

Designing Interactive Systems I

Course Introduction

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

Winter term 2019/20

<http://hci.ac/dis>



RWTHAACHEN
UNIVERSITY

Who am I?



- 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,...

Our Team



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



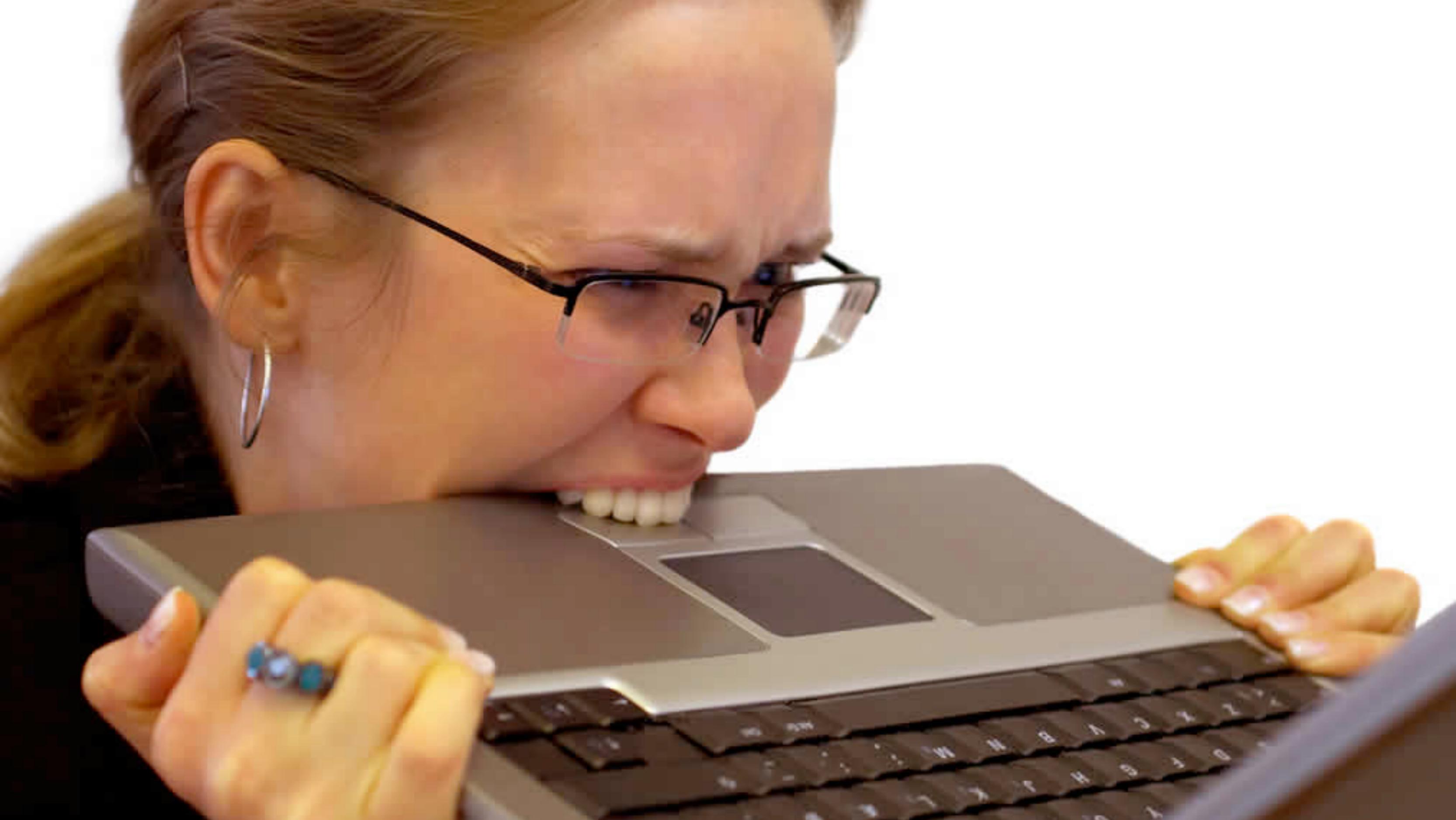
Oliver Nowak, M. Sc.
nowak@cs.rwth-aachen.de

They answer all your questions!

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

Human–Computer Interaction?







Usability Sells!



350,000

DVD Player (1996)



1,000,000

iPhone (1st Q'07)



