Human Computer Interaction

Introduction to the course

Luigi De Russis

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Academic Year 2022/2023

Expectations?

What do you hope to learn in this course?

Goals

- Understanding how to design the user experience when interacting with modern applications, devices, and environments

- Gaining in-depth knowledge of a human-centered process to create interactive systems
  - and how to apply it in practice

- Becoming familiar with methods to gather and listen to users' needs

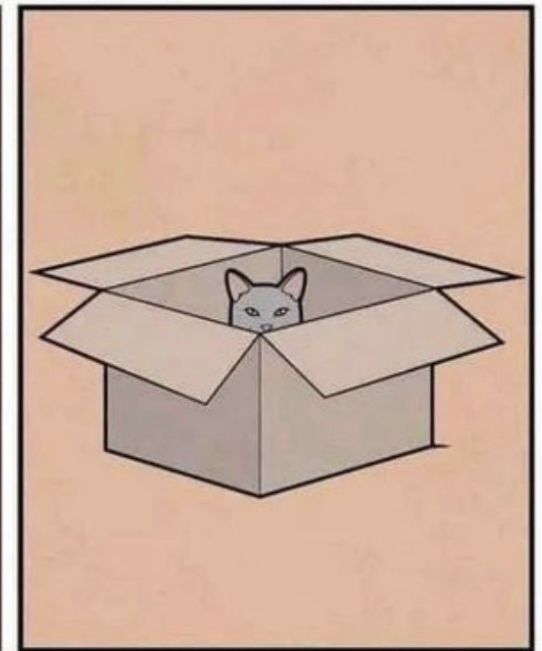- Learning to evaluate interactive systems with their users

