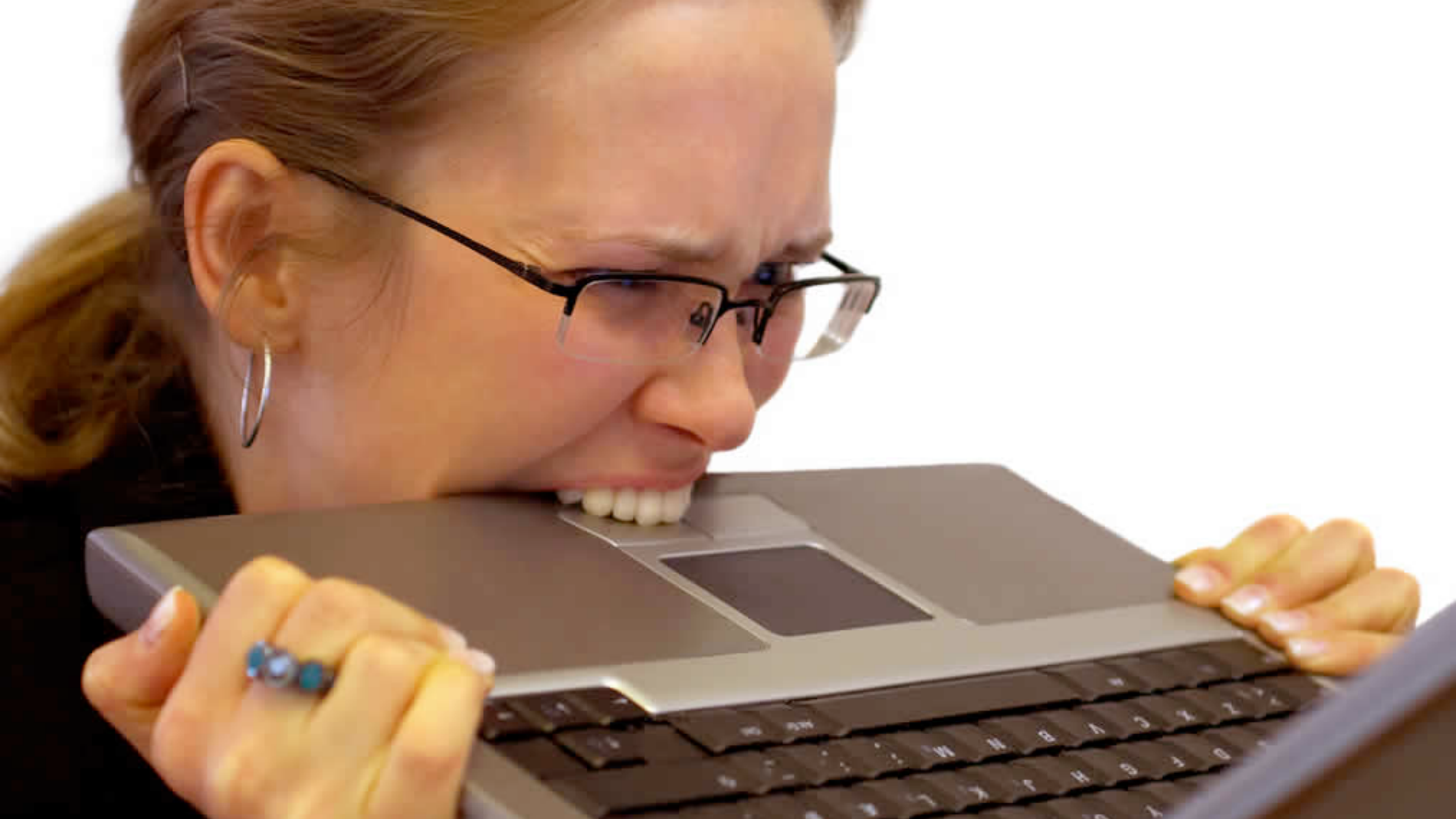
SPEC DISP

CUST NOTE | INV

Units | Type | H | Description | Stated | ActWT | Dimensions | ChgWt | Rate | Charges



Usability Sells!