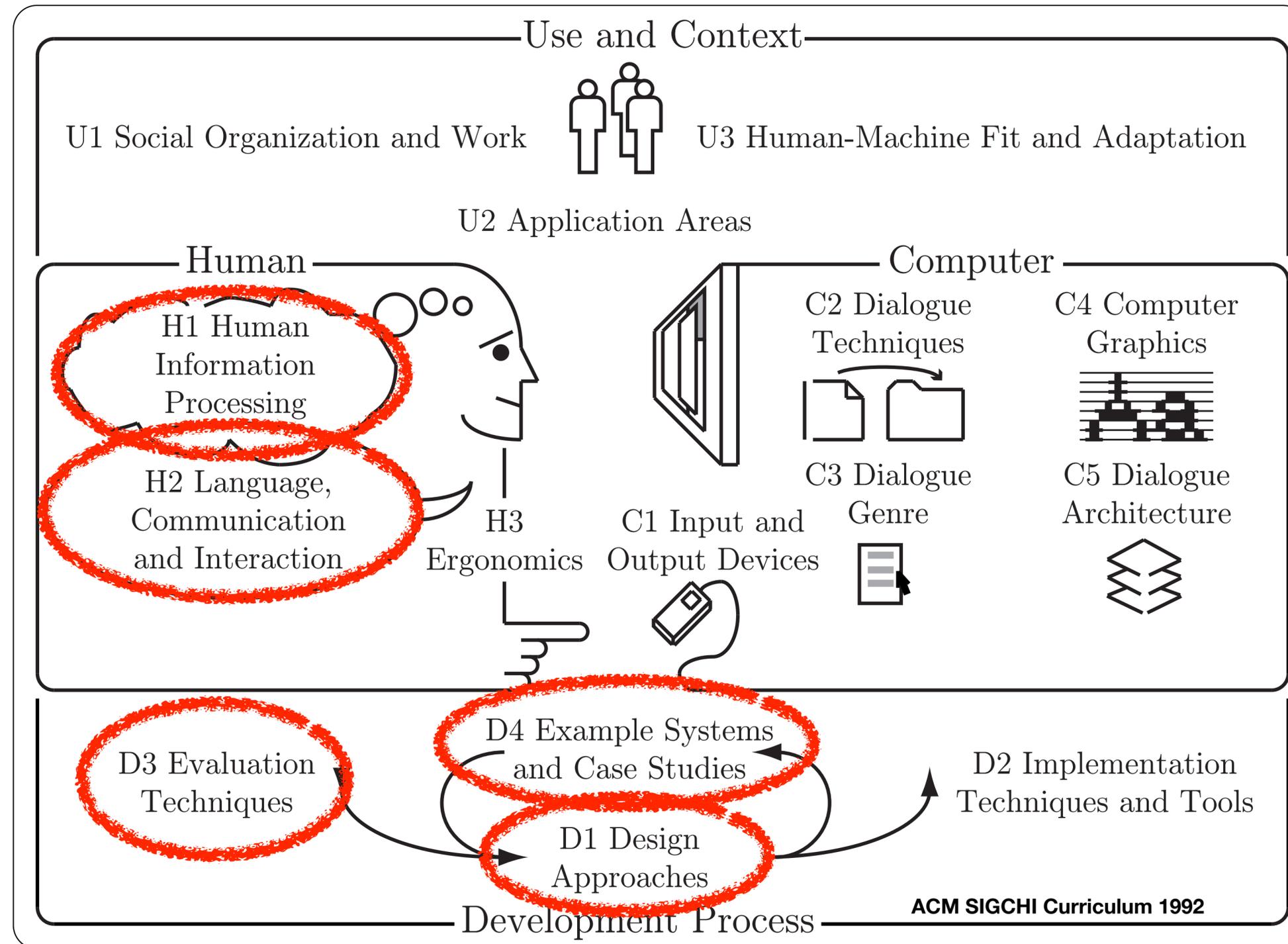
3,000,000

iPad (1st 80d '10)

Source: CNBC



What is HCI?



Class Topics

Human

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

Case Studies

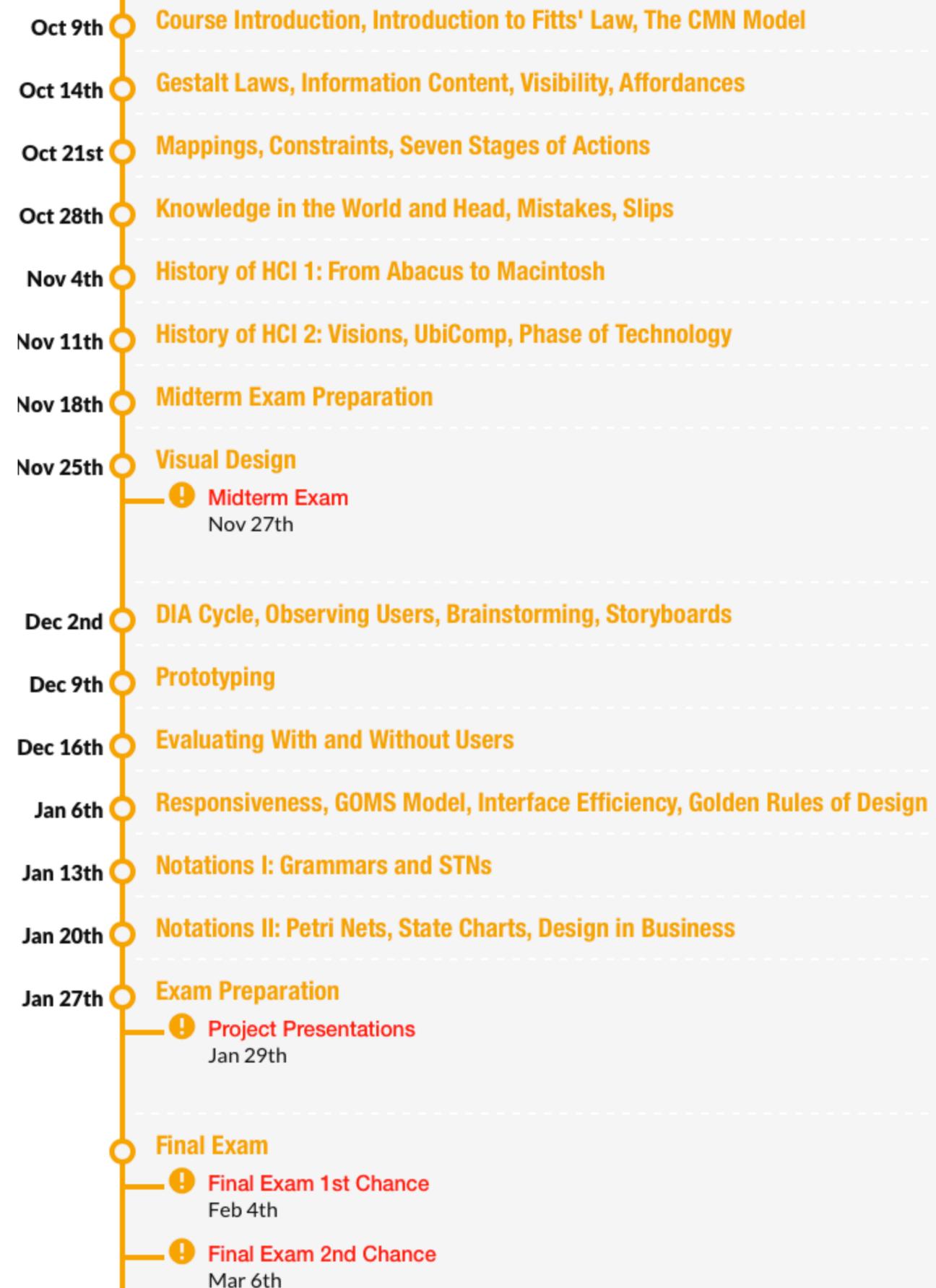
- History of HCI
- Visions
- Phases of Technology