Why?
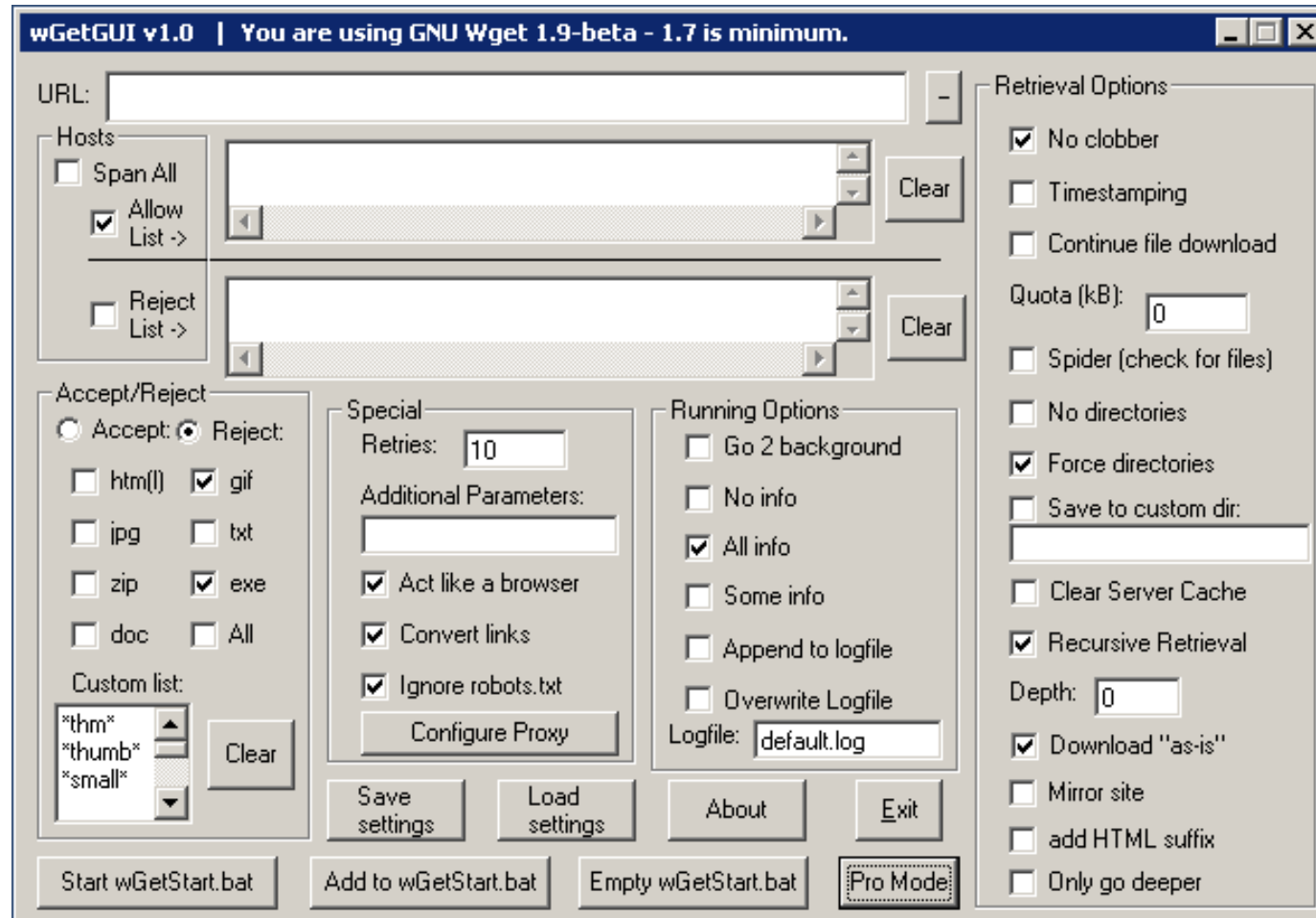

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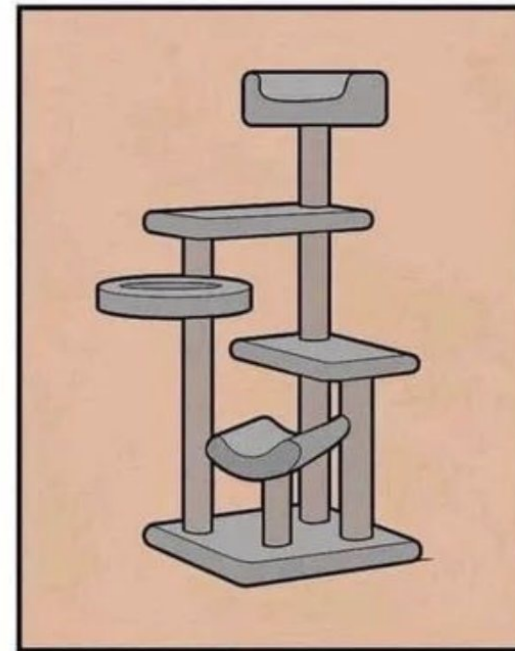
Hall of Fame or Shame?

How to Design and Develop Good Interactive Systems?

- *Iterative* and *human-centered* process

- People needs (not "wants")

- Design principles and guidelines

- Usability goals

- Prototyping (rapidly)

- Evaluation (various kind)

- Programming

What We Will Learn

|	
Introduction to Human-Computer Interaction	Definitions, the human, the computer, vision of the future
Building interactive applications with a human-centered process	Main tasks and methods to design, develop, and evaluate an interactive application
	Needfinding strategies, low-, medium, and high-fidelity prototypes, mental models and visual design, heuristic evaluation, and basic concepts and methods for user studies
Application & Projects	Practical part on a specific application domain
	Various kind of interactive prototypes (with and without writing code)
"Beyond WIMP" paradigms	Tangible interaction, wearables, voice user interfaces, gestures, interaction with AI systems, ...
	Thematic seminars on emerging topics and case studies

Course Topics... At a Glance!

