

# Human Computer Interaction

Introduction to the course

*Luigi De Russis*

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Academic Year 2023/2024



# Expectations?

What do you hope to learn in this course?

# Goals

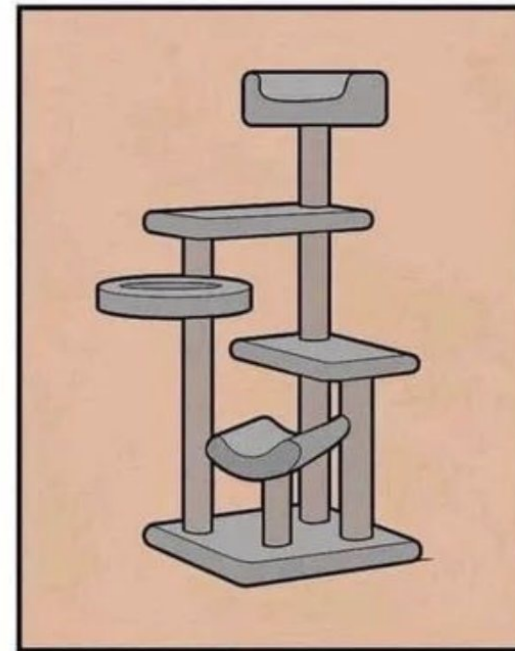
- Understanding how to design the user experience when interacting with modern applications, devices, and environments
- Gaining in-depth knowledge of a human-centered process to create interactive systems
  - and how to apply it in practice
- Becoming familiar with methods to gather and listen to users' needs
- Learning to evaluate interactive systems with their users

# Why?

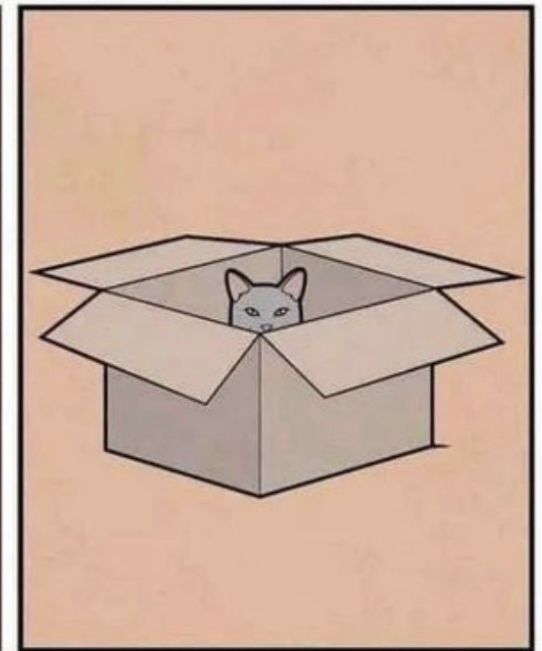


source: [https://www.instagram.com/p/CT8qVYaDE\\_R/](https://www.instagram.com/p/CT8qVYaDE_R/)

