

User Interface Design, Usability, and Bias

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Overview

1. Why UI Design is important
2. User-Centered Design
3. Usability
4. Bias & ethics – quick outlook

Note:

- Final exam on June 19st from 10:15 (80 mins); be in front of your room at 09:45am;
more information by email

Examinable Skills

By the end of this lecture, you should be able to...

- explain why designing user interfaces is challenging
- explain and understand how human limitations can affect usability
- explain why usability is important and how it can be achieved
- assess and justify the usability of a product
- analyze a GUI for problems using Nielsen's 10 usability heuristics and suggest what to improve
- explain biases in software engineering and why they are important to be aware of
- Know about ethical aspects of software

Why is User Interface Design Important?

Learning Objectives

Be able to:

- explain why designing user interfaces is challenging yet important

Are there any issues?



Why design matters



It's not always obvious...

Some examples are obvious, but small, subtle changes can have a big impact - Natural Mapping example by Don Norman

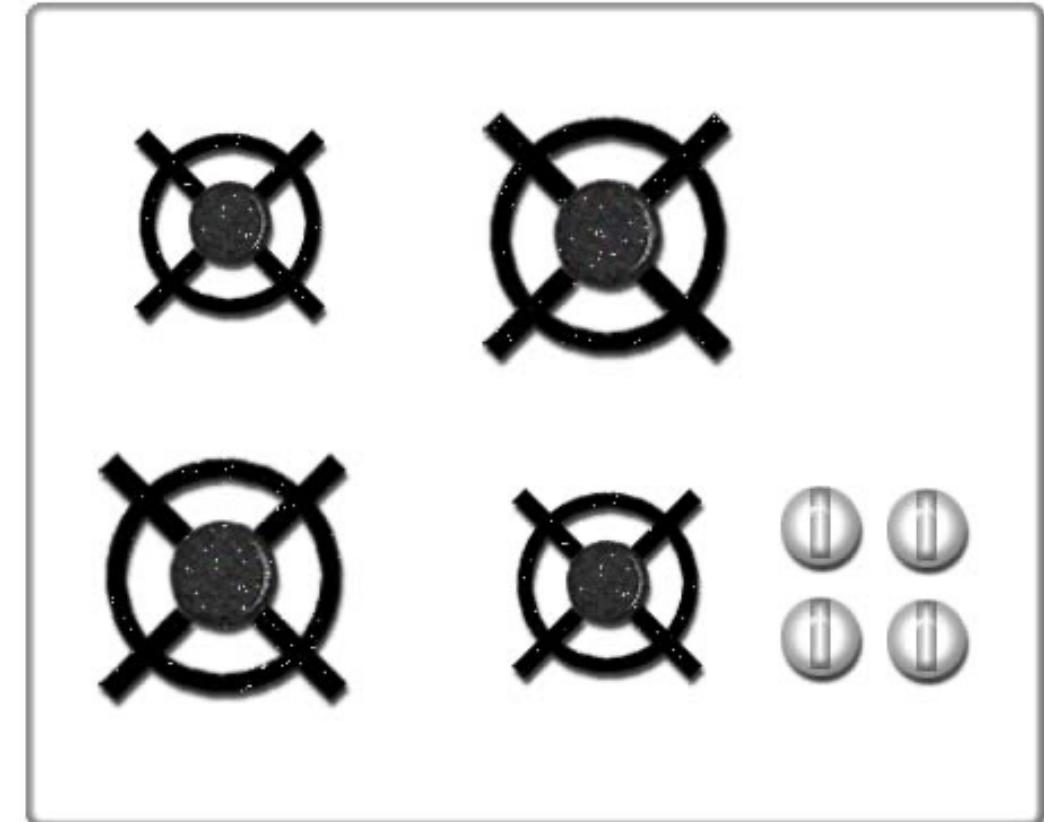
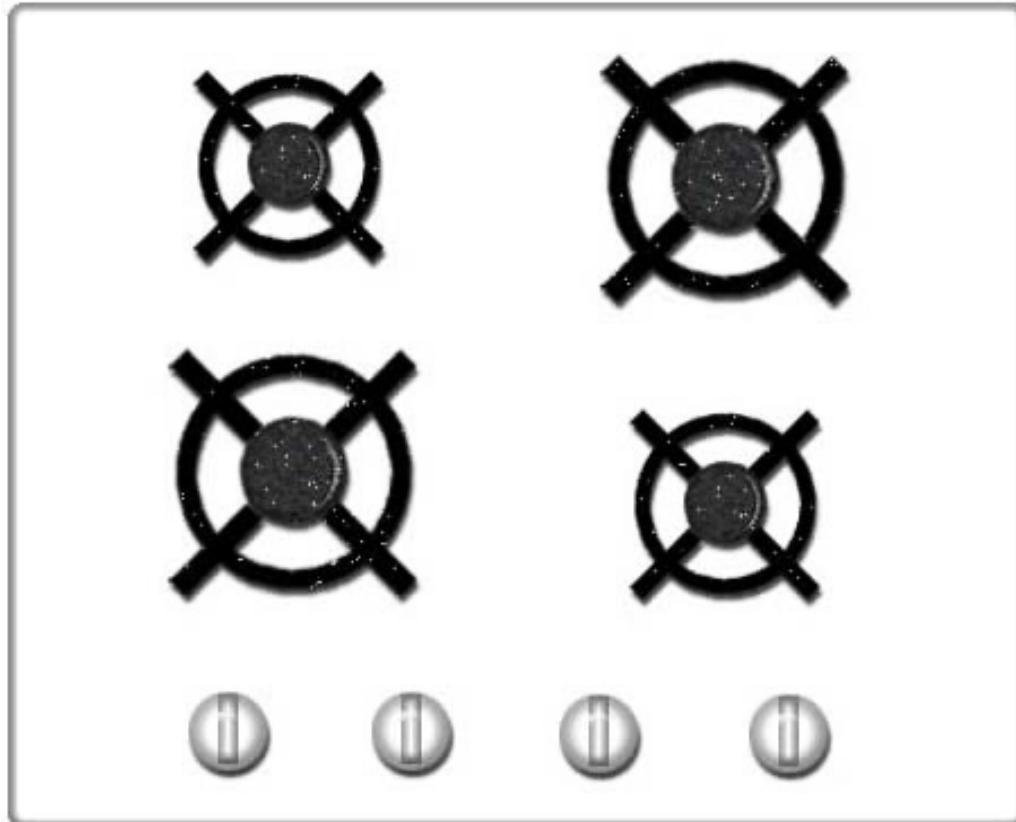
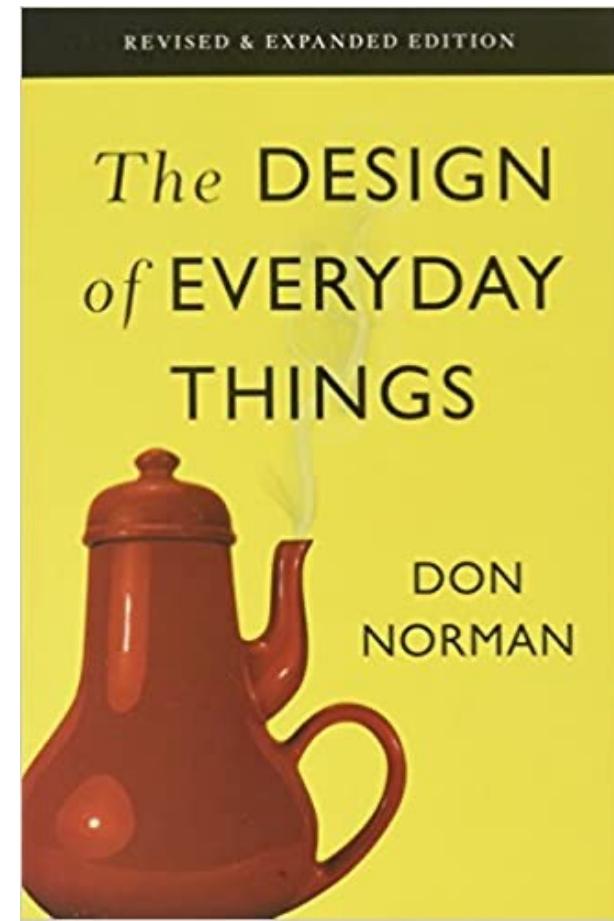


Image Source: [https://en.wikipedia.org/wiki/Natural_mapping_\(interface_design\)](https://en.wikipedia.org/wiki/Natural_mapping_(interface_design))

“Good design is actually a lot harder to notice than poor design, in part because good designs fit our needs so well that the design is invisible.”