1. Introduction to HCI (*this week!*)
2. Needfinding
3. Defining needs and tasks
4. Prototyping
5. Design guidelines, principles, and heuristics
6. Human abilities and theoretical models
7. Visual design and design patterns
8. Heuristic evaluation
9. Usability testing
10. Advanced interactions

Learning Material

- Course website - http://bit.ly/polito-hci
  - o Slides, exercises, lab texts
  - o Full schedule
  - o Templates and deadlines
  - o Supplementary material

- Video lectures (for classes, only)
  - o YouTube - https://www.youtube.com/playlist?list=PLs7DWGc_wmwRZHYGyiQxcgfJ7U1X81N_i
  - o Portale della Didattica

- GitHub - https://github.com/polito-hci-2022
  - o Slides, lab texts, examples, group work, …
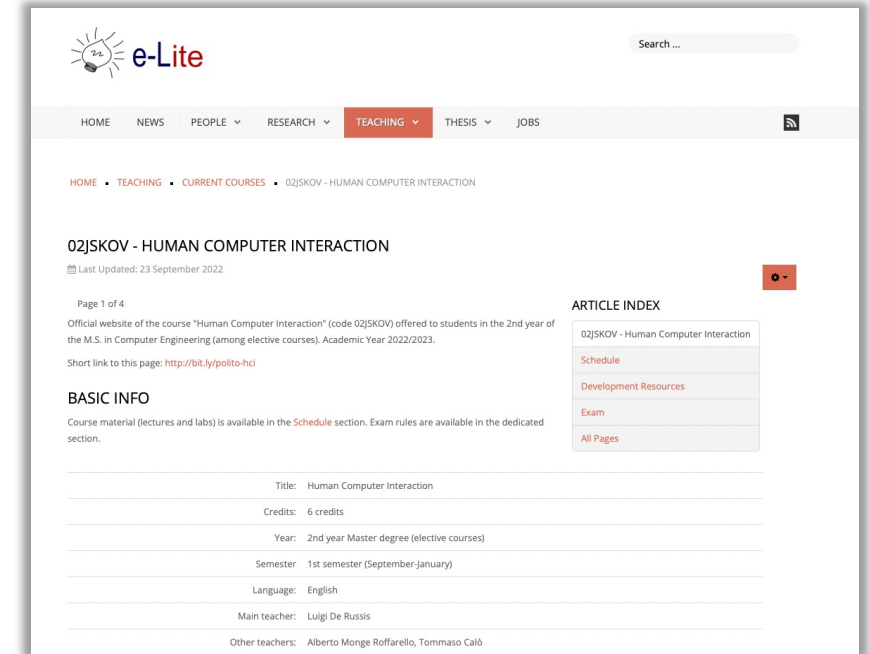
Communications

- We will use **Telegram** for quick communications
  - Among students, with teachers, etc.

- Join at https://t.me/+fH1BU1qkTrgzMDE8

- Announcements, reminders, and official information will have the **#news** tag

- Feel free to contact the teachers for feedback and ask questions
  - use the **#question** tag, if writing in the group

- Emails are an **alternative** for longer, slower, and private conversations
  - Use "Student Hours", too

Student Hours

Why?

- An opportunity for *individual students (or groups)* to discuss any need or challenge

- To clarify information and ask questions about the course

- To discuss academic and/or career goals

- To know more about certain topics

- …

When?

- Every **Wednesday 10:00-11:00** in my office: [book a slot on my calendar](#)

- On request, either in person (in my office) or remotely (on Zoom)

Course Methodology

- Learning method
  - Project-based → students learn by doing a project, in teams
  - Problem-based → the project work starts from elicited and real users' needs (*needfinding phase*)

- Projects developed **during** the semester and **step-by-step** (*assignments*)
  - Within a given *theme* and mostly in the labs
  - Iterating on *prototypes*

- *Intermediate checks* at the end of the assignments' work: the main way to provide **feedback** to the teams
  - Feedback is there to help students improve the next step in their projects, in the course, in addition to possibly improve the final grading