## Product features

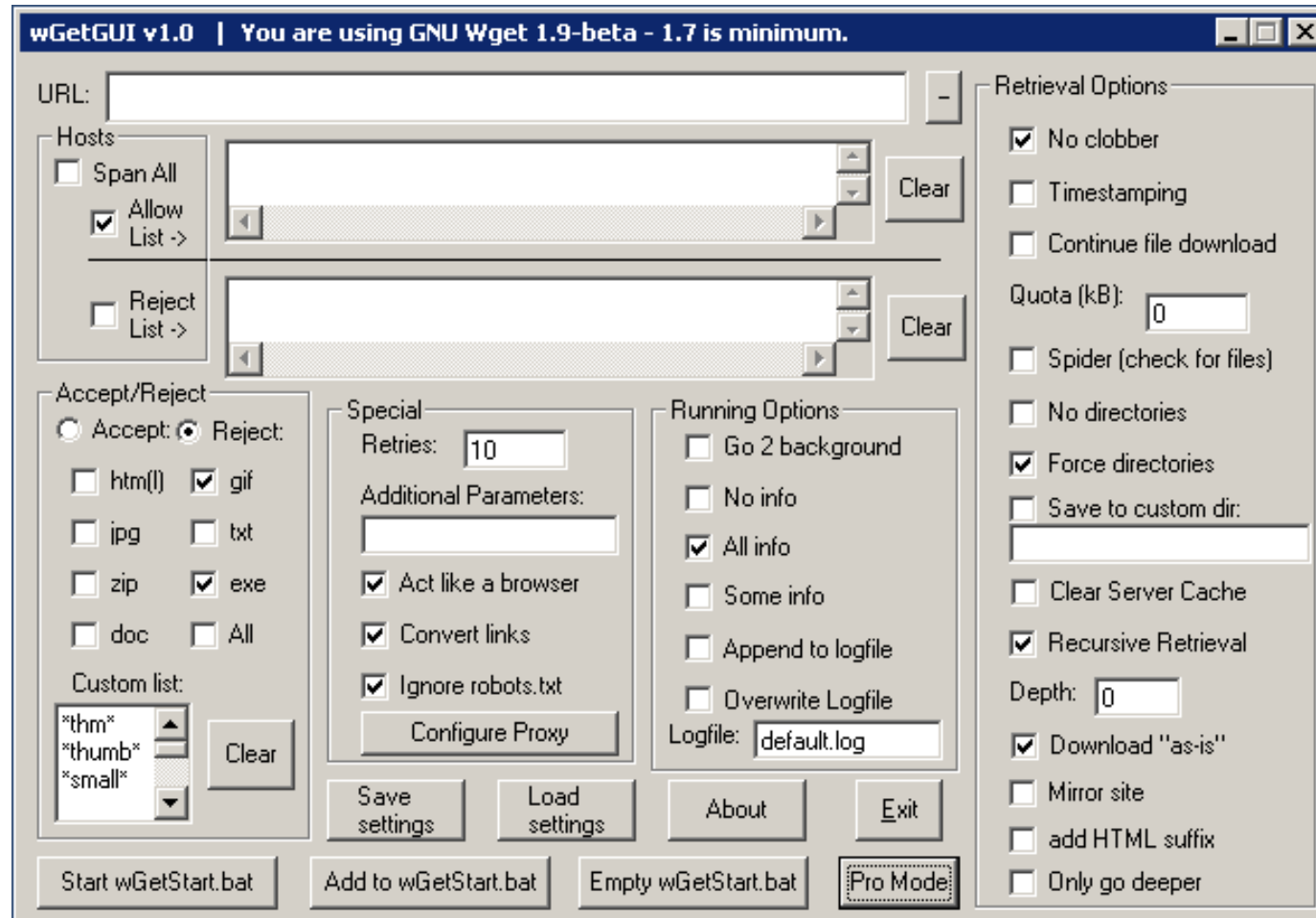


## User needs



© \_yes\_but

# 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 and frequently)
- Evaluation (various kind)
- Programming

# What We Will Learn

## Introduction to Human-Computer Interaction

Definitions, the human, the computer.

## Building interactive applications with a human-centered process

Main tasks and methods to design, develop, and evaluate an interactive application.

Needfinding strategies, low- 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, ...

Seminars/demos on emerging topics and case studies.

# Course Topics... At a Glance!

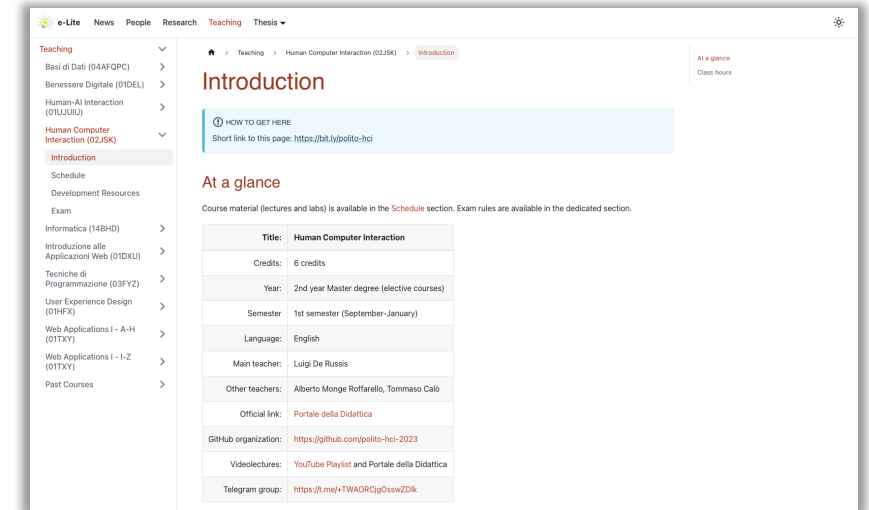
1. Introduction to HCI (*this week!*)
2. Problem framing and needfinding
3. Tasks and their analysis
4. Prototyping at various levels of fidelity
5. Design guidelines, principles, and heuristics
6. Visual design and design patterns
7. Heuristic evaluation
8. Usability testing
9. Advanced interactions