350,000

DVD Player (1996)

1,000,000

iPhone (1st Q'07)

3,000,000

iPad (1st 80d '10)

Source: CNBC

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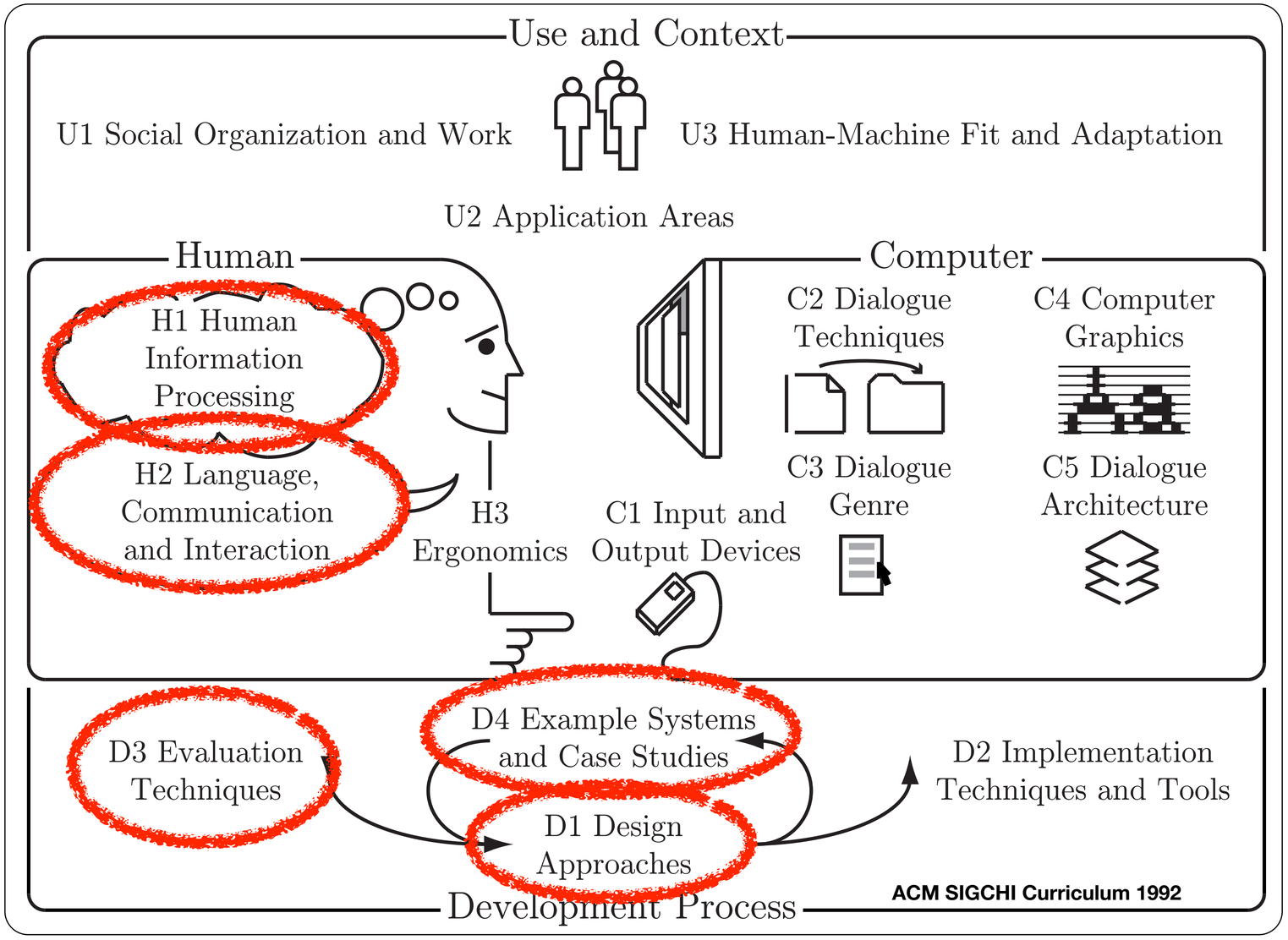
What is HCI?



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Class Topics

Human

- Performance
- Models of interaction
  - Affordances
  - Mappings
  - Constraints
  - Types of knowledge
  - Errors
- Design principles

Case Studies

- History of HCI
- Visions
- Phases of Technology

Development Process

- Iterative design
- User observation
- Ideation
- Prototyping
- User studies and evaluation
- Interaction design notation

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Schedule

- Course Introduction, Introduction to Fitts' Law, The CMN Model, Gestalt Laws, Information Content, Visibility, Affordances
- Mappings, Constraints, Seven Stages of Actions
- Knowledge in the World and Head, Mistakes, Slips
- History of HCI 1: From Abacus to Macintosh
- History of HCI 2, Midterm Exam Preparation
- Visual Design