Development Process

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

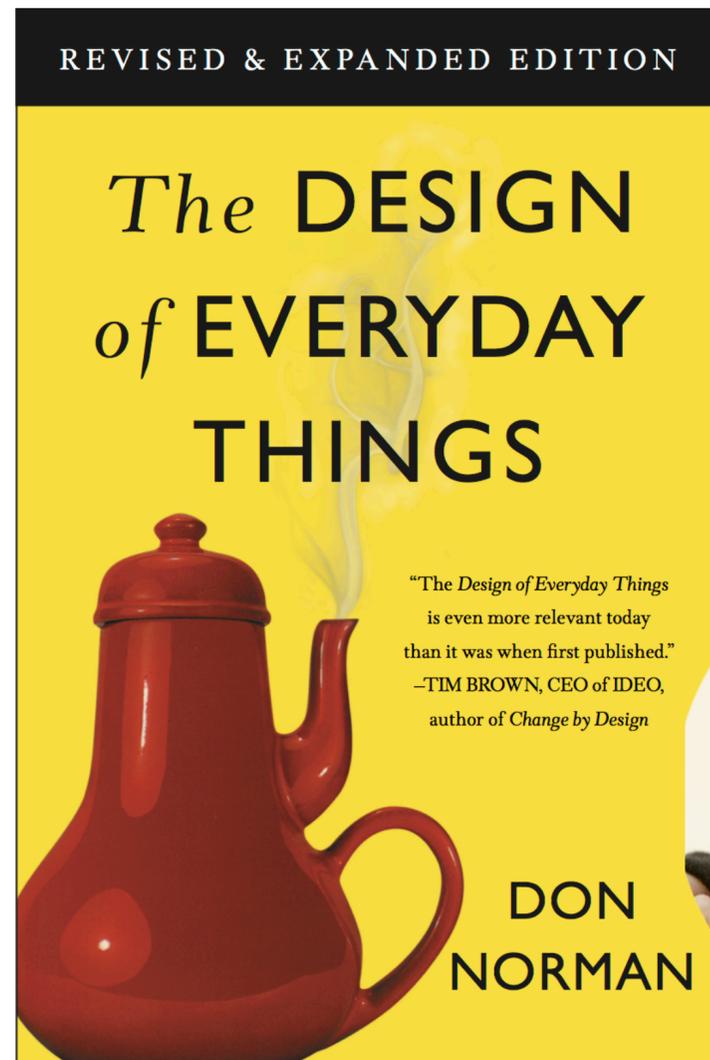


Schedule

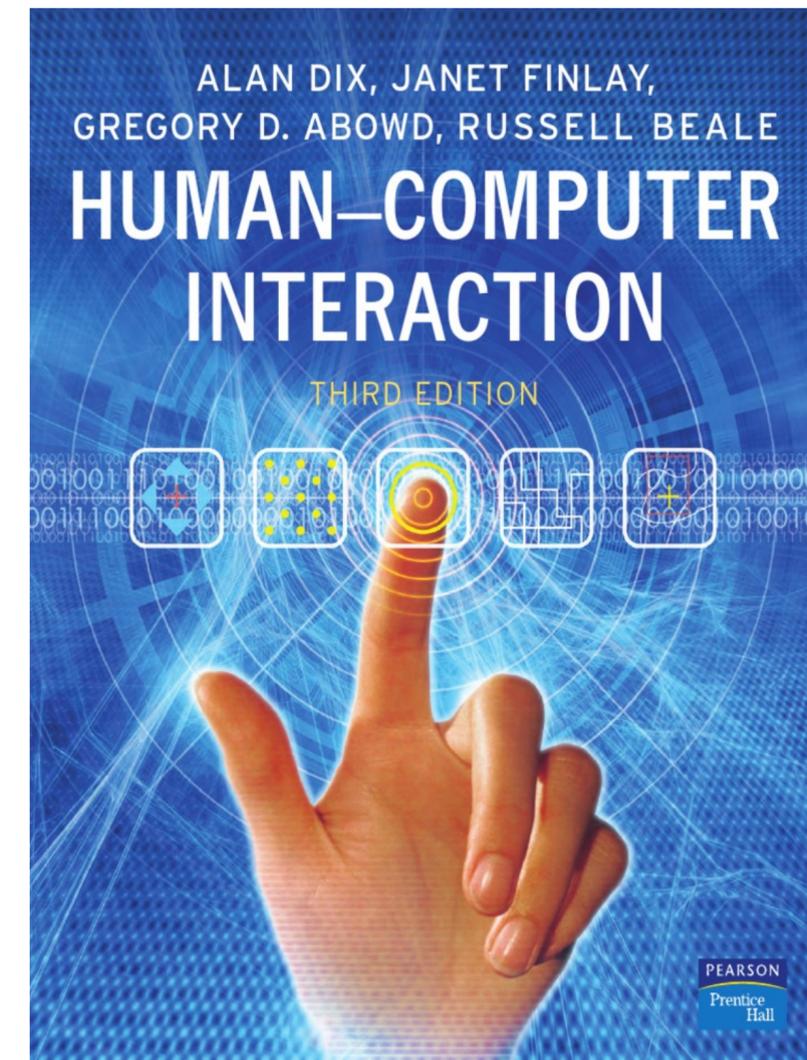


Textbooks

Required Read



Recommended Read



Media Computing Group



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

Course: iOS Application Development

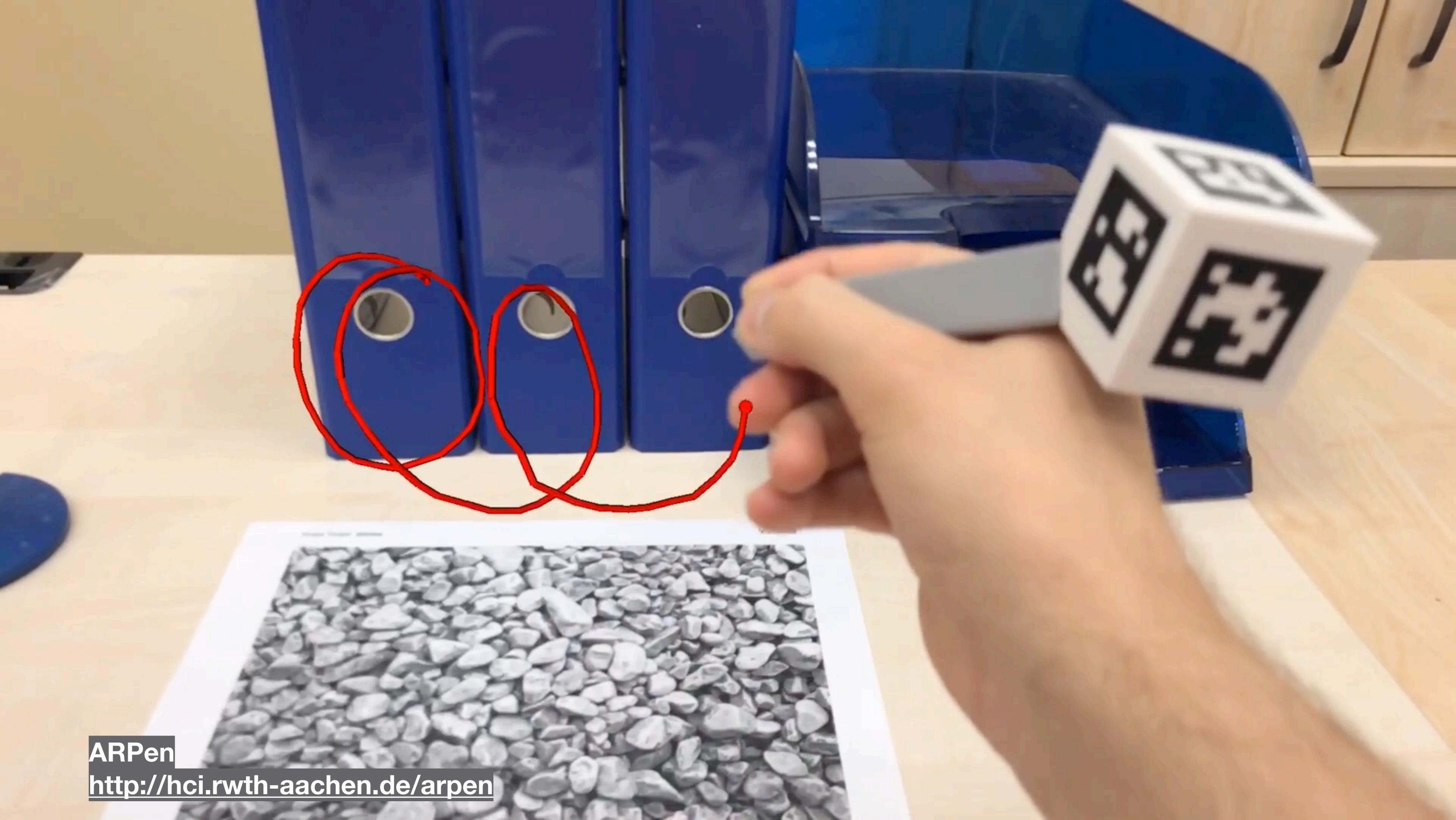
- Mobile application design principles
- iOS development basics
- Swift and UIKit