Course Organization

- Classes
  - 3 h/week
  - Interactive lectures + exercises (*mixed*)

- Laboratories (room 2T)
  - 1.5 h/week
  - 3 Lab slots
  - Starting from **Week 2**
  - For group projects

- **Exception**: first week
  - Class instead of Lab

	MO	TU	WE	TH	FR
08:30					
10:00					
11:30		Class 7T			
13:00	Class R1b				
14:30				Lab 2T	
16:00				Lab 2T	
17:30				Lab 2T	

Keep an eye on the ~~staircases~~ classrooms.
They like to change
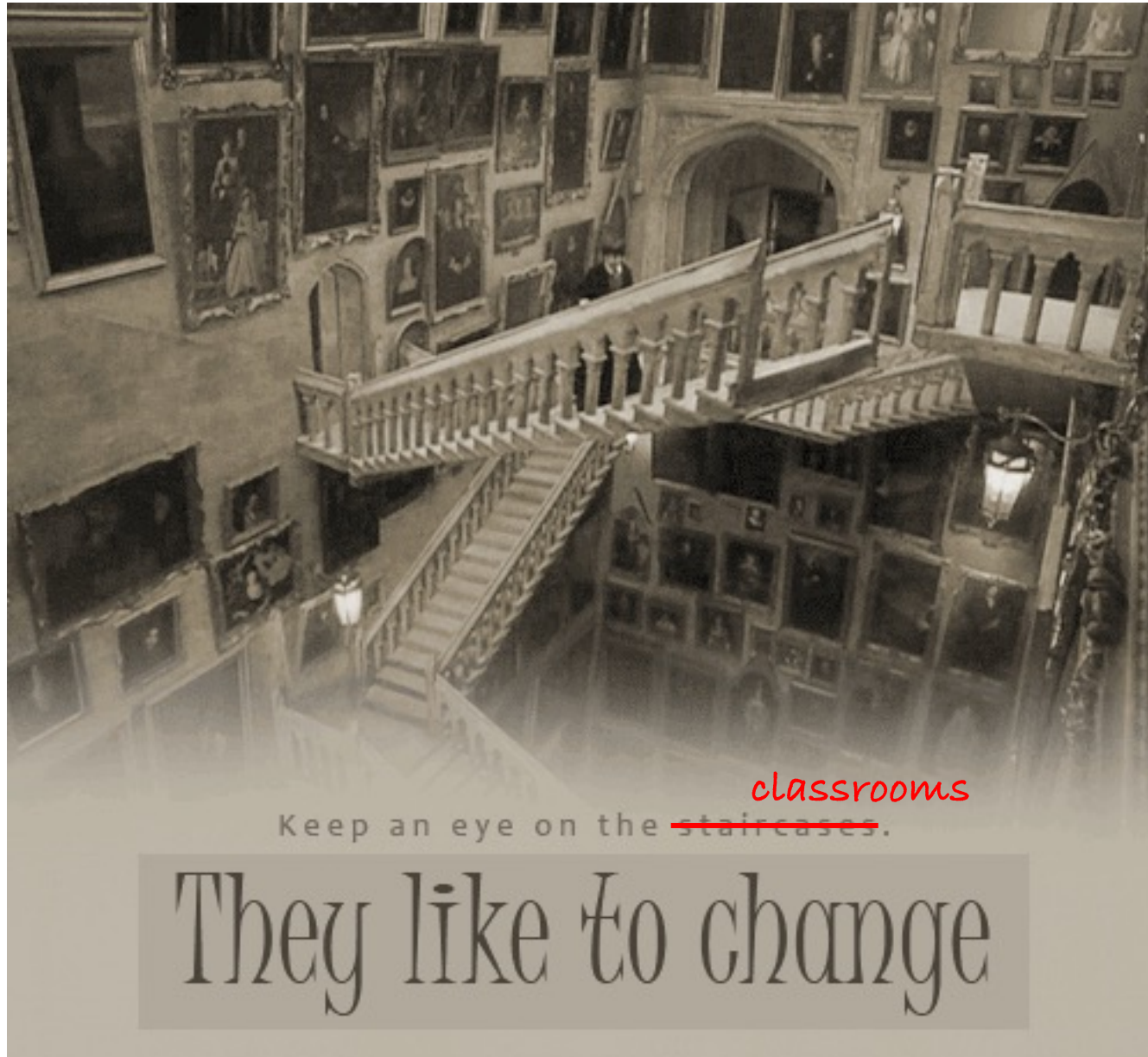
Classes