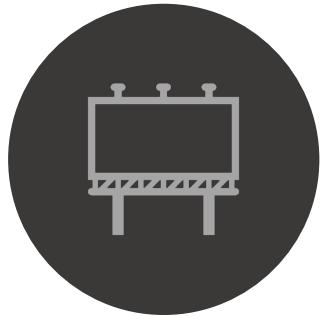
(UI) Design is important



Many so-called human errors and “machine misuse” are errors in design



Designers help things to work by providing a good conceptual model



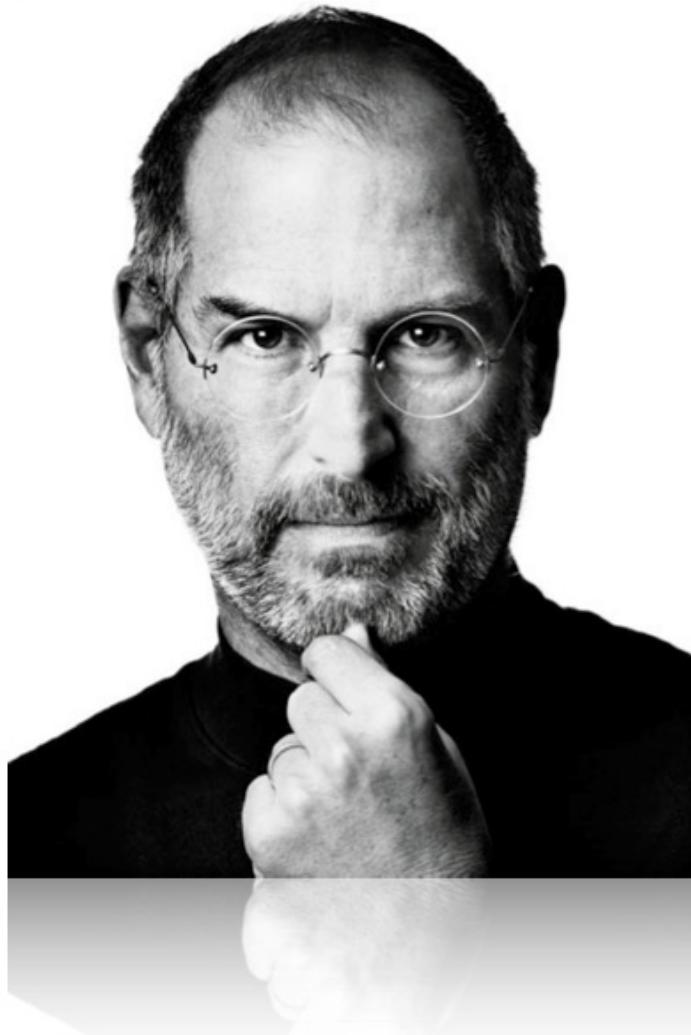
Designers decide on a range of users as the design audience



But design is difficult for a variety of reasons that go beyond design

Good design avoids wasting time of users.

What is design?



Design is not just
what it looks like
and feels like.

Design is how it
works.

User-Centered Design

Learning Objectives

Be able to:

- explain user-centered design
- explain and understand how human limitations can affect usability

User-Centered Design

The process of designing a tool from the perspective of how it will be understood and used by human user

Why?

- Cost saving
- Competitive market
- User expectations

What to consider?

- Abilities & limitations
 - Memory
 - Color
- Ergonomics
- ...



Human Capabilities (1)



Some facts on memory

- Associations are built by repetition
- Scaffold model (more likely to remember items that have many associations)
- Recognition easier than recall
- Working memory has small capacity
- Long-term memory has large capacity

(game to train working memory:
<https://www.brainturk.com/dual-n-back>)

Example: Recognition over Recall

Products Rooms Offers Inspiration Services & contact Design & Planning More

New Storage & organisation Furniture Textiles Decoration Outdoor products Pots & plants Baby & children

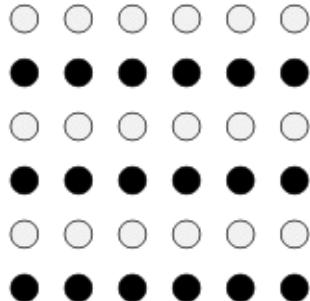
Follow 5 topics
Then we'll build a custom home feed for you

Search for any topic

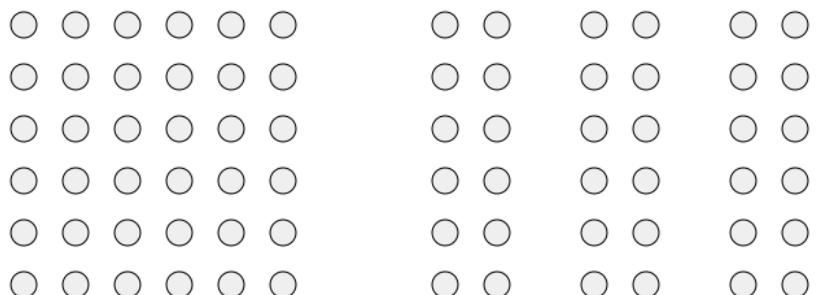
Design	Technology	Web design	Home decor	DIY and home improvement
Art	Typography	Gadgets	Travel	Men's apparel
abcde fghijk lmnopr	Waterfall	Surprised woman	Man in a dome	Sergei Bochitsky

Follow 3 more

Human Capabilities (2)



Principle of similarity



Principle of proximity

Visual Perception

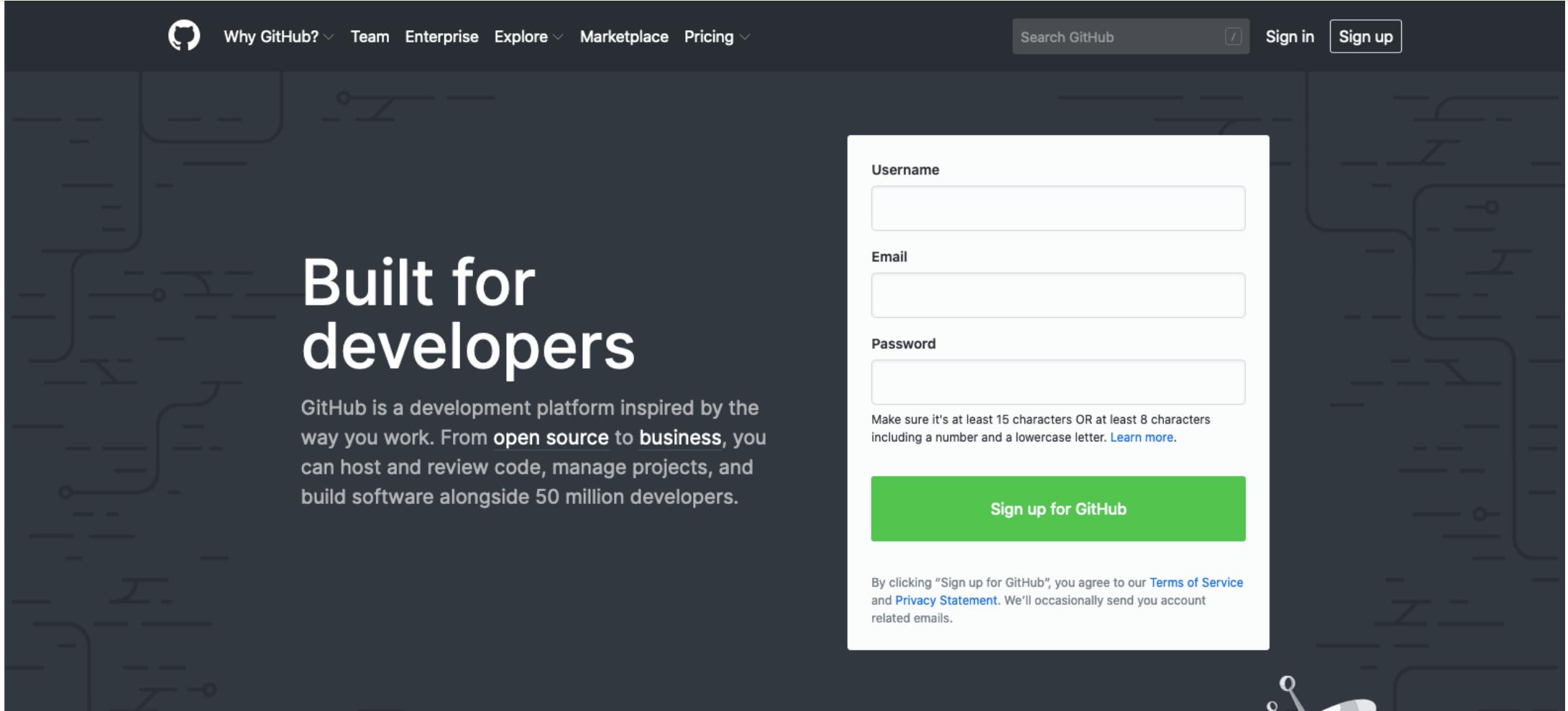
- We excel at pattern recognition
- We automatically try to organize visual displays and look for cues
- Motion, grouping, contrasts, color can make different parts of a display more or less salient
- Gestalt principles

Image sources:

https://en.wikipedia.org/wiki/File:Gestalt_proximity.svg
https://en.wikipedia.org/wiki/File:Gestalt_similarity.svg