- Navigation and Workflow
- Input techniques
- Networking
- Augmented Reality
- Modeling via SpriteKit
- Performance tweaking



Course: iOS Application Development

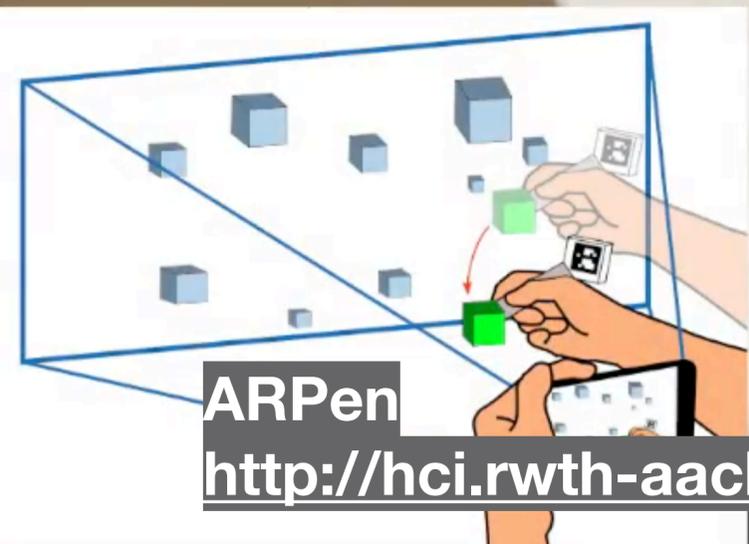
- Dates
 - Tue., 10:30–12:00, Room 2222 (started 08.10.) and Mon., 12:30–14:00, Room 2222 (starting 14.10.)
- 6 ECTS credits
- Lecture (5 weeks) + Seminar (4 weeks) + Project (6 weeks)
 - <http://hci.rwth-aachen.de/ios>
- Full for now, but check wait list, or next year