# Learning Material

- Course website - <http://bit.ly/polito-hci>
  - Slides, exercises, lab texts
  - Full schedule
  - Templates and deadlines
  - Supplementary material
- Video lectures (for classes, only)
  - YouTube - [https://www.youtube.com/playlist?list=PLs7DWGc\\_wmwRwGT5u9W9TKenphrJKtDss](https://www.youtube.com/playlist?list=PLs7DWGc_wmwRwGT5u9W9TKenphrJKtDss)
  - Portale della Didattica
- GitHub - <https://github.com/polito-hci-2023>
  - Slides, lab texts, examples, group work, ...





# Communications

- We will use **Telegram** for quick communications
  - Among students, with teachers, etc.
- Join at <https://t.me/+TWAORCjgOsswZDIk>
- Two topics:
  - **News and Updates** -> Announcements, reminders, and official information
  - Q&A -> For feedback and questions
- Private conversations can be done via direct messages
- 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 **Tuesday 16:00-17:00** in my office, send a message beforehand
- 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 some assignments: 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					
13:00			Lab 11I		
14:30	Class 2P		Lab 5I		
16:00			Lab 8N		
17:30		Class 4			

# Classes

- In-person, in rooms with power outlets at the desks
- Video-recorded and made available soon after each class
  - not *streamed live*
- *This week*: class on Wednesday at 13:00 (1,5 h)
  - we will skip one class, later on

# Laboratories

- Starting **October 11, 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”

# Laboratories

- **Collaborative** and interactive places, to work and share feedback
  - In-person attendance is *fundamental!*
  - 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 labs, 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

- Each of the three slots will have a specific **theme**
  - All the projects must fall in the slot's theme and specialize it
  - Slots must have around the same number of assigned teams
  
- Themes:
  1. **Health and Wellbeing** (13:00-14:30)
  2. **Education and Learning** (14:30-16:00)
  3. **Humans meet AI** (16:00-17:30)

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

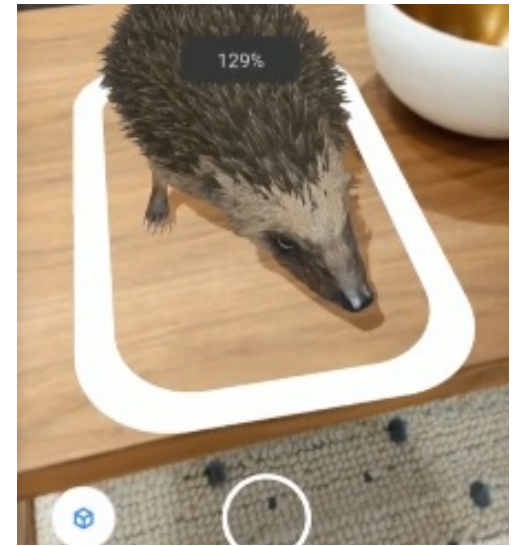


# Theme 1 – Health and Wellbeing

- **Teacher:** Alberto Monge Roffarello ([alberto.monge@polito.it](mailto:alberto.monge@polito.it))
- **When:** Wednesday 13:00-14:30
- **Description:** Health and wellbeing are fundamental aspects of our daily existence. They encompass physical, mental, and emotional dimensions that can be significantly influenced by our interactions with technology. Within this theme, we will explore innovative ways to leverage HCI principles to create applications, interfaces, and systems that empower individuals to lead healthier lives, focusing on aspects like fitness, mental wellness, stress management, and fostering social connections.

# Theme 2 – Education and Learning

- **Teacher:** Luigi De Russis ([luigi.derussis@polito.it](mailto:luigi.derussis@polito.it))
- **When:** Wednesday 14:30-16:00
- **Description:** Education, either formal or informal, plays a pivotal role in many aspects of our life: you can learn at school, to play sports, to support class' learning activities, within families and to pass cultural traditions and languages. Within this theme, we will explore how we might create educational experiences for helping people learn better and possibly with more fun.





## Theme 3 – Humans Meet AI

- **Teacher:** Tommaso Calò ([tommaso.calo@polito.it](mailto:tommaso.calo@polito.it))
- **When:** Wednesday 16:00-17:30
- **Description:** The intersection of humans and artificial intelligence (AI) is a rapidly evolving frontier that challenges our understanding of interaction, cognition, and augmentation. Within this theme, we will delve into how humans and AI collaborate, emphasizing the design of AI-driven interfaces. We will investigate the role of HCI in shaping user trust, understanding, and adoption of AI systems to enhance human potential in tasks ranging from decision-making to creative expression.