Visual Perception – Example

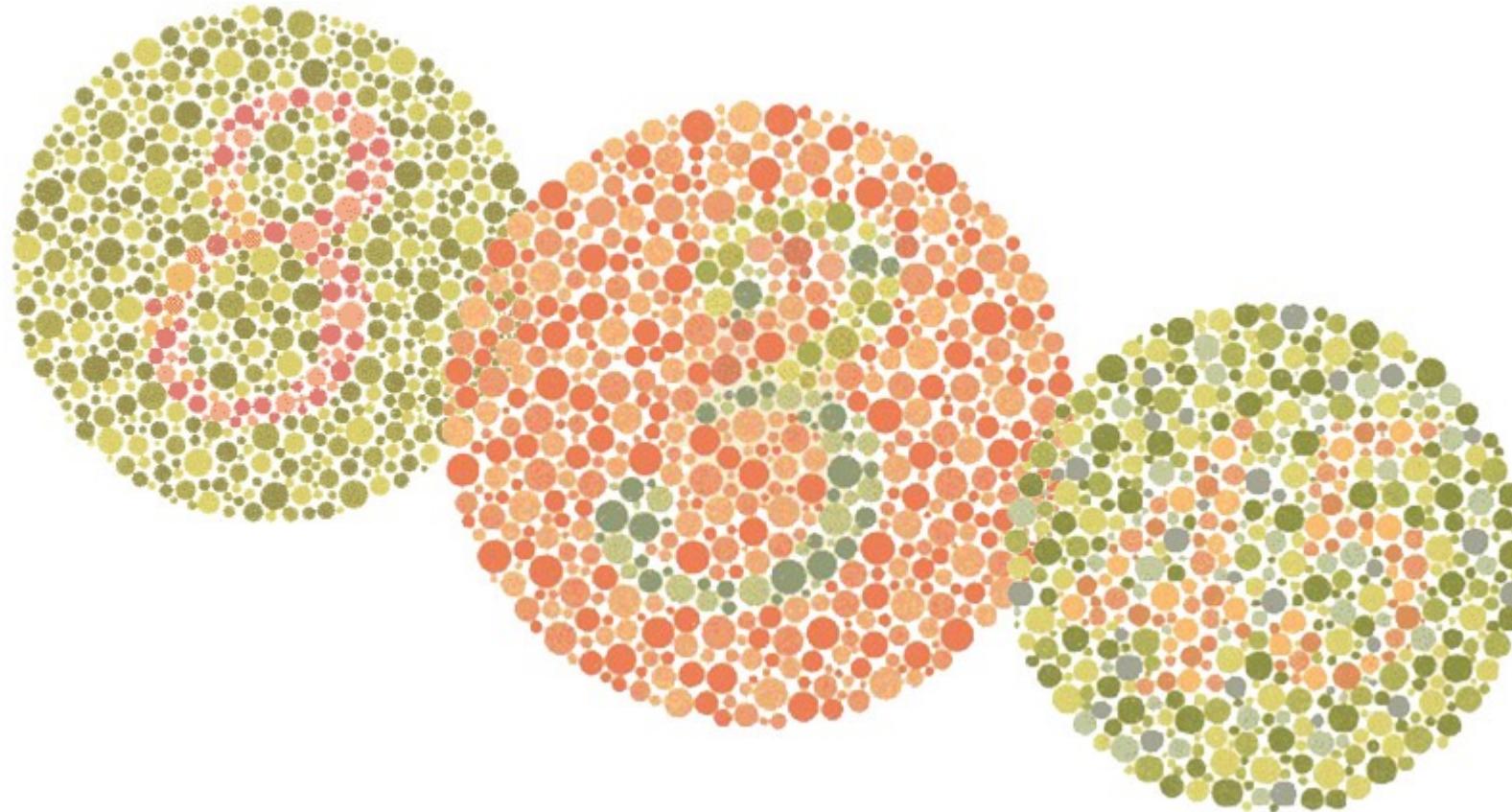
Recognize any of the previous points in here?



The image shows a screenshot of the GitHub sign-up page. At the top, there is a navigation bar with links for "Why GitHub?", "Team", "Enterprise", "Explore", "Marketplace", and "Pricing". On the right side of the navigation bar are "Search GitHub", "Sign in", and "Sign up" buttons. The main content area features a large, bold title "Built for developers" and a descriptive paragraph about GitHub's purpose and user base. To the right of this text is a sign-up form with fields for "Username", "Email", and "Password". Below these fields is a note stating, "Make sure it's at least 15 characters OR at least 8 characters including a number and a lowercase letter." A green "Sign up for GitHub" button is located below the password field. At the bottom of the form, there is a small note about agreeing to the Terms of Service and Privacy Statement. The background of the page has a subtle circuit board pattern.

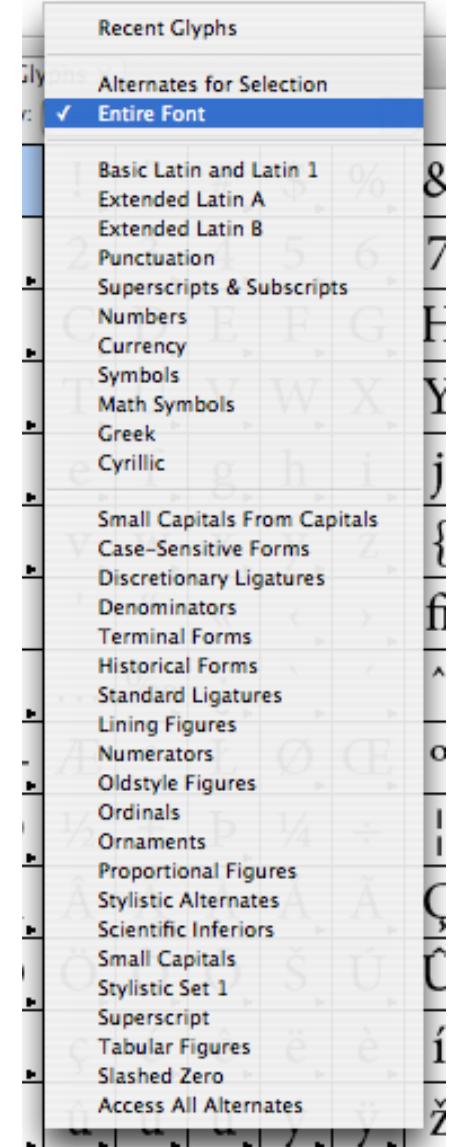


Barriers – Example



Human Limitations

- Color blindness
 - 8% males and 0.4% females red-green color blind
 - Guideline: don't depend solely on color distinctions
- Information overload



Exercise (5 min) [<https://bit.ly/3UXpsaZ>]



Take a look at an older and current screenshot from the homepage of the Yale School of Art (<https://www.art.yale.edu/>).

Question: Is this a good or bad design? Why?

The screenshots illustrate the evolution of the Yale School of Art website's design and content over three years.

Left Screenshot (March 2020):

- Header:** Yale School of Art, 1156 Chapel Street, POB 208339, New Haven, Connecticut, 06520-8339.
- Logo:** YALE SCHOOL OF ART
- Background:** A large, colorful molecular model (protein structure) composed of blue, pink, green, and yellow spheres.
- Navigation:** Home, About the School, Apply to the School, Gallery, Publications, News, Public Events, Play animations.
- Text:** This website exists as an ongoing collaborative experiment in digital publishing and information sharing. Because this website functions as a wiki, all members of the School of Art community—graduate students, faculty, staff, and alumni—have the ability to add new content and pages, and to edit most of the site's existing content.
- Links:** A Message from Dean Kuzma to MFA Students (March 21, 2020), SoA COVID-19 Student Resources >>, Yale School of Art COVID-19 FAQ >>, "Artist Resources List," a shared spreadsheet for the SoA community resources on funding, volunteering, and online content >>.
- Footer:** Editor details.

Right Screenshot (Spring 2023):

- Header:** Yale School of Art, 1156 Chapel Street, POB 208339, New Haven, Connecticut, 06520-8339.
- Logo:** YALE SCHOOL OF ART
- Background:** A large, colorful molecular model (protein structure) composed of blue, pink, green, and yellow spheres.
- Navigation:** Home, About the School, Apply to the School, Exhibitions, Publications, News, Public Events.
- Text:** The Yale School of Art is a graduate school that confers MFAs in Graphic Design, Painting/Printmaking, Photography, and Scripture; and offers undergraduate-level art courses to Yale College students. Our website exists as an ongoing collaborative experiment in digital publishing and information sharing. It functions as a wiki—all members of the School of Art community have the ability to add new, and edit most existing content.
- Links:** Editor details.
- Section:** QUICK LINKS
- Text:** Congratulations to the MFA Class of 2023! 🎉
- Text:** Learn more about Monday's commencement exercises and the School of Art's newest alums here >
- Section:** ON THIS PAGE
- Section:** HAPPENING AT SOA
- Section:** COMMUNITY BULLETIN BOARD
- Section:** CALENDARS & NEWSLETTERS
- Section:** HAPPPENING AT SOA
- Text:** Spring 2023 Visiting Artist lectures have concluded. Find the Spring 2023 schedule with posters here >

Inclusion & accessibility

Inclusion is about diversity, and ensuring involvement of everyone to the greatest extent possible. Addresses issues like accessibility, education, culture, language, etc.

Accessibility addresses discriminatory aspects related to equivalent user experience for people with disabilities. Web accessibility means that people with disabilities can equally perceive, understand, navigate, and interact with websites and tools.