- In-person, in rooms with power outlets at the desks (<u>often</u>)

- Video-recorded and made available soon after each class
  - o *<u>not</u> streamed live*

- We will **lose** 1-2 classes
  - o (Asynchronous) video-lectures as substitutions
  - o Q&A session in the following in-person class

Laboratories

- Starting **October 7, 2022**
  - In rooms with power outlets at the desk

- For group activities

- Assignment text online some days in advance
  - We *aim* at "one week in advance"

- We will **lose** one lab
  - we need to catch up during the semester!

Laboratories... As Design Studios

- Set up in a *design studio* way
  - *"A design studio is a workplace for people engaged in conceiving, designing and developing new products or objects"*
  - Each team will be in the **same slot** and will work with the **same teacher** for the entire semester
  - The teacher is there to *support* the teams' work, **not** just reply at questions

- Two **main activities** within studios, identical for the three slots:
  1. *Assignments* - Teams work on steps of the project with the guidance of the teacher
  2. *Checks* - Teams present their assignment work to the teacher and receive feedback

Laboratories... As Design Studios

- Each of the three slots will have a specific **theme**
  - o All the projects must fall in the slot's theme and specialize it
  - o Slots must have around the same number of assigned teams

- Themes:
  1. **Digital Wellbeing** (13:00-14:30)
  2. **AR/VR for Education** (14:30-16:00)
  3. **Humans meet AI** (16:00-17:30)

Theme 1 – Digital Wellbeing

No one: Are you okay?
Me: Yeah. I'm totally fine.
My Phone:

⊘ Digital Wellbeing
Check your weekly report
You used your phone 42 h 6 m more than last week.

- **Teacher:** Alberto Monge Roffarello (alberto.monge@polito.it)

- **When:** Friday 13:00-14:30

- **Description:** Internet-connected devices, such as smartphones, are an integral part of our daily life. They are always with us and gives us many opportunities for social support. They also show many negative aspects linked to the misuse and overuse thus negatively impacting our "digital wellbeing". Within this theme, we will explore ways to build digital experiences that work with you and your wellbeing, not against you, to find a better balance with technology.

- **Examples:** [Forest](), [Hinge: the dating app designed to be deleted](), [Google's Digital Wellbeing Experiments]()

Theme 2 – AR/VR For Education

- **Teacher:** Luigi De Russis (luigi.derussis@polito.it)

- **When:** Friday 14:30-16:00

- **Description:** Virtual and, especially, augmented reality (VR/AR) can create new educational experiences for many, from primary-school students learning the different species of animals to developers wanting to create 3D videogames. Within this theme, we will explore how we might create VR/AR educational experiences for helping people learn better and possibly with more fun.

- **Examples:** [AR in Google Search](#), [timelooper](#), SkyView
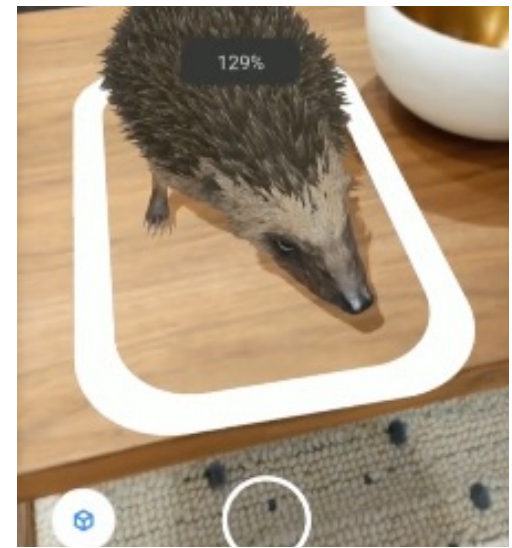
Theme 3 – Humans Meet AI