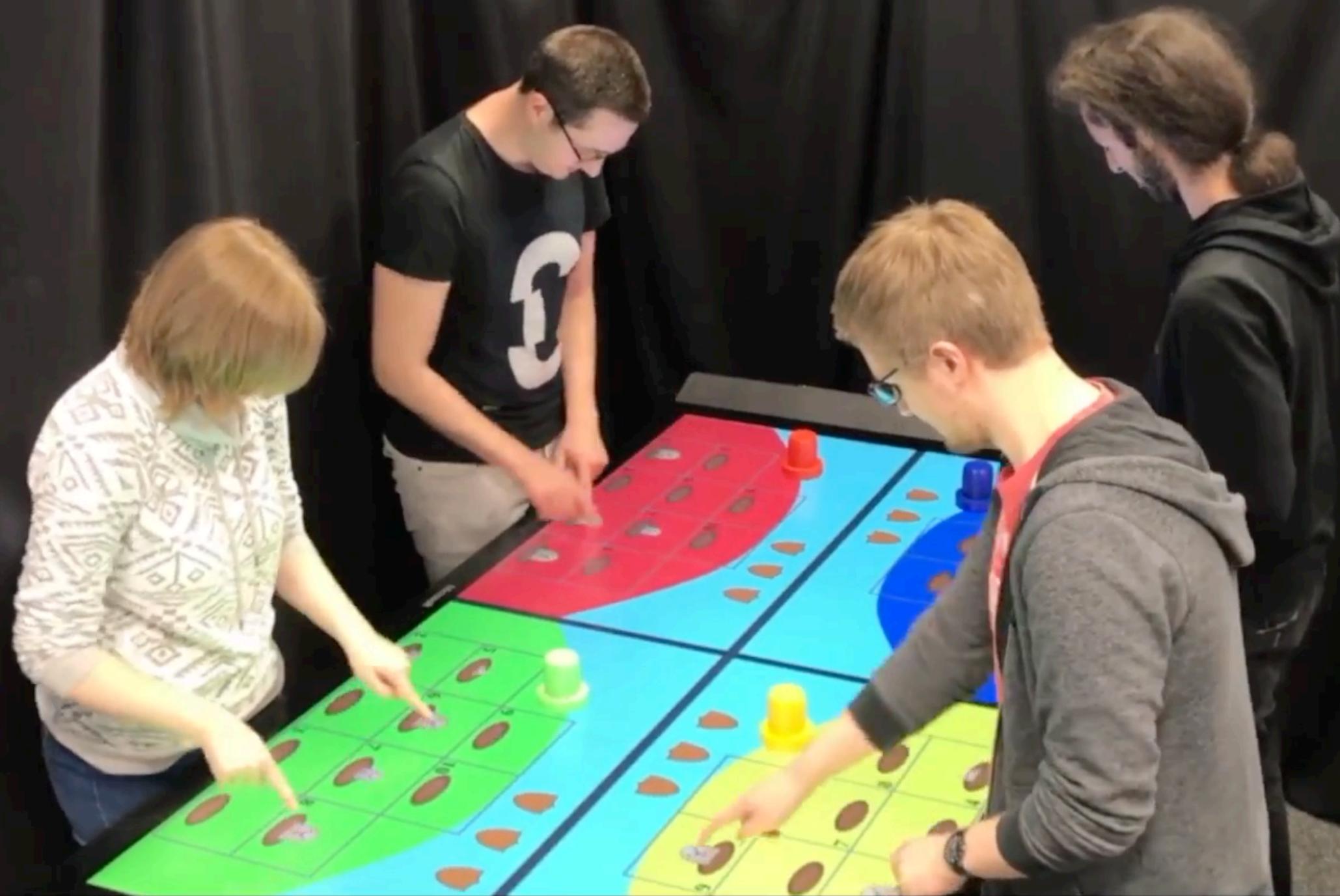
ARPen

<http://hci.rwth-aachen.de/arpn>



ARPen

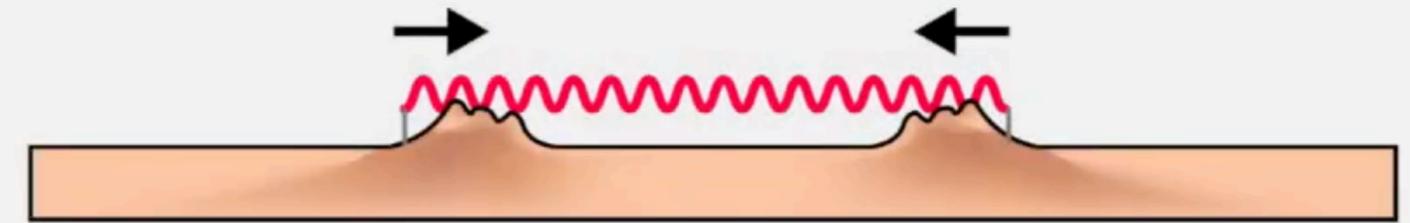
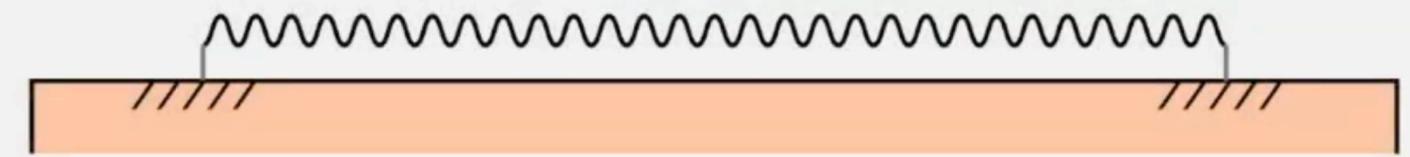
<http://hci.rwth-aachen.de/arpn>



But modern multitouch tables are so big that people can start working on them in separate workspaces.