Midterm Exam
Nov 27th

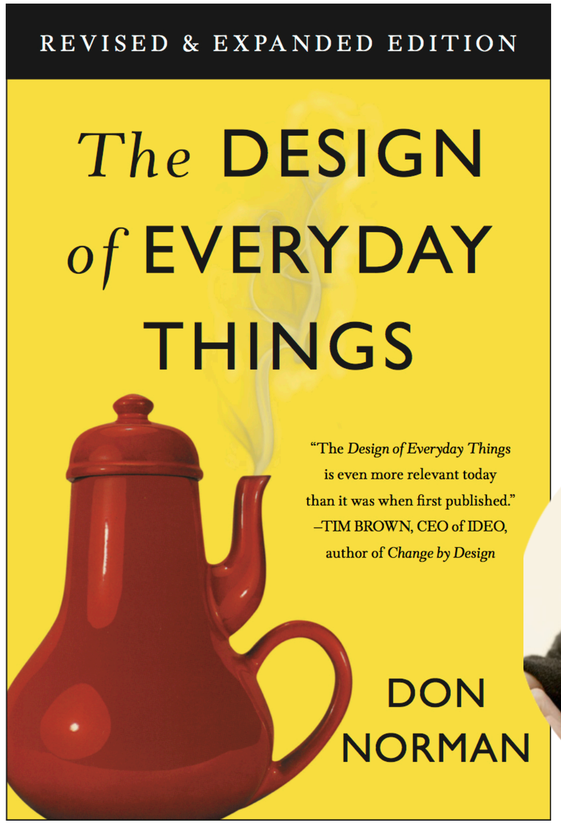
- DIA Cycle, Observing Users, Brainstorming, and Storyboards
- Prototyping
- Evaluating With and Without Users
- Responsiveness, GOMS Model, Interface Efficiency, Golden Rules of Design
- Notations I: Grammars, STNs
- Notations II: Petri Nets, State Charts, Design in Business
- Exam Preparation

Project Presentations
Jan 29th

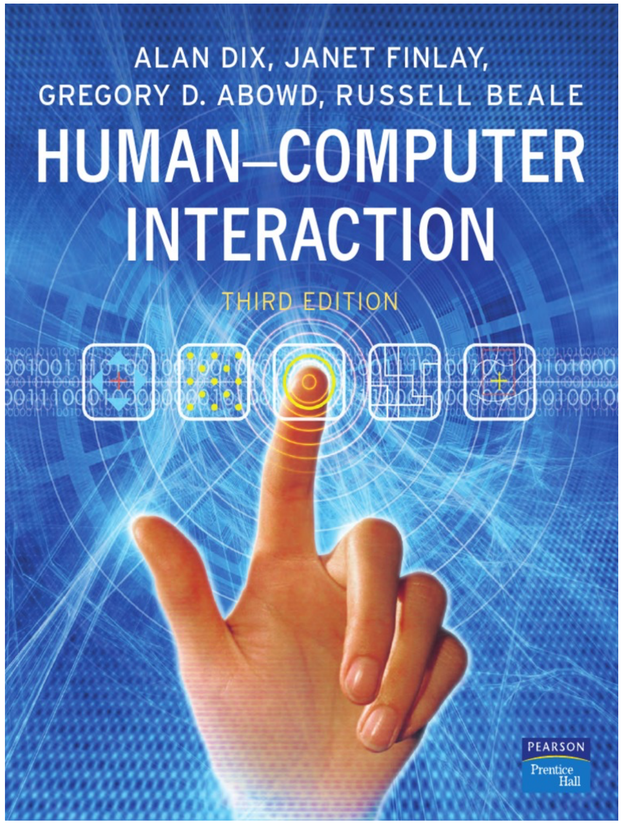
- Final Exam 1st Chance

Textbooks

Required Read



Recommended Read



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Media Computing Group

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Our Classes

When?	Type	Credits (ECTS)	Name
SS, WS	P	7	The Media Computing Project
WS, SS	S	4	Post-Desktop User Interfaces
SS	V/Ü	6	Current Topics in HCI
WS	V/Ü	6	iOS Application Development
SS	V/Ü	6	Designing Interactive Systems II
WS	V/Ü	6	Designing Interactive Systems I
		Only for B.Sc. students	
SS	PS	4	Human-Computer Interaction
SS	SW-Pr	7	M3: Multimodal Media Madness