- **Teacher:** Tommaso Calò (tommaso.calo@polito.it)

- **When:** Friday 16:00-17:30

- **Description:** AI-powered systems have impacts on different aspects of our life, from the movies we watch (movie recommendation) to how we look for information (virtual assistants). They also changed many industries and professions. However, such systems are typically built with a technology-first approach, instead of a human-first. Within this theme, we will explore how an intelligent agent can augment human capabilities to really serve people needs.

- **Examples:** Amazon Alexa, Youper, GAUGAN2

Teams

EVERY GROUP PROJECT

- 3-4 students (*preferably* 4)

- It is students' responsibility to form teams
  - Teachers may help, but not automatically assign anyone

- Teams <u>cannot</u> be changed during the semester

- In case of issues among teammates: please, talk with the teachers

- Each team will work on their own GitHub repository
  - we will create and assign private repositories to each group

About The Exam

1. **Project development** (up to 20 points)
   - In teams
   - Final report – process, execution, and outcomes of *five group assignments*
   - Prototypes "source"

2. **Heuristic evaluation** (up to 4 points)
   - Individual
   - Report – outcome and execution of *one individual assignment*

3. **Oral discussion** on the project (up to 8 points)
   - As a group, mandatory

- The realized project will be valid until the end of the **academic year**

Evaluation Criteria

- Invested effort in the project activity, including the willingness to incorporate the provided feedback

- Originality, complexity, and richness of the work

- Methodological and technical correctness of the entire process

- Completeness and communication quality of the assignments' outcomes and report(s)

- Quality of the presentations and oral discussion

- Individual contribution

Project Development

- **Goal:**
  - to give hands-on experience with the modern human-centered design process described during the course

- Projects will be built **step-by-step** and mostly carried on *during* studios

- Project's topic proposed by each group
  - Based on *needfinding*
  - Within the chosen theme

- *Assignments* represent the various process steps
  - Start during a studio
  - Are often followed by *checks* with teachers (in one of the following studios)
  - <u>Evaluated at the exam</u> through reports and discussion

(Planned) Assignments and Checks

- Assignment 1 [group]
  - *Needfinding*
  - Starts at week 2, ends/check at week 3 (duration: **1 week**)

- Assignment 2 [group]
  - *Refinement and project focus*
  - Starts at week 4, ends/check at week 5 (duration: **1 week**)

- Assignment 3 [group]
  - *Low-fidelity prototype and evaluation*
  - Starts at week 6, ends/check at week 8 (duration: **2 weeks**)

(Planned) Assignments and Checks – cont'd

- Assignment 4 [group]
  - *Medium-fidelity prototype*
  - Starts at week 9, ends/ready at week 11, <u>no</u> check (duration: **2 weeks**)

- Assignment 5 [individual]
  - *Heuristic evaluation on another group's medium-fidelity prototype*
  - To be done **during** the studio of week 11
  - Results passed to the other group

  Coding will start here, <u>not</u> before!