# Teams

- 3-4 students (*preferably 4*)
- It is students' responsibility to form teams
  - Teachers may help, but not automatically assign anyone
- Teams cannot 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 *four group assignments*
    - Prototypes “source”
  2. **Heuristic evaluation** (up to 6 points)
    - Individual
    - Report – outcome and execution of *one individual assignment*
  3. **Oral discussion** on the project (up to 4 points)
    - As a group, mandatory
- The realized project will be valid until the end of the **academic year**.
  - Additional points (max 2) can be assigned for the effort during the course, the project, and the oral discussion.

# 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* labs
- Project's topic proposed by each group
  - Based on *needfinding*
  - Within the chosen theme
- *Group assignments* represent the various process steps
  - Start during a lab
  - Are often followed by *checks* with teachers (in one of the following labs)
  - Evaluated at the exam through reports and discussion



# (Planned) Assignments and Checks

- Assignment 1 [group]
  - *Needfinding*
  - Starts at week 2, ends/check at week 4 (duration: **2 week**)
- Assignment 2 [group]
  - *Storyboard and Low-fidelity prototype*
  - Starts at week 6, ends/check at week 8 (duration: **2 week**)
- Assignment 3 [individual]
  - *Heuristic evaluation on another group's low-fidelity prototype*
  - To be done **during** the lab of week 9
  - Results passed to the other group

# (Planned) Assignments and Checks – cont'd

- Assignment 4 [group]
    - *Medium- to high-fidelity prototype*
    - Starts at week 10, ends at week 11, no check (duration: **1 week**)
  - Assignment 5 [group]
    - *High-fidelity prototype and evaluation (+ final report)*
    - Starts at week 11, ends **one week before each exam date**
- { Coding will start here, not before!

# Assignments and Checks – Summary

	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	...	Exam -1 week
A1				Check												
A2								Check								
A3																
A4																
A5																

# Projects Completion Level

- The realized final prototype *must* be a **high-fidelity interactive prototype**
  - not a final “product”
- The application is not 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 and 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 most critical part
  - 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 no need to cover those

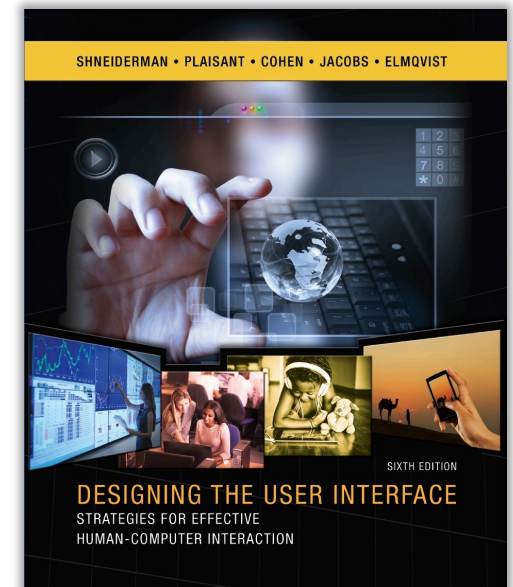
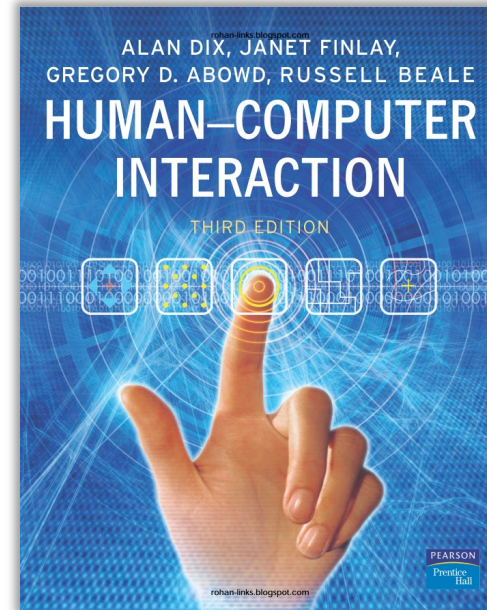
# Introducing... the Assignment Zero