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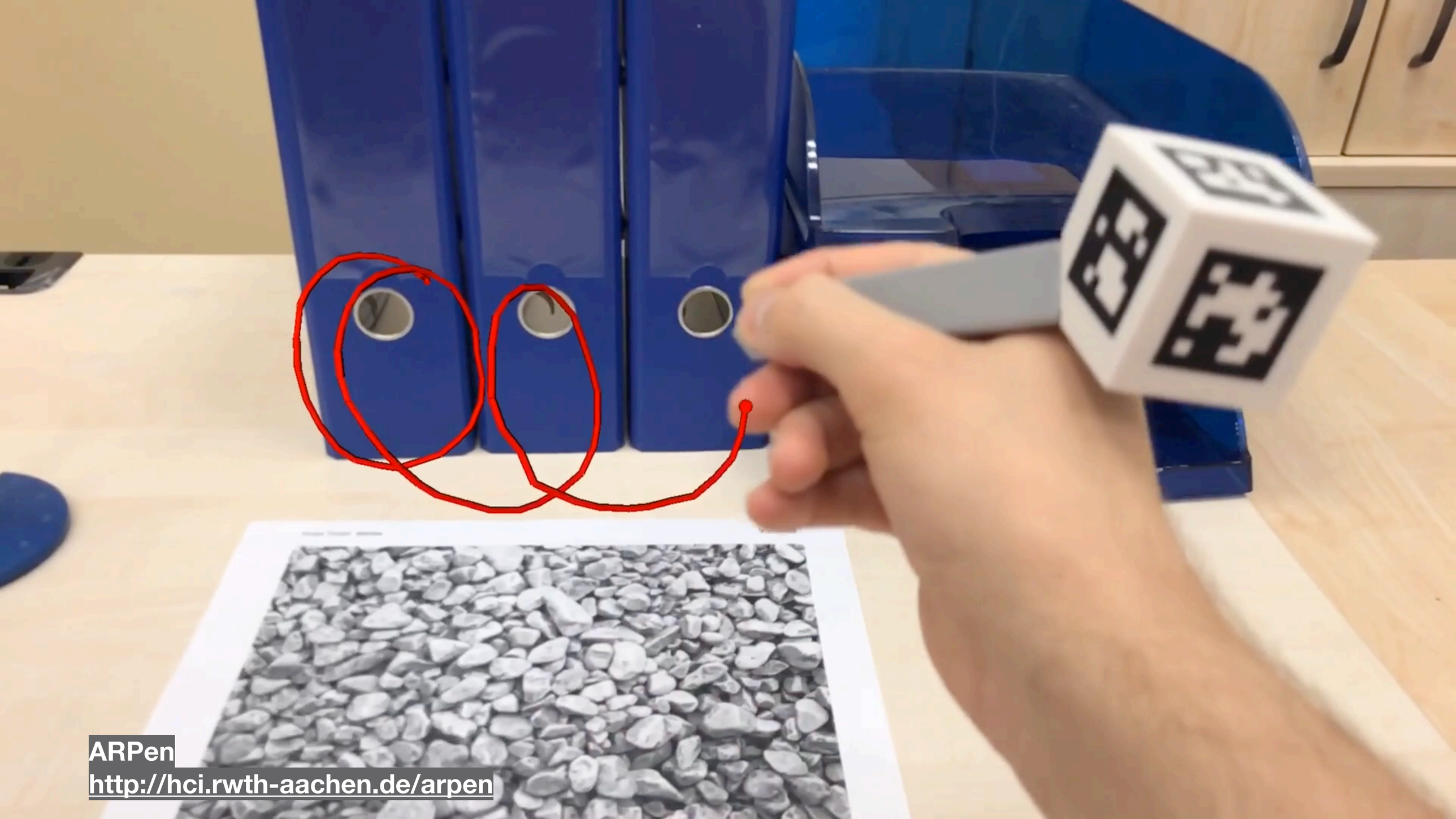
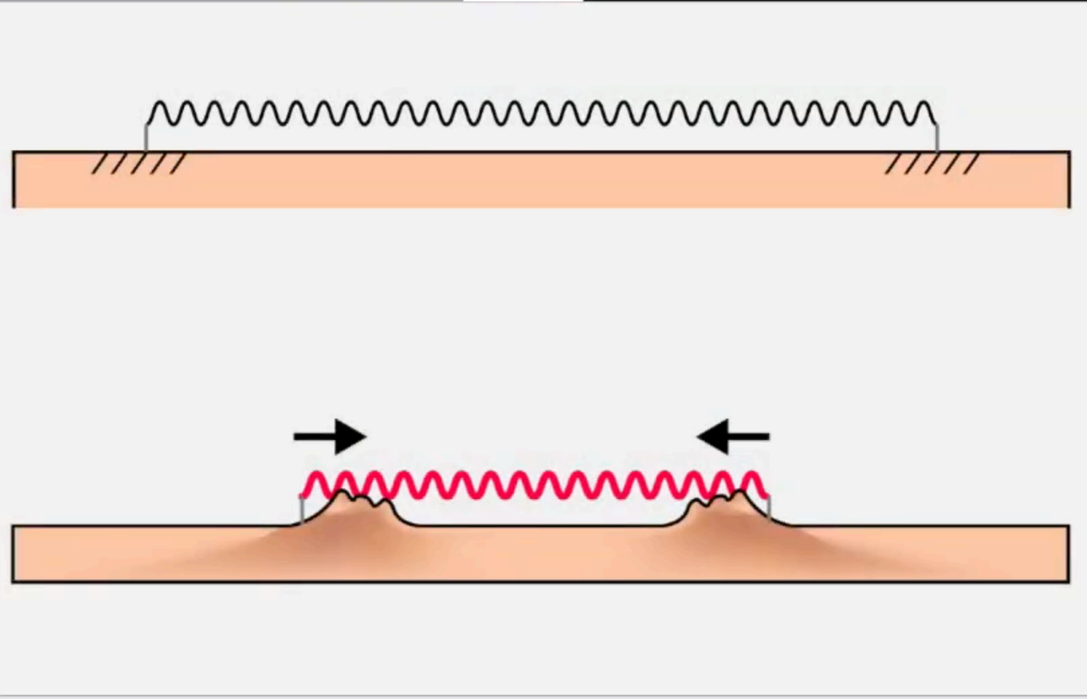
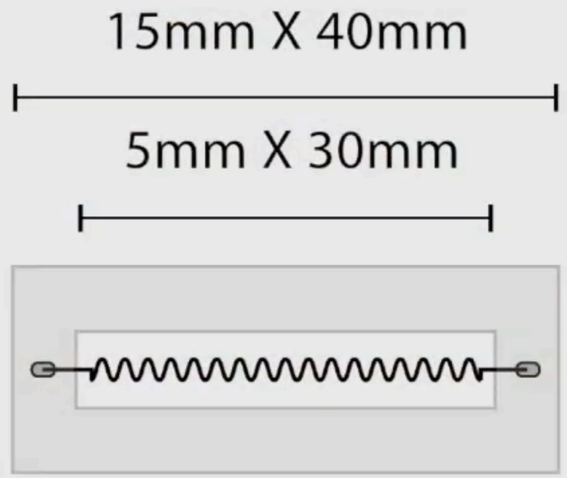