Tangible Awareness

<https://hci.rwth-aachen.de/tangibleawareness>



15mm X 40mm



5mm X 30mm



Springlets

<https://hci.rwth-aachen.de/springlets>

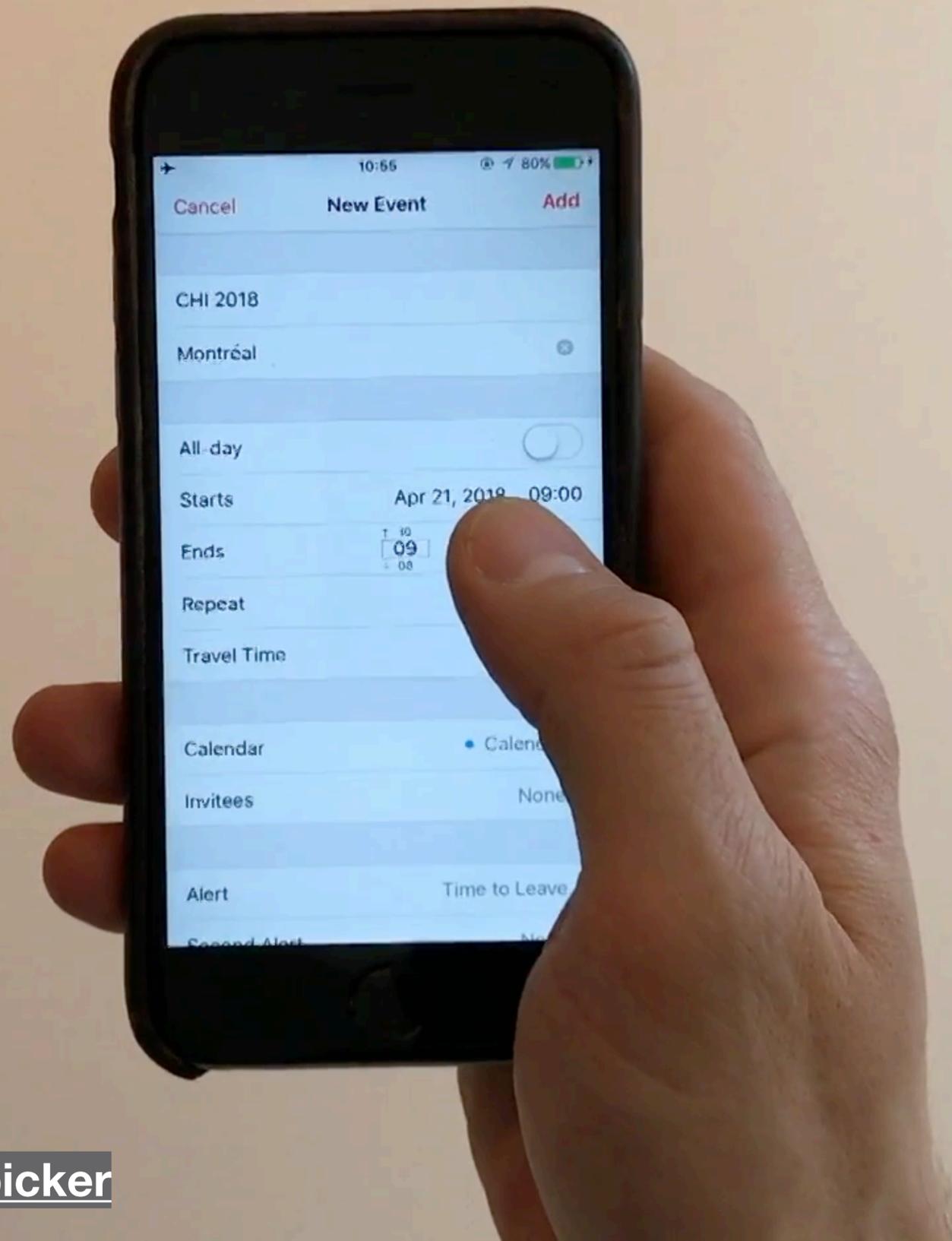


Springlets

<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>



The vest has a depth camera facing forward to record the area in front of the wearer.

HaptiVest

<http://hci.rwth-aachen.de/haptivest>



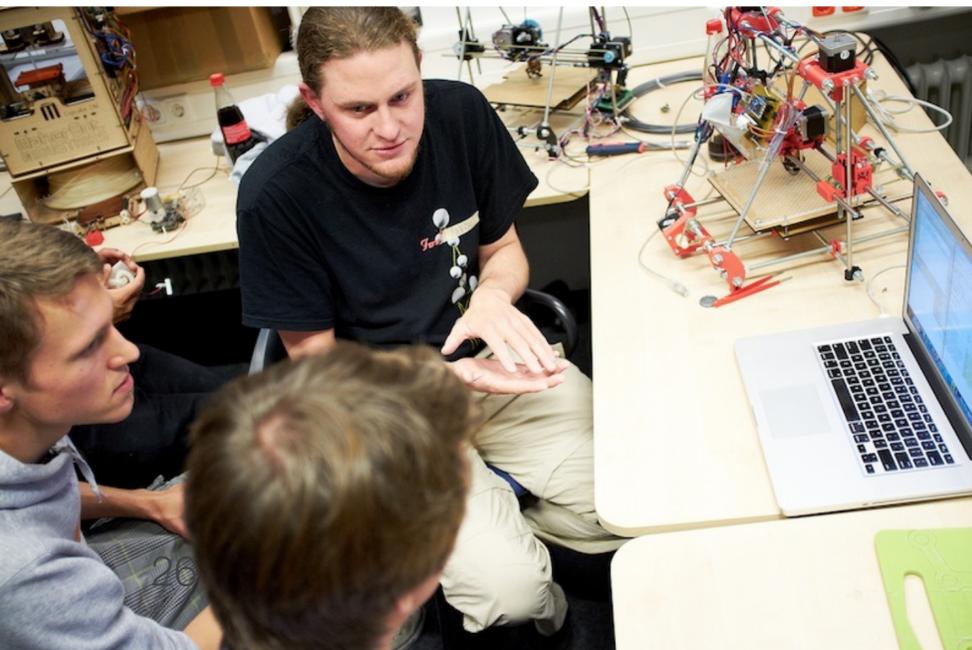
640x480 Depth Image



Depth Sensor

Aachen Maker Meetup

- People doing strange things with electricity in Aachen
- 3rd Wednesday every month
Next meetup: Wednesday, **Oct. 16, 18:30**
- 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/



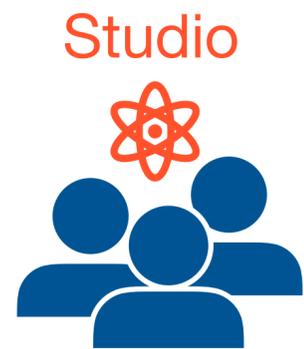
Class Structure



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**)