Usability

Learning Objectives

Be able to:

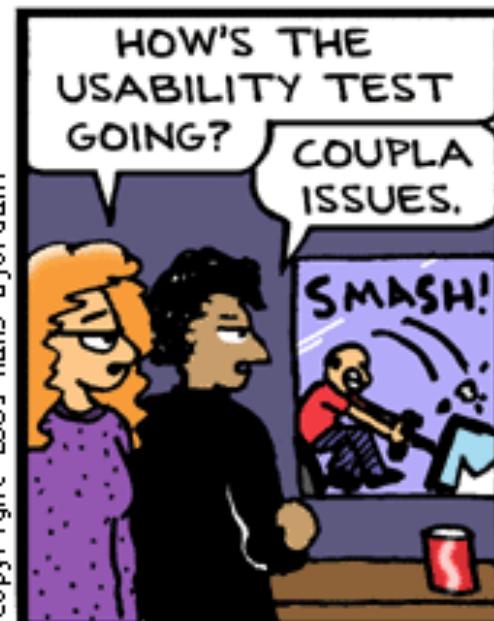
- explain why usability is important and how it can be achieved
- assess and justify the usability of a product
- analyze a GUI for problems using Nielsen's 10 usability heuristics and suggest what to improve

Definition – Usability

The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use. – ISO 9241-11

Usability

- Closely related to good UI design
- Part of User Experience



Bug Bash by Hans Bjordahl

<http://www.bugbash.net/>

Usability is NOT utility/functionality

Utility is how useful something is

Functionality is concerned with functions/features of the product

Usability is how easy it is to use

You can have something that is extremely usable, but has no utility

A good product / software should have both

Usability Methods

Extensive list of methods at:
<http://www.usabilityfirst.com/usability-methods/>

Prototyping

Surveys

Contextual inquiry / task analysis

Cognitive walkthrough

Heuristic evaluation

...

Prototyping

- Creating a scaled-down or incomplete version of a system to demonstrate or test aspects of it
 - Reasons to do prototyping:
 - aids UI design
 - provides basis for testing
 - team-building
 - allows interaction with user to ensure satisfaction

I4F - Directory Profile Page



Profile Name

245 Blackfriars Road
Ludgate House
London, SE1 9UY

Email: firstname@surname.com

Telephone: 0207 955 3705

Categories

Lore ipsum
dolor sit
amet
dolor sit

Lore ipsum dolor sit amet, consectetur adipiscing elit. Morbi consectetur nibh feugiat urna elementum facilisis. Nullam diam arcu, lobortis ut tincidunt vel, suscipit quis lectus. Praesent interdum sapien in nisi tempor vestibulum. Mauris nec mauris sapien. Nam laoreet nisi non magna iaculis vitae convallis lorem porttitor.

Lore ipsum dolor sit amet, consectetur adipiscing elit. Morbi consectetur nibh feugiat urna elementum facilisis. Nullam diam arcu, lobortis ut tincidunt vel, suscipit quis lectus. Praesent interdum sapien in nisi tempor vestibulum. Mauris nec mauris

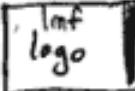


Attachments

-  [Lore ipsum dolor sit amet.](#)
-  [Lore ipsum dolor sit amet.](#)
-  [Lore ipsum dolor sit amet.](#)
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created with Balsamiq Mockups - www.balsamiq.com

e.g., <http://www.balsamiq.com/>

LEGG MASON	Inst. Asset Mgmt.	Wealth Management	Legg Mason Trust	Private Client	Legg Mason Funds	Capital Markets
Client Log-In	<h2>Legg Mason Funds Banner</h2>					
Open An Account						
Search ►►	tagline~~~~~					
Our Funds	Global Brief content, content~~~~~ More ➤ Aug 8, xxxx					
Press + Performance Fund Management Dividends Capital Gains In the News What's New Applications Prospectuses	Context And Perspective content, content~~~~~ More ➤ Aug 8, xxxx					Fund Finder Select a Fund ▾ Select by Category Find a fund that meets your needs.
Knowledge	Monthly Market Review content, content~~~~~ more ➤ Aug 8, xxxx					What's New! Press Release Another Press Release 401k Season Comments by Bill Miller.
						
Funds Inquire Services 1-800-522-5544 8:00 AM - 5:30 PM (ET) MON - FRI	footer, disclaimer, privacy policy , ~~~~~					

If the user pointed to the "Fund Finder" drop down menu, the full menu (below) would be presented.

Fund Finder
Select a Fund ▾
American Leading Balanced Trust Cash Reserve Classic Valuation Emerging Markets Europe Fund Financial Services Focus Trust Global Income High Yield Intl Equity Opportunity Fund Value Trust

Surveys

- Used to collect quantitative data
- Helps to find information on who the users are, how they use your product, users' opinions, ...
- Consider mixing open-ended with closed questions
- Plan questions well (usually no follow-up questions possible)
- Keep it short

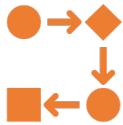


Contextual Inquiry

- Interviews with people in their natural work environment
- Silently observe (watch and listen) the user and take notes; you may ask clarifying questions
- Helps to understand the task procedures that users follow to reach their goals
- Helps to get more qualitative data around context of use (physical characteristics, social/cultural environment,...)



Cognitive Walkthrough



Group of usability experts walk through a set of typical user tasks, one-step-at-a-time



At each step, answer 4 questions, e.g.

Will the user try to achieve the right effect?

Will the user notice that the correct action is available?

Will the user associate the correct action with the effect to be achieved?

If the correct action is performed, will the user see that progress is being made toward solution of the task?



Define tasks and sub-tasks to be analyzed



Establish persona: who is the user of the system, specify experience or technical knowledge for persona

e.g., very computer-savvy teenage kid / senior without tech experience

Heuristic Evaluation

Based on Nielsen's 10 Principles of UI Design

Example: Jupyter Notebooks (<https://jupyter.org/>)

- Web application
- Live code, visualisations, text, ...
- Used for data cleaning, transformation, numerical simulation, statistical modelling, data visualization, machine learning, ...
- Python, R, Julia, Scala

Nielsen's Principles

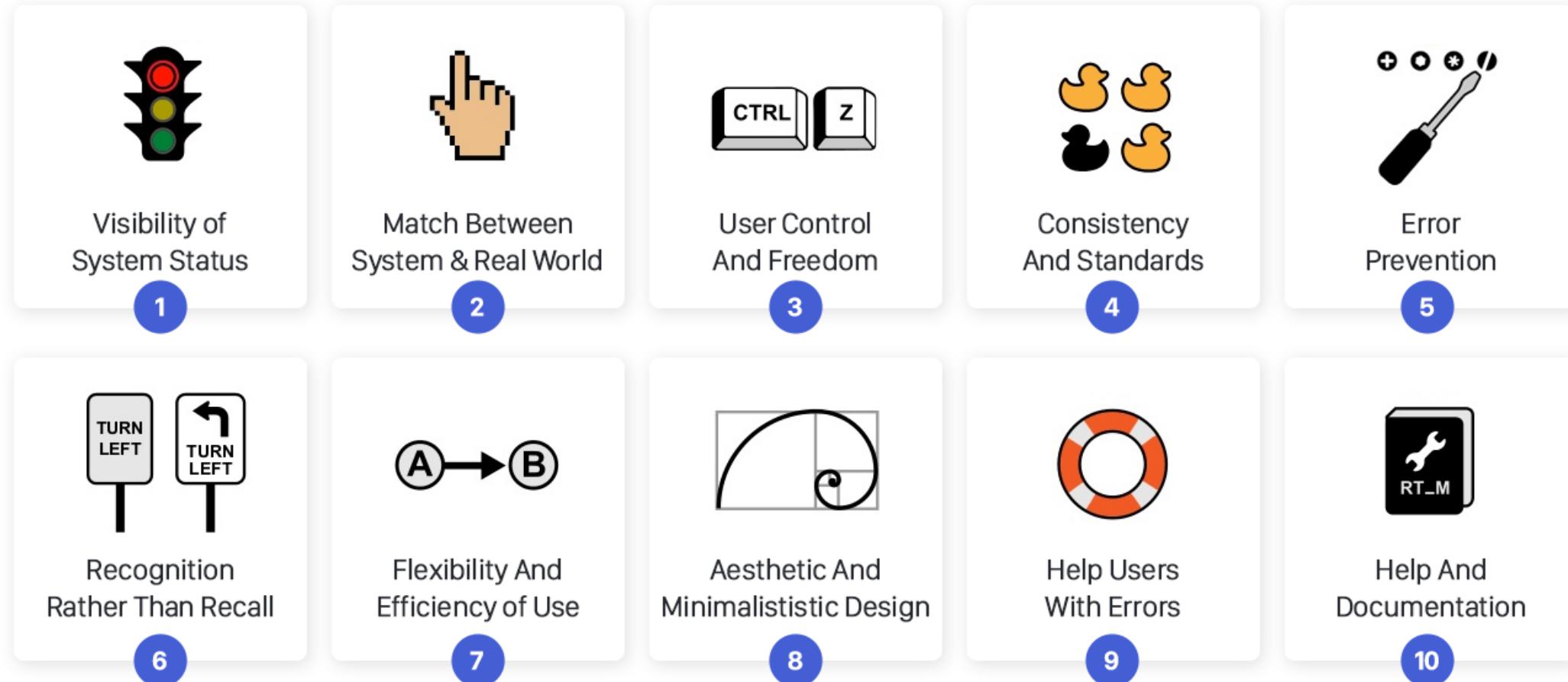
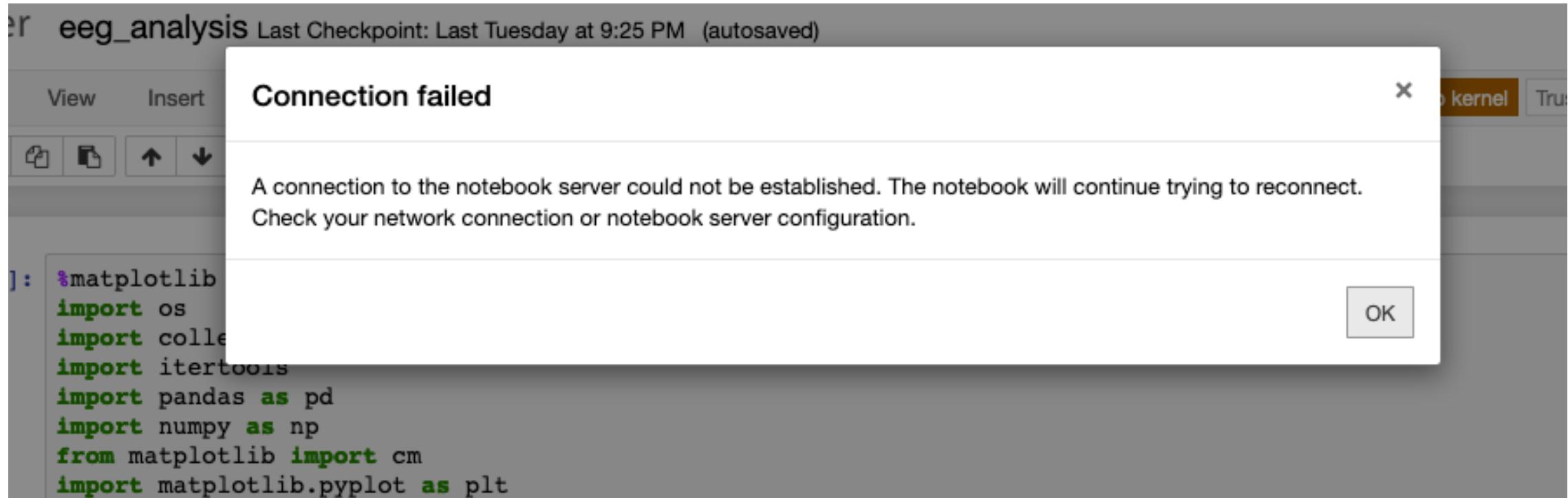