- 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/R83Yd2LysdNWrXeT9>

**Deadline:**  
**October 10, 2023**  
End of Day (EoD)

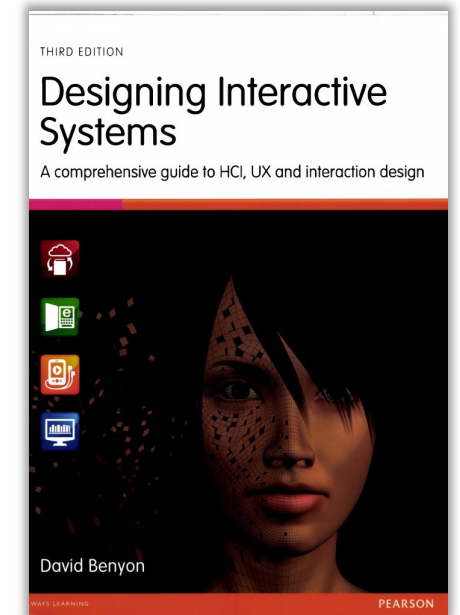
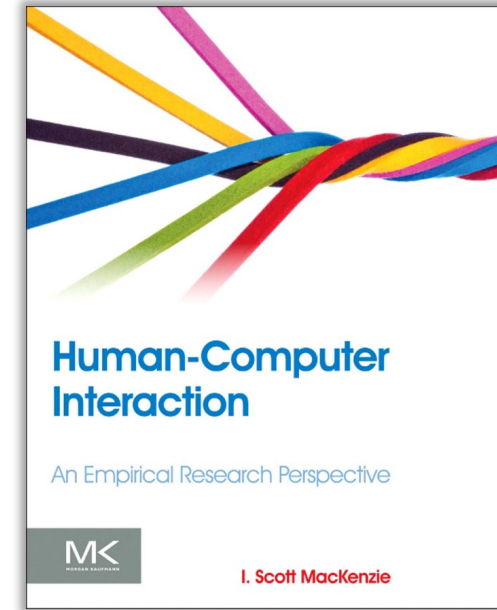
# Suggested Books

- Alan Dix, Janet Finlay, Gregory D. Abowd, Russel Beale, "Human-Computer Interaction", 3<sup>rd</sup> edition, Prentice Hall, 2004, ISBN 0-13-046109-1
- Shneiderman, Plaisant, Cohen, Jacobs, Elmqvist, "Designing the User Interface: Strategies for Effective Human-Computer Interaction", 6<sup>th</sup> edition, Pearson, 2016, ISBN 013438038X / 9780134380384



# Suggested Books

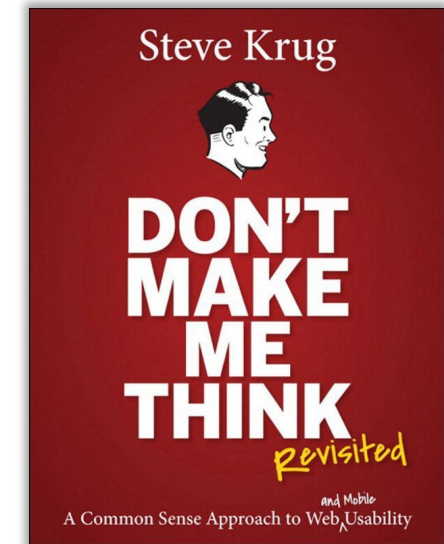
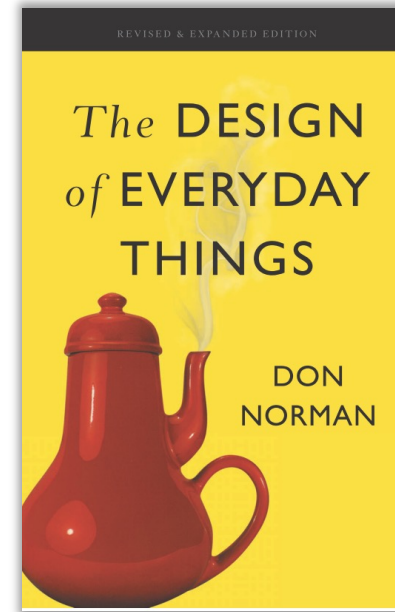
- I. Scott MacKenzie, "Human-Computer Interaction: An Empirical Research Perspective", Morgan Kaufmann, 2013, ISBN 978-0-12-405865-1
- David Benyon, "Designing Interactive Systems", 3<sup>rd</sup> edition, Pearson, 2014, ISBN 978-1447920113





# 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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