ARPen
http://hci.rwth-aachen.de/arpen

ARPen
http://hci.rwth-aachen.de/arpen

Tangible Awareness
https://hci.rwth-aachen.de/tangibleawareness

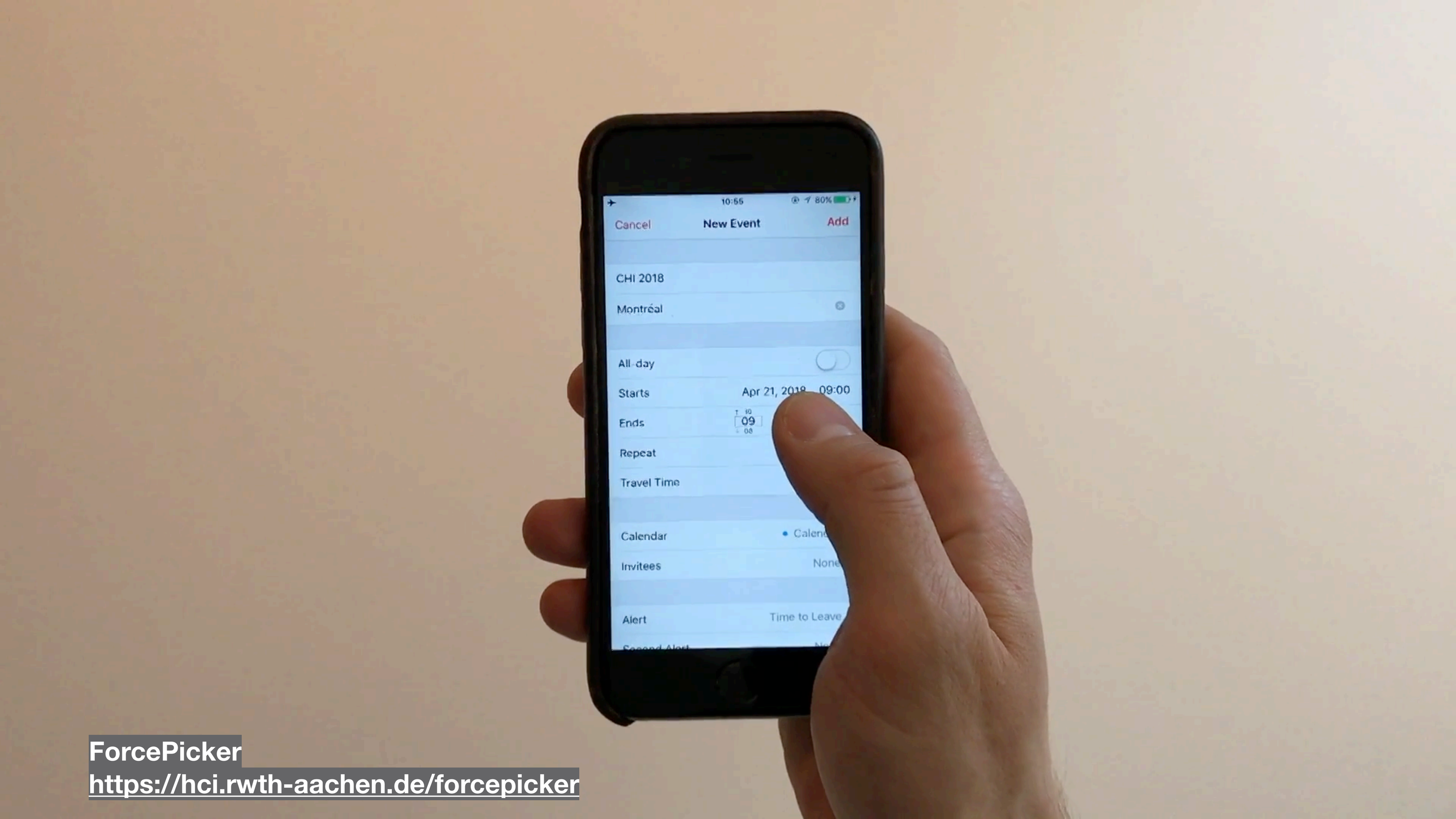




Springlets
https://hci.rwth-aachen.de/springlets

Springlets
https://hci.rwth-aachen.de/springlets

Student project “SAFE” from Multimodal Media Madness, SS 2019
https://hci.rwth-aachen.de/m3

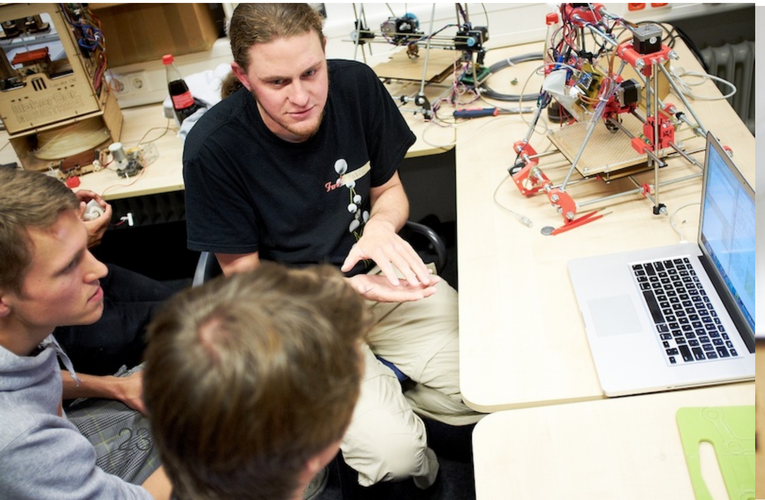


ForcePicker
https://hci.rwth-aachen.de/forcepicker

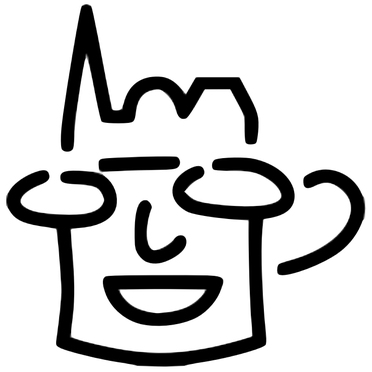
Silhouettes at EXPO 2010, Shanghai
http://hci.rwth-aachen.de/expo

Aachen Maker Meetup

- People doing strange things with electricity in Aachen
- 3rd Wednesday every month
- Sign up here: https://www.meetup.com/Aachen-Maker-Meetup/



CocoaHeads Aachen



- CocoaHeads: International meet-ups about Apple's Cocoa Framework for macOS and iOS

- Last Thursday every month
  Next event: **Oct. 25, 19:00,** Room 2222

- Sign up here: https://www.meetup.com/cocoaheads_ac/

Class Structure

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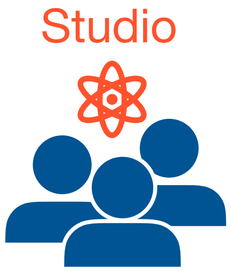
Flipped Classroom



- At **Home:** Learn from videos with slides at your own pace **(2.5 hrs/week)**, work on group assignments and project **(6 hrs/week)**
- In **Studio:** Work on group assignments and final project with one-on-one feedback **(1–2 hrs/week)**
  - Attendance in studios is **required**—please make sure you do not take any other classes during this time (Wed. 10–12h)
- In **Lab:** Discuss solutions and new assignments, in-class exercises **(1.5 hrs/week)**