Image Source:

<https://uxdesign.cc/10-usability-heuristics-every-designer-should-know-129b9779ac53>

Kahoot!

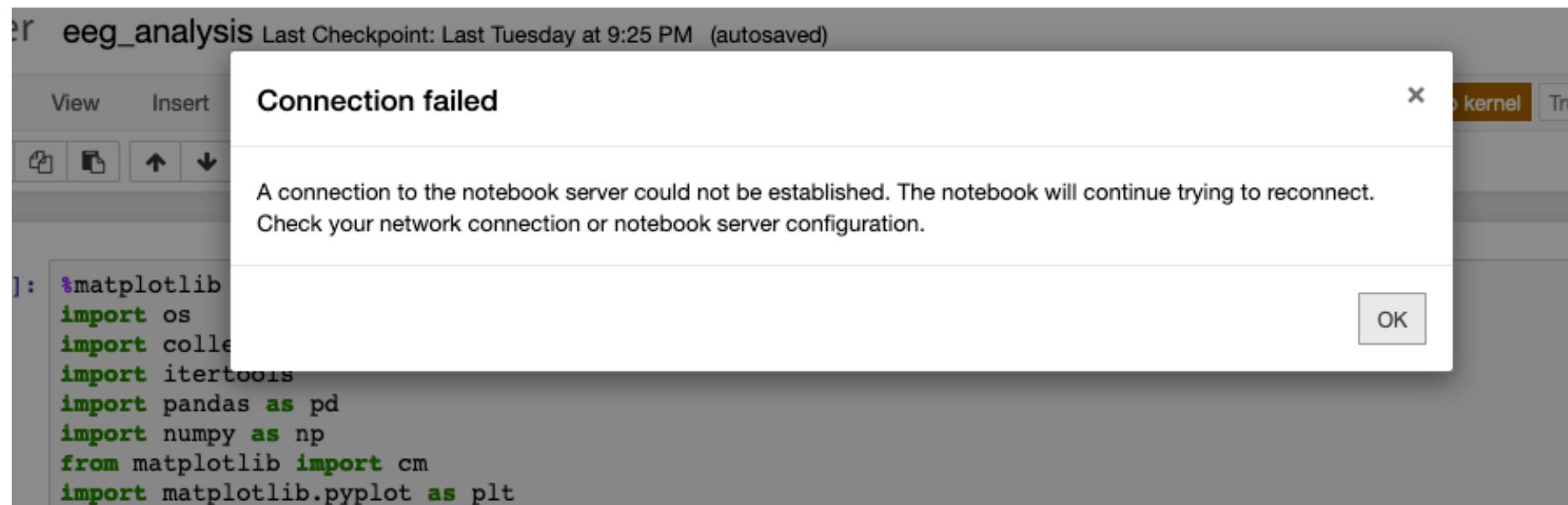
Which Nielsen Principle applies best here?



Nielsen's Principles - #9

Help users recognize, diagnose, and recover from errors

Error messages in plain language (no codes), precise, and constructive



Which Nielsen Principle applies best here?

The screenshot shows a Jupyter Notebook interface. The top menu bar includes File, Edit, View, Insert, Cell, Kernel, Widgets, and Help. To the right of the menu is a toolbar with various icons. The status bar at the top right shows "Not Trusted" and "Python 3". A red circle highlights the "Not Trusted" status. Another red circle highlights the Python 3 kernel icon.

The main area contains two code snippets:

```
# save file to csv
result_filename = 'results/csv_files/60_sec_intervals/00_numerical_diffs_' + measure +
'.csv'
avg_diffs = diff_avg_df[avg_cols].mean(axis=0)
print('measure')
print(measure)
print('avg diffs across participants')
print(avg_diffs)
print()
print()
```



```
In [ * ]: titl = 'Average difference between conditions in ' + measure + '-rate across participants'
ax = diff_avg_df.plot.bar(x='PID', figsize=(16,10), grid=True, title=titl)
ax.set_xlabel("participant")
ax.set_ylabel("difference")
```

A red arrow points to the In [*]: prompt in the bottom cell, and a red circle highlights the cell number.

Nielsen's Principles - #1

Visibility of System Status

Keep users informed about what is going on, through appropriate feedback within reasonable time

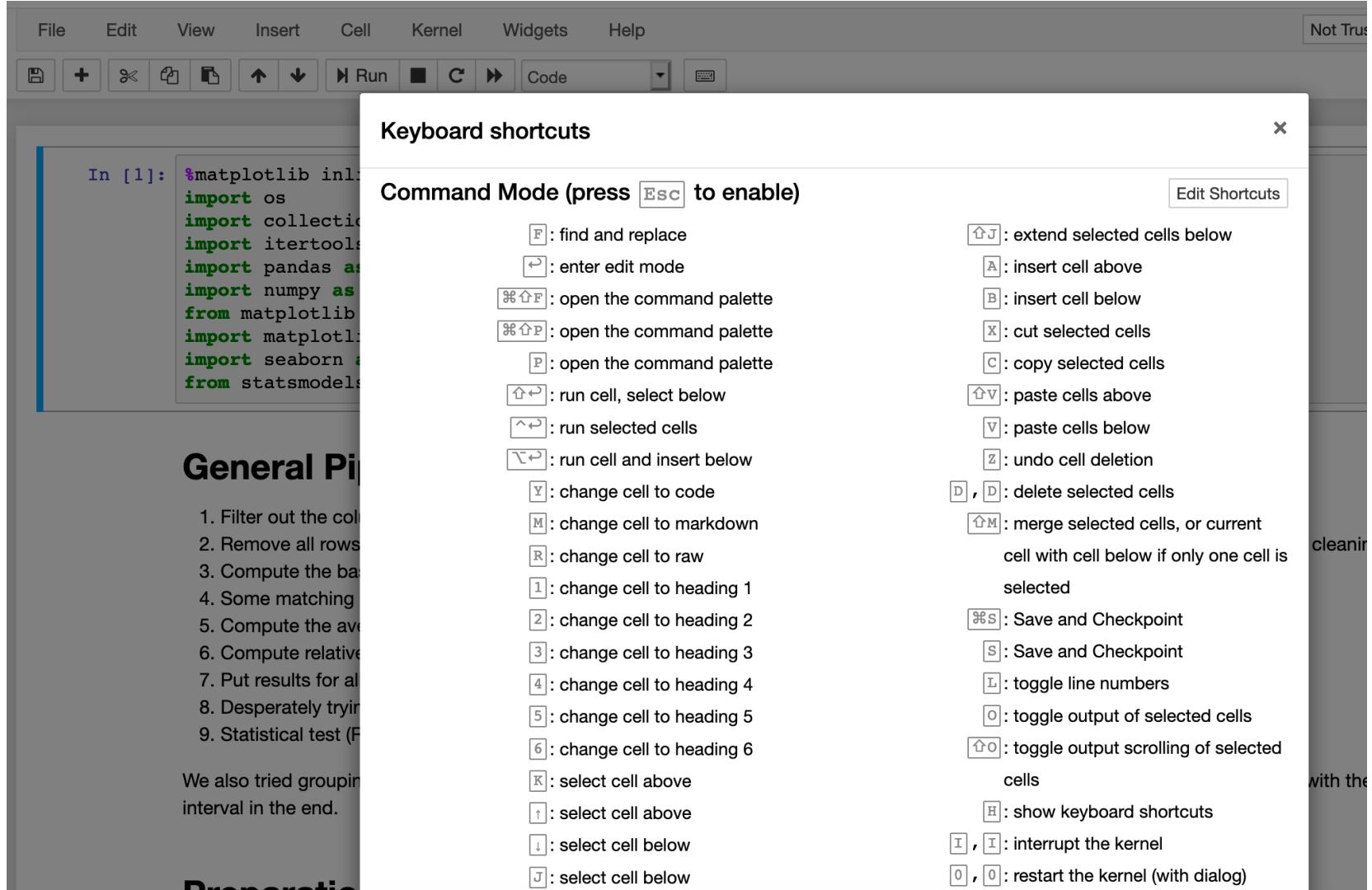
The screenshot shows a Jupyter Notebook interface. At the top, there is a menu bar with File, Edit, View, Insert, Cell, Kernel, Widgets, and Help. To the right of the menu is a toolbar with various icons. Further right is a status bar showing "Not Trusted" and "Python 3". A red circle highlights the "Not Trusted" status. Another red circle highlights the Python 3 kernel selection. The main area contains code in a code cell:

```
# save file to csv
result_filename = 'results/csv_files/60_sec_intervals/00_numerical_diffs_' + measure +
'.csv'
avg_diffs = diff_avg_df[avg_cols].mean(axis=0)
print('measure')
print(measure)
print('avg diffs across participants')
print(avg_diffs)
print()
print()
```