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
- Further details in the lab starting next **Monday, Oct. 14** at **14:30** in **AH VI**



Registering for this Class

- Limited to **120 seats** (already 200+ registrations)
 - Register via RWTHonline **by the end of tomorrow** (i.e., 23:59h, Thursday)
 - We will announce who we have selected on Friday via email
 - Students for whom DIS 1 is mandatory (e.g., TK students) will be prioritized; others will be selected randomly
- M.Sc. SSE, Erasmus students, and others who cannot register via RWTHonline: Email **Oliver** (nowak@cs.rwth-aachen.de) your matriculation number and full name from your official @rwth-aachen.de email-address

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
 - B.Sc. students: you won't be registered for the second final exam automatically!
 - Do not register just for the second chance final directly (possible, but not recommended)

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

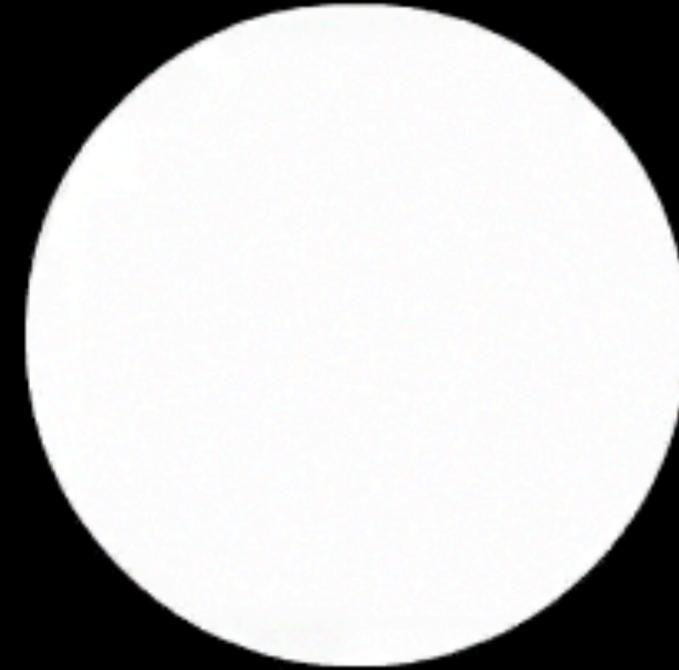


Read the text on the next slide.

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

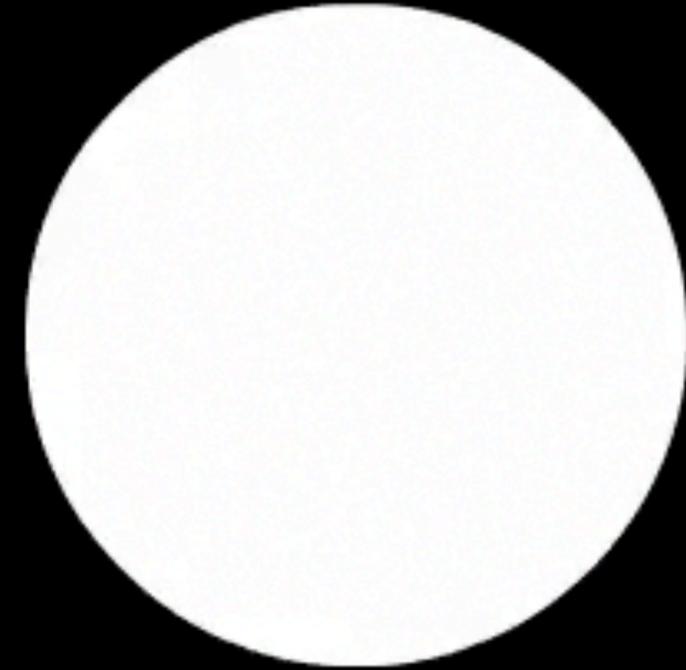
Press the SPACE bar once you have finished reading the text and are ready to answer the question.