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Credits and Grading

- Group-oriented, project-centered
- **6 ECTS Credits**
  - 20% assignments, 20% project
  - 25% midterm (60 min): **Nov. 27**
    (We will announce the time and exam hall shortly.)
  - 35% final exam (60 min): **Feb. 4, 14:30–16:00**
    (We will announce the exam hall a week or two before the exam.)
- To pass the course,
  - You need to pass the final exam (at least 4.0), **and**
  - Overall, you need an average grade of at least 4.0

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Exam Registration

- No need to register for the midterm exam
- **No second chance midterm exam** unless you have a valid reason (requires a medical certificate)

- Deadline to register: **Wednesday, Jan. 15, 23:59** (for both final exams)
  - If you fail the first final exam, there will be a short period to register for the second chance
  - Do not register just for the second chance final directly (possible, but not recommended)

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In-Class Experiment 1: Eye Movement

- Work in pairs of 2
  - Read the paragraph handed out
  - Have your friend observe your eye movements while you're reading

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tobii
www.tobii.com

Read the text on the next slide.

Afterwards you will be asked a question about the information in the text.

Press the SPACE bar once you have finished reading the text and are ready to answer the question.

Video: http://www.youtube.com/watch?v=VBTZNydUh0w

In-Class Experiment 2: Bloch’s Law

A

In-Class Experiment 2: Bloch’s Law

B

In-Class Experiment 2: Bloch’s Law

C

A: 0 ms delay

B: 50 ms delay

C: 100 ms delay

In-Class Experiment 3: Memory

- Digit experiment
  - Choose 5 digits secretly from your sheet, then read them to your neighbor
  - Have her count backwards aloud from 50
  - Have her answer some other question (like what she had for dinner 3 days ago)
  - Does she still remember the entire 5-digit sequence correctly?
- Switch roles, repeat with 9 digits
- Finally, switching roles again, read the long sequence of numbers to your neighbor, stopping somewhere suddenly
  - How many of the last numbers can she repeat (in order) immediately?

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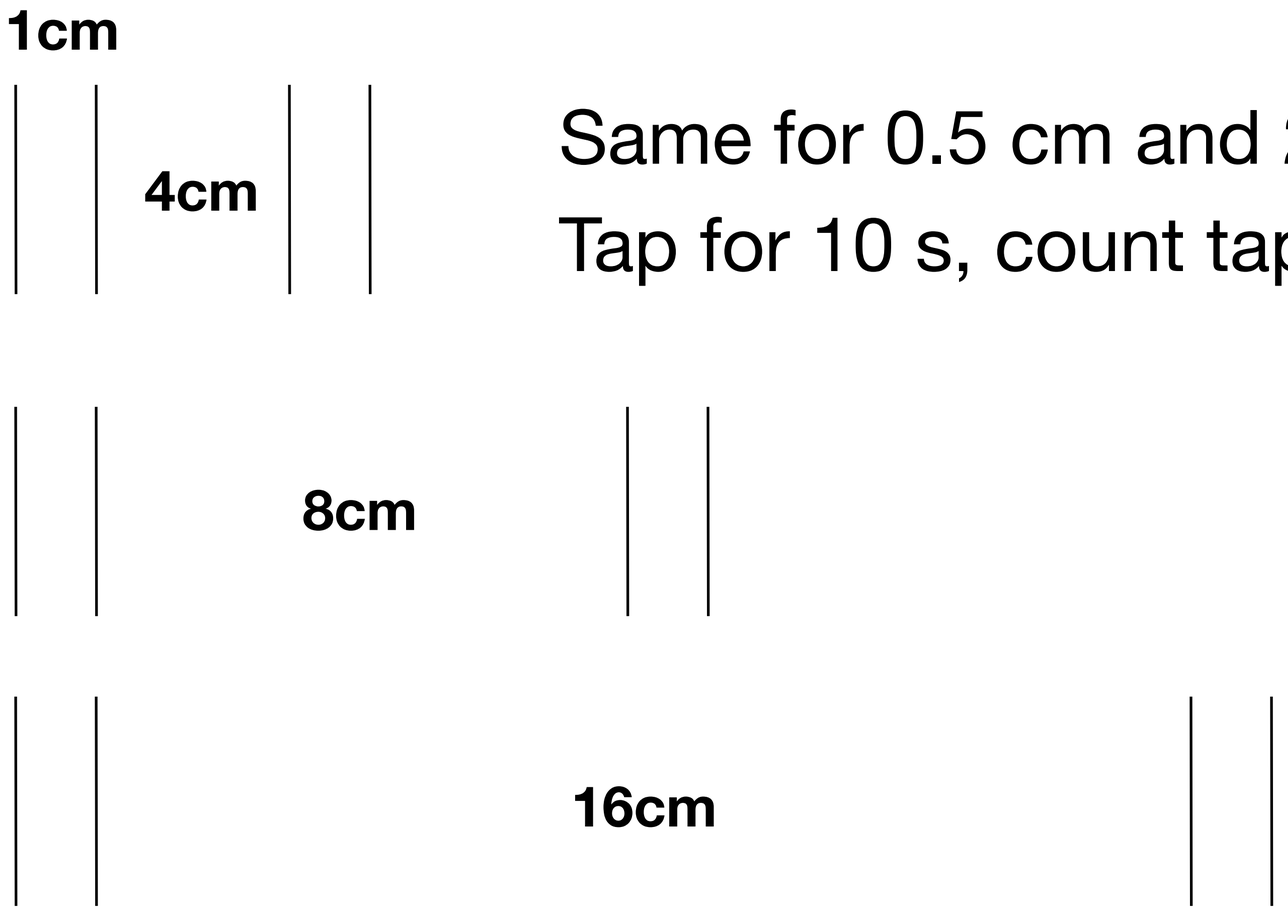
In-Class Experiment 4: Fitts' Law