Below this, another code cell is shown with a red arrow pointing to its index [*]. A red circle highlights the index. The code in this cell is:

```
In [ * ]: titl = 'Average difference between conditions in ' + measure + '-rate across participants'
ax = diff_avg_df.plot.bar(x='PID', figsize=(16,10), grid=True, title=titl)
ax.set_xlabel("participant")
ax.set_ylabel("difference")
```

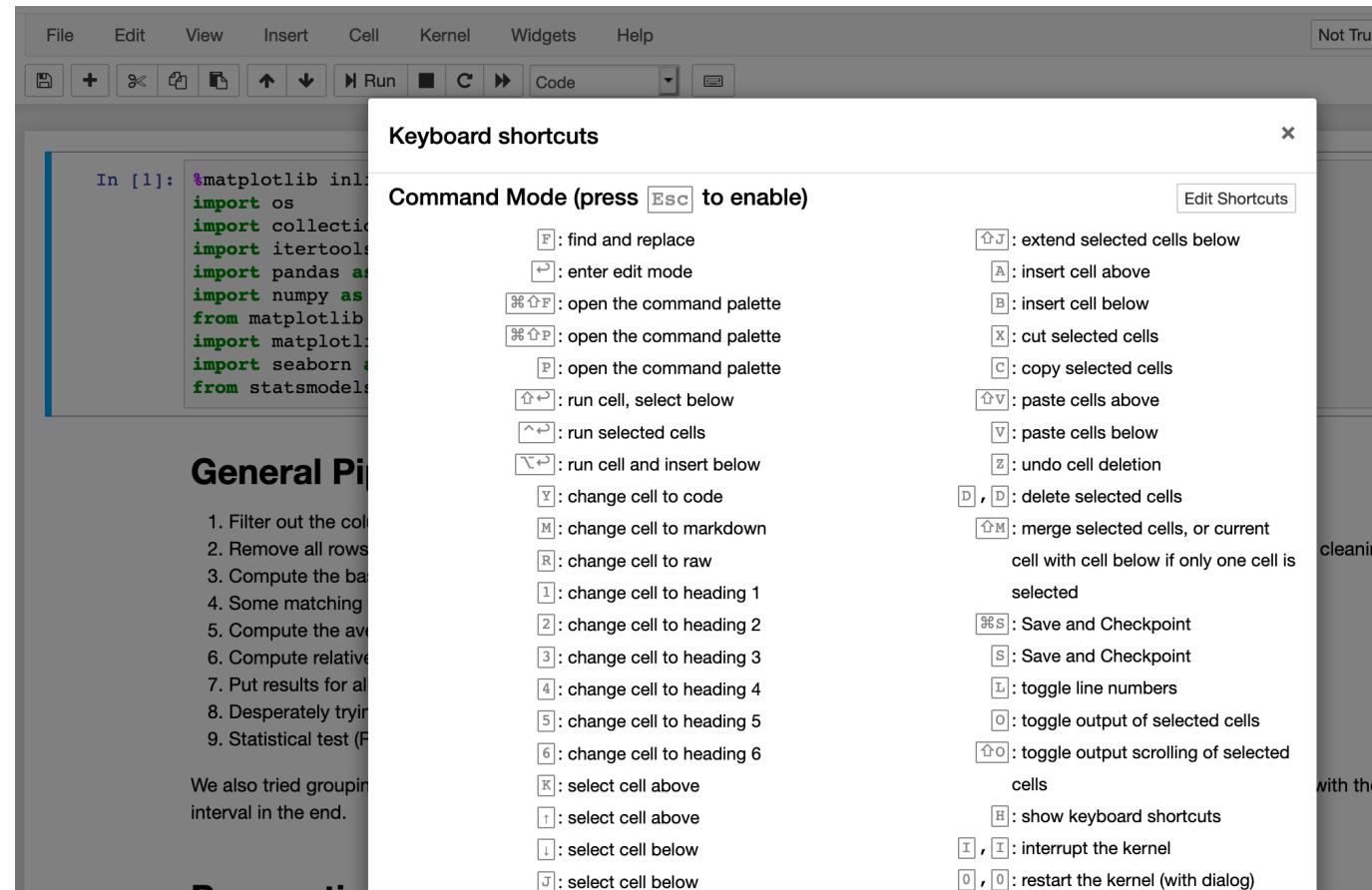
Which Nielsen Principle applies best here?



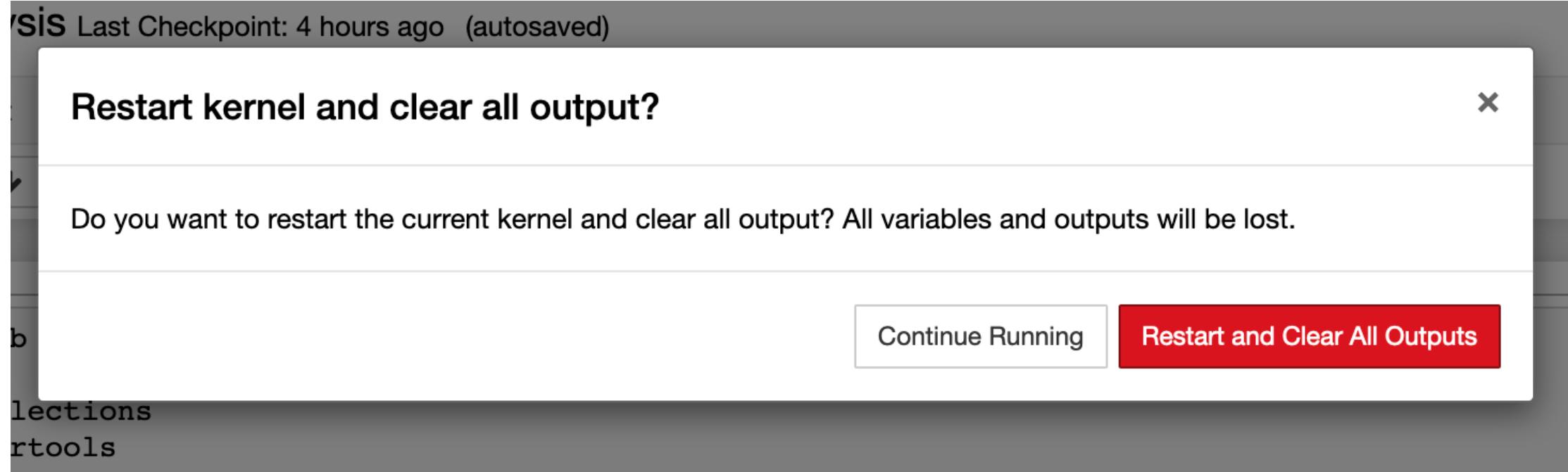
Nielsen's Principles - #7

Flexibility and efficiency of use

Accelerators – unseen by the novice user – may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.