In-Class Experiment 2: Bloch's Law



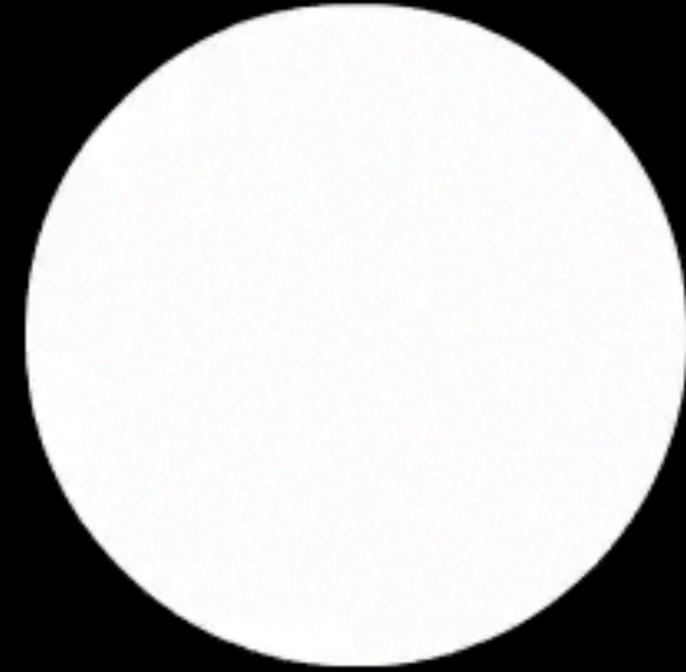
A

In-Class Experiment 2: Bloch's Law

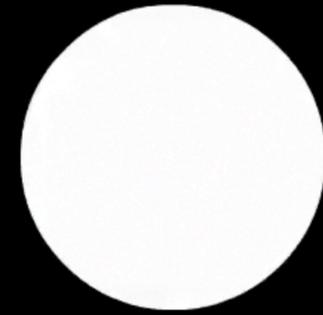


B

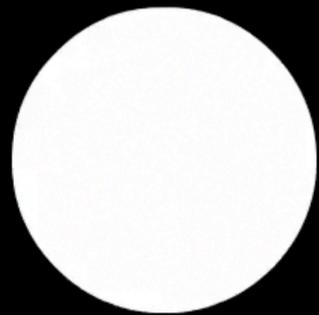
In-Class Experiment 2: Bloch's Law



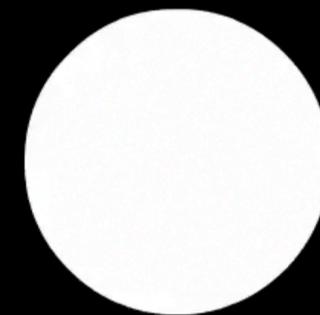
C



A: 0 ms delay



B: 50 ms delay



C: 100 ms delay

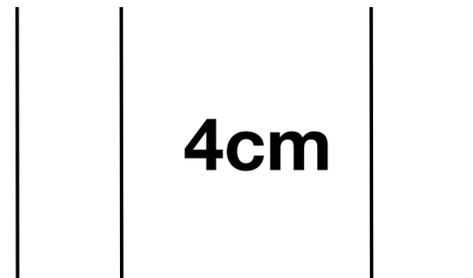
In-Class Experiment 3: Memory

- 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?



In-Class Experiment 4: Fitts' Law

1cm



Same for 0.5 cm and 2 cm wide strips
Tap for 10 s, count taps afterwards

8cm

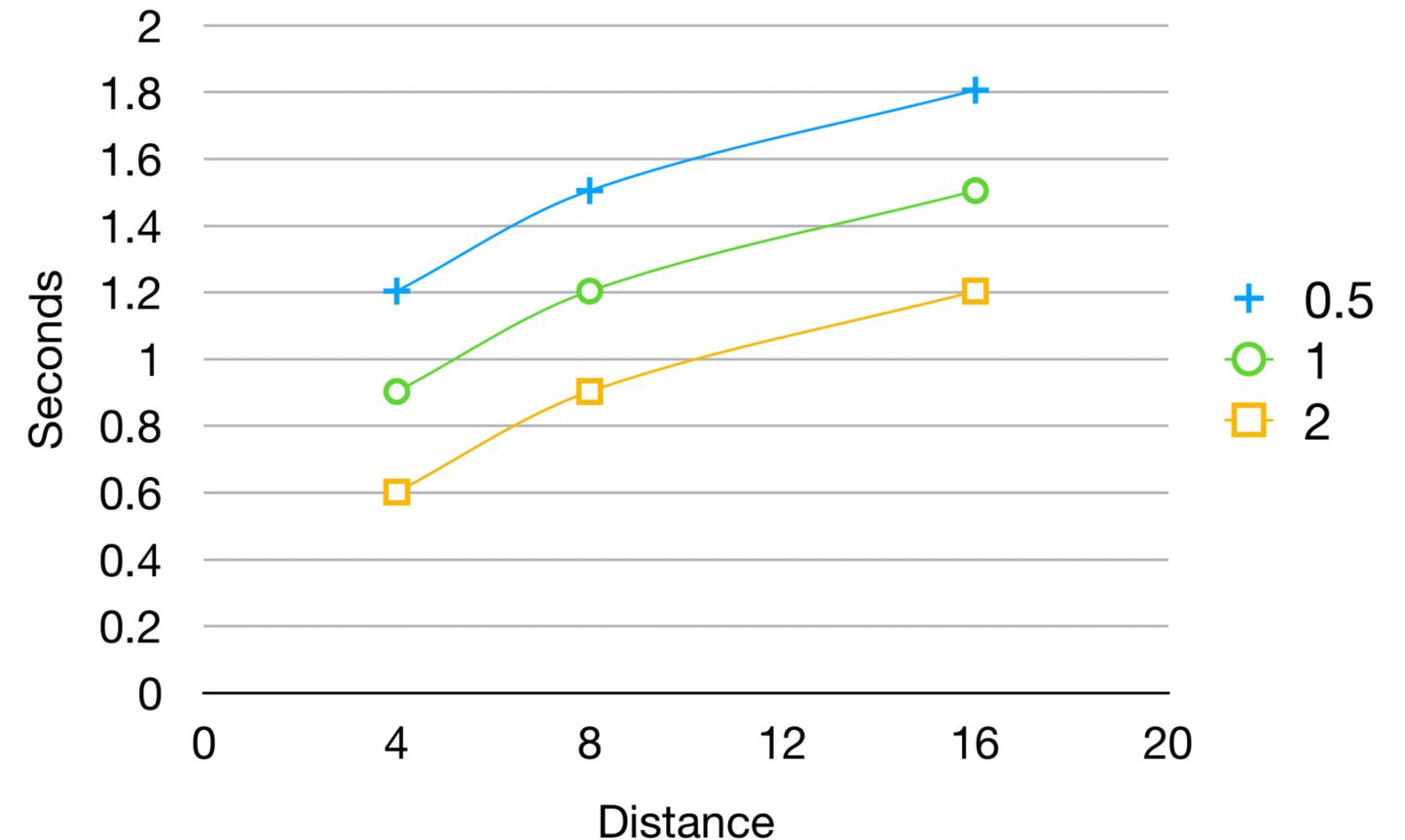


16cm



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



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>

What to Do Now

- **Register for the course** on RWTHonline by **tomorrow**—selection results will be announced this **Friday**
- Also check out other classes this week—please deregister if you’re not taking DIS 1!
- By **5pm, Oct. 10 (tomorrow)**:
 - **Hand in** your **signed Declaration of Compliance** form.
- Before next Lab on **Monday, Oct. 14, 14:30-16:00, AH VI**:
 - **Watch** videos for the first week on YouTube, see <http://hci.ac/dis>
 - **Buy** Don Norman’s *The Design of Everyday Things* (2nd edition, 2013) (required read)
- Before next **Wednesday, Oct. 16**:
 - **Read** Dix’ *Human-Computer Interaction*, chapter “The Human” (pp. 11–59) (PDF will be made available on Moodle)