Same for 0.5 cm and 2 cm wide strips

Tap for 10 s, count taps afterwards

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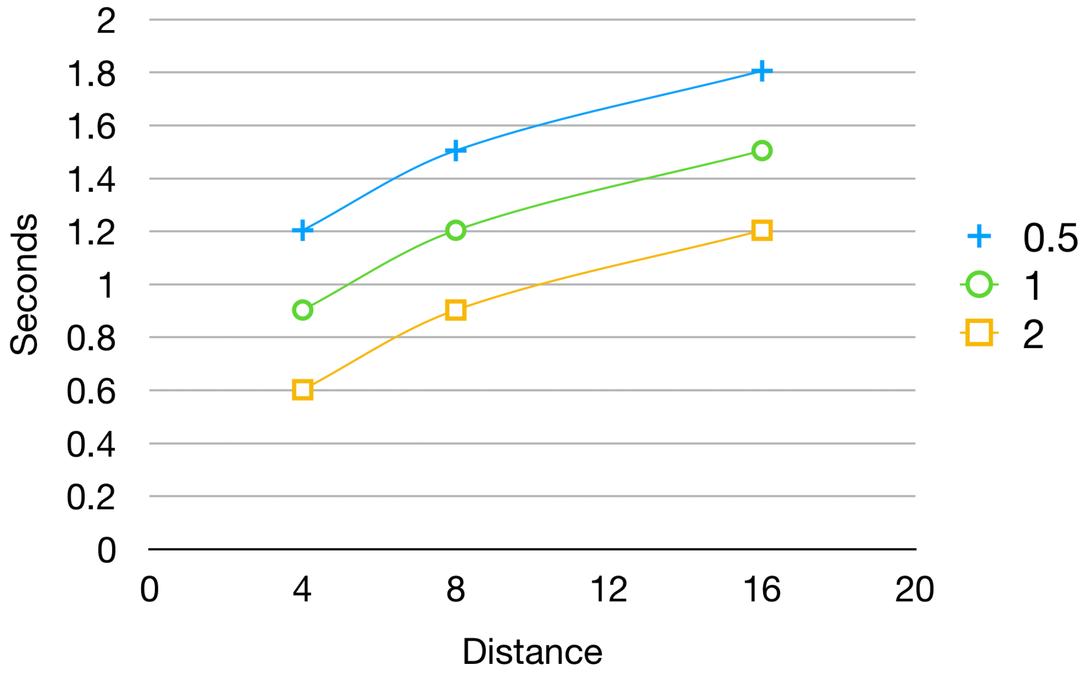
Tapping Task Results

- Doubling the distance adds roughly a constant to execution time

  ⇒ indicates logarithmic nature

- Doubling the target width (W) gives about same results as halving the distance (D)

  ⇒ indicates connection of D/W in formula



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Summary

- HCI is about people, technology, and design
- This class is your ticket to our other classes, cool thesis projects, and HiWi jobs
- You've experienced that mathematical laws seem to govern your perception, memory, and movement—watch the videos for answers!

Link for videos are on the course landing page: **http://hci.ac/dis**

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What to Do Now

- **Watch** videos 1.4., 1.4.1., and 1.4.2. on our YouTube channel, see **http://hci.ac/dis**
- **Hand in** your ***signed*** **Declaration of Compliance** form

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What to Do Next

- Before next **Tuesday, Oct. 29:**
  - Finish **watching** videos for the **first and second week** on YouTube, see **http://hci.ac/dis**
  - **Buy** Don Norman's *The Design of Everyday Things* (2nd edition, 2013) (required read)
  - **Read** Dix' *Human-Computer Interaction,* chapter "The Human" (pp. 11–59) (PDF will be made available on Moodle)
  - **Submit** Assignment 1 via RWTHmoodle before **9 am**

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