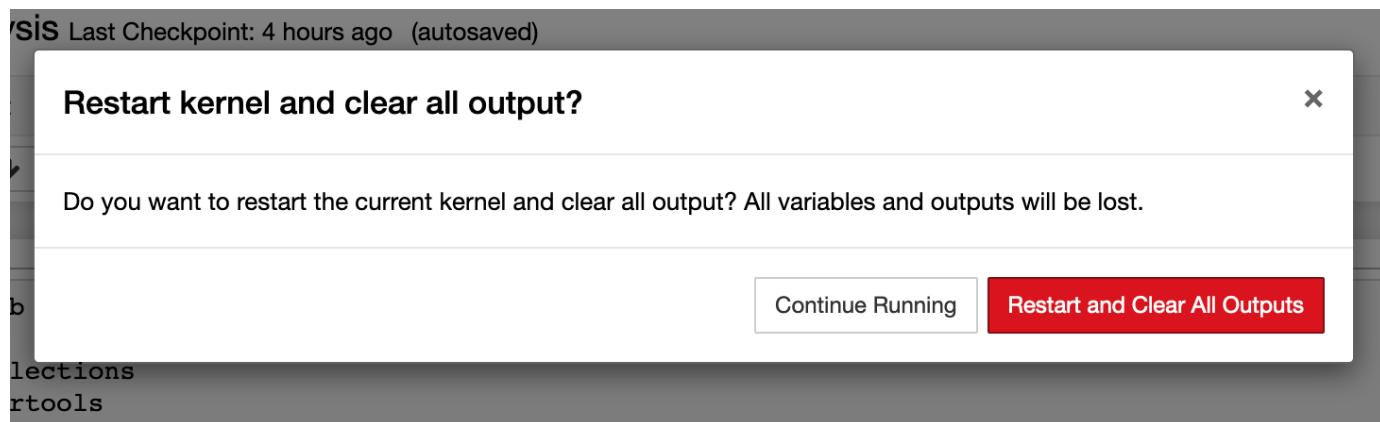
Which Nielsen Principle applies best here?



Nielsen's Principles - #5

Error Prevention

- Preventing errors is better than good error message
- Eliminate error-prone conditions or check and present users with confirmation option



Which Nielsen Principle applies best here?

Files Running Clusters

Select items to perform actions on them.

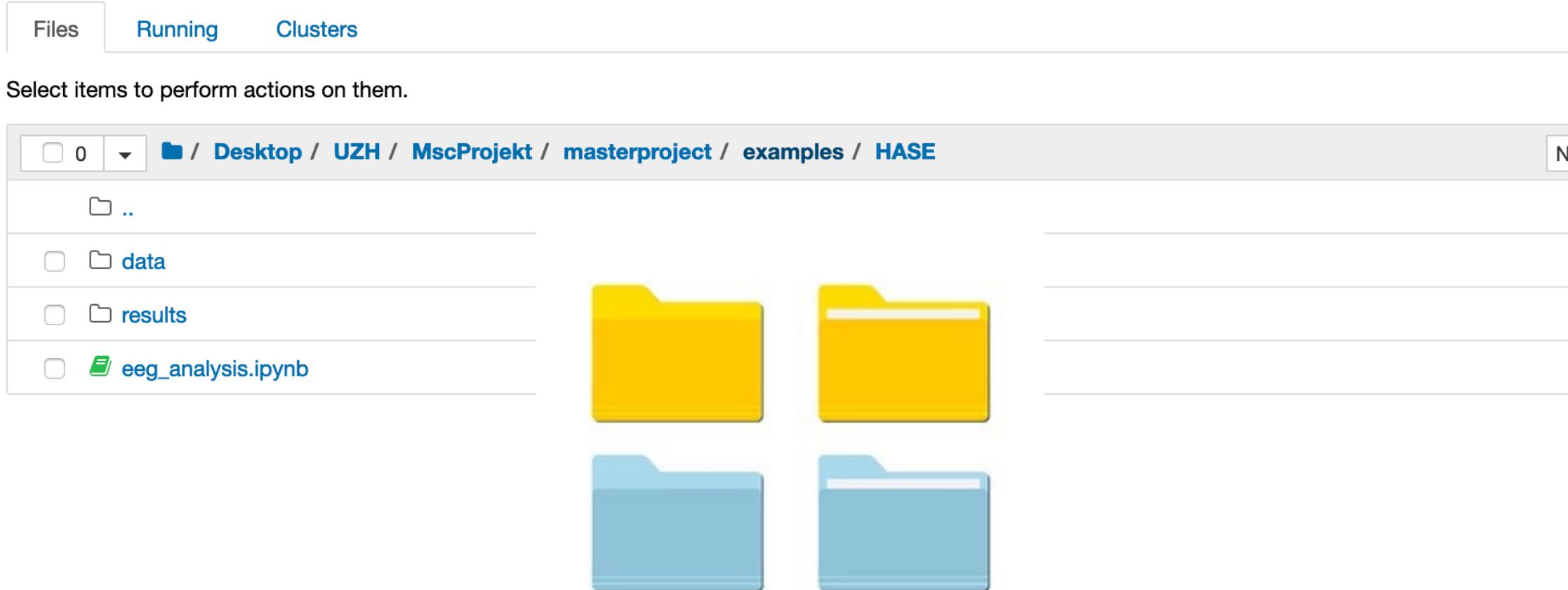
0  / Desktop / UZH / MscProjekt / masterproject / examples / HASE

..