- Assignment 6 [group]
  - *High-fidelity prototype* (and final report)
  - Starts at week 12, ends **one week before each exam date**

Assignments and Checks – Summary

	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	...	Exam -1 week
A1			Check												
A2					Check										
A3								Check							
A4															
A5															
A6															

Projects Completion Level

- The realized final prototype *must* be a **high-fidelity interactive prototype**, <u>not</u> a final "product"

- The application is <u>not</u> required to (fully) implement standard (yet important) features, such as sign-up, sign-in, …
  - Assume that your user is *already* registered and signed in

- This means that some (difficult or standard) features can be *faked* or *hard coded*

Oral Discussion

- **All teammates** present <u>and</u> presenting

- Each group will present their project with:
  1. A brief *introduction* to the project
  2. A *demonstration* of the implemented prototype, where students cover the main features and everybody in the team speak
  3. Answering some *questions* from the teachers, about what students showed and/or about the submitted report(s)

- **Beware:** the demonstration is typically the <u>most critical part</u>
  - it needs to be carefully prepared, and not rigged up at the moment

- Teachers will have already read the report(s) and had a look at the final prototype code, so there is <u>no need</u> to cover those

Introducing... the Assignment Zero

- Submit group composition
  - Group name
  - 4 persons (max), for each:
    - ID (matricola), Surname, Name, GitHub username, e-mail
  - Two preferred lab slots/themes

- Submission link (Google Form):
  - https://forms.gle/FsGjUnvCcCvpBmin7

Deadline:
October 5, 2022
End of Day (EoD)

Suggested Books

- Alan Dix, Janet Finlay, Gregory D. Abowd, Russel Beale, "Human-Computer Interaction", 3rd edition, Prentice Hall, 2004, ISBN 0-13-046109-1

- Shneiderman, Plaisant, Cohen, Jacobs, Elmqvist, "Designing the User Interface: Strategies for Effective Human-Computer Interaction", 6th edition, Pearson, 2016, ISBN 013438038X / 9780134380384
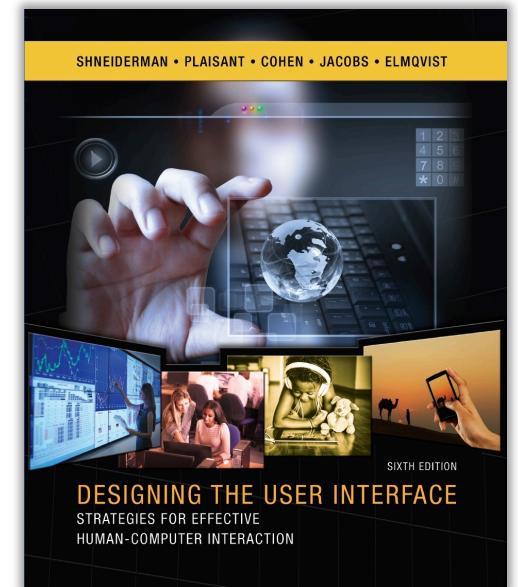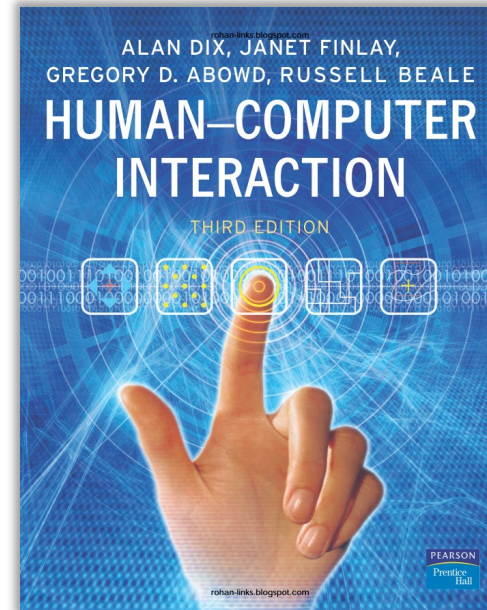
Suggested Books

- I. Scott MacKenzie, "Human-Computer Interaction: An Empirical Research Perspective", Morgan Kaufmann, 2013, ISBN 978-0-12-405865-1

- David Benyon, "Designing Interactive Systems", 3rd edition, Pearson, 2014, ISBN 978-1447920113
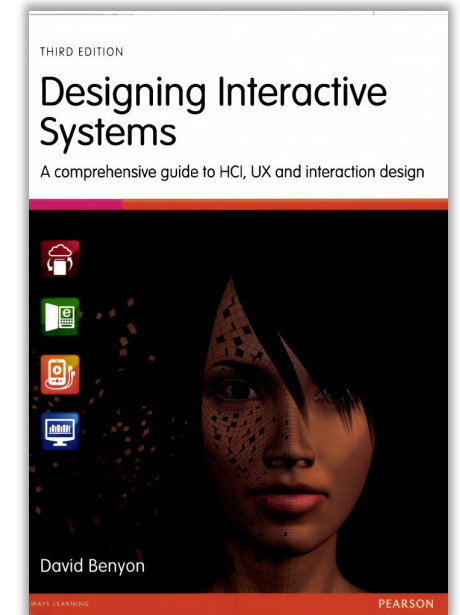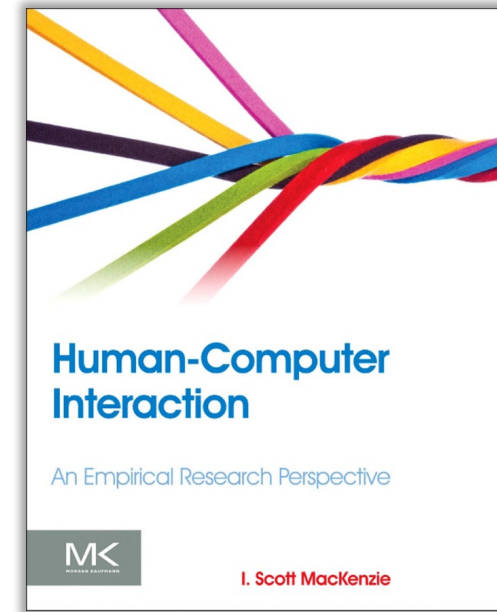
Suggested Books

- Don Norman, "The Design of Everyday Things: Revised and Expanded Edition", Hachette UK, 2013, ISBN 0465072992/ 9780465072996

- S. Krug, "Don't Make Me Think: A Common Sense Approach to Web and Mobile Usability - revisited", Pearson Education, 2014, ISBN 0321648781/9780321648785
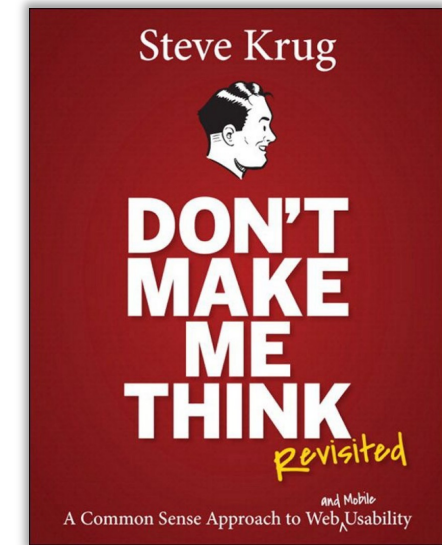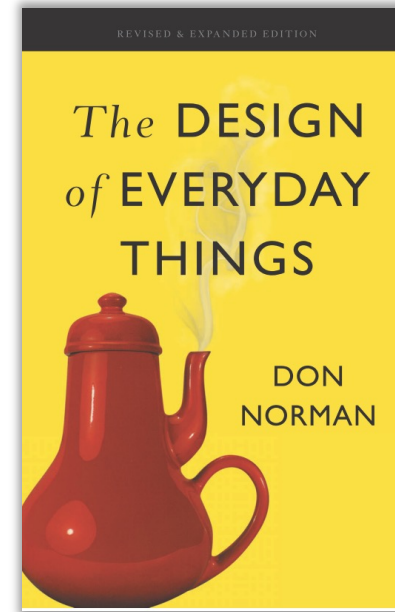
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