data

results

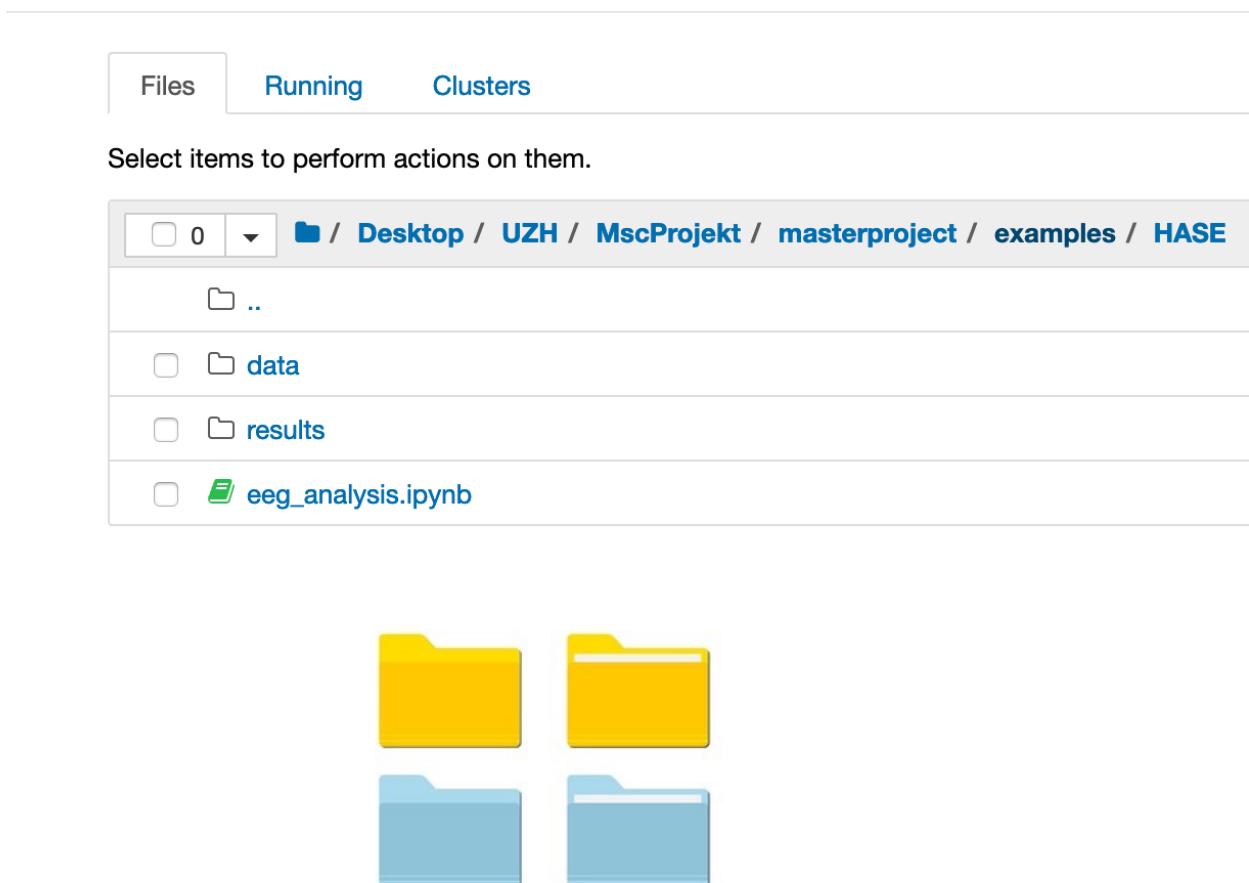
 eeg_analysis.ipynb



Nielsen's Principles - #2

Match the real world

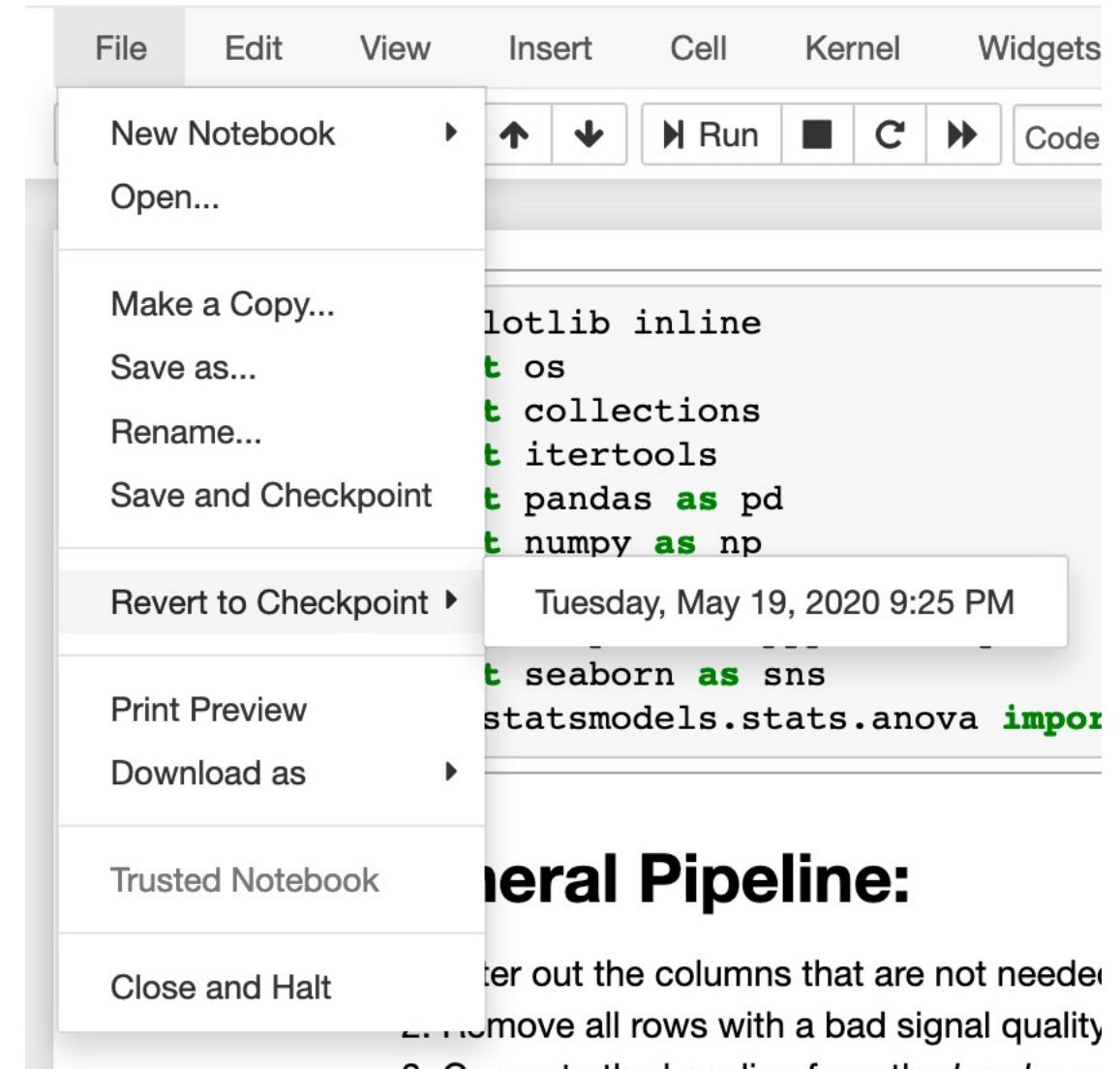
- System should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms
- Follow real-world conventions
- Make information appear in natural and logical order



Nielsen's Principles - #3

User Control and Freedom

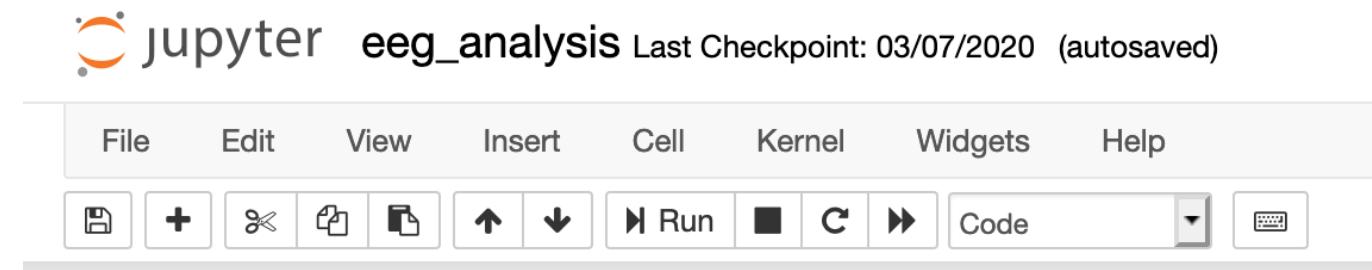
- Provide “emergency exit” without having to go through extended dialogue
- Support undo and redo



Nielsen's Principles - #4

Consistency and Standards

Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.



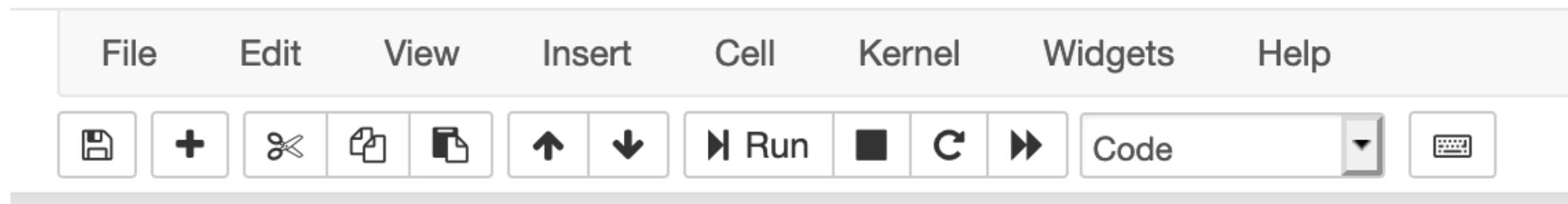
Nielsen's Principles - #6

Recognition rather than recall

Minimize user's memory load
by making objects, actions, and
options visible.



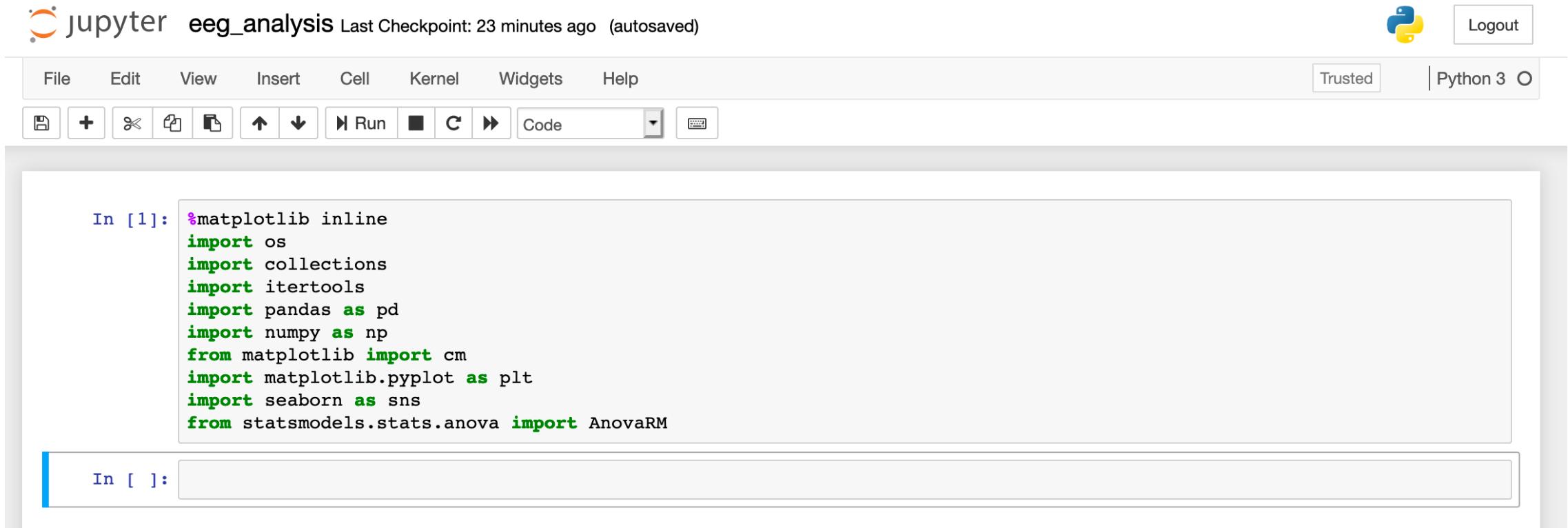
jupyter eeg_analysis Last Checkpoint: 03/07/2020 (autosaved)



Nielsen's Principles - #8

Aesthetic and Minimalist Design

Dialogues should not contain information which is irrelevant or rarely needed



The screenshot shows a Jupyter Notebook interface with the following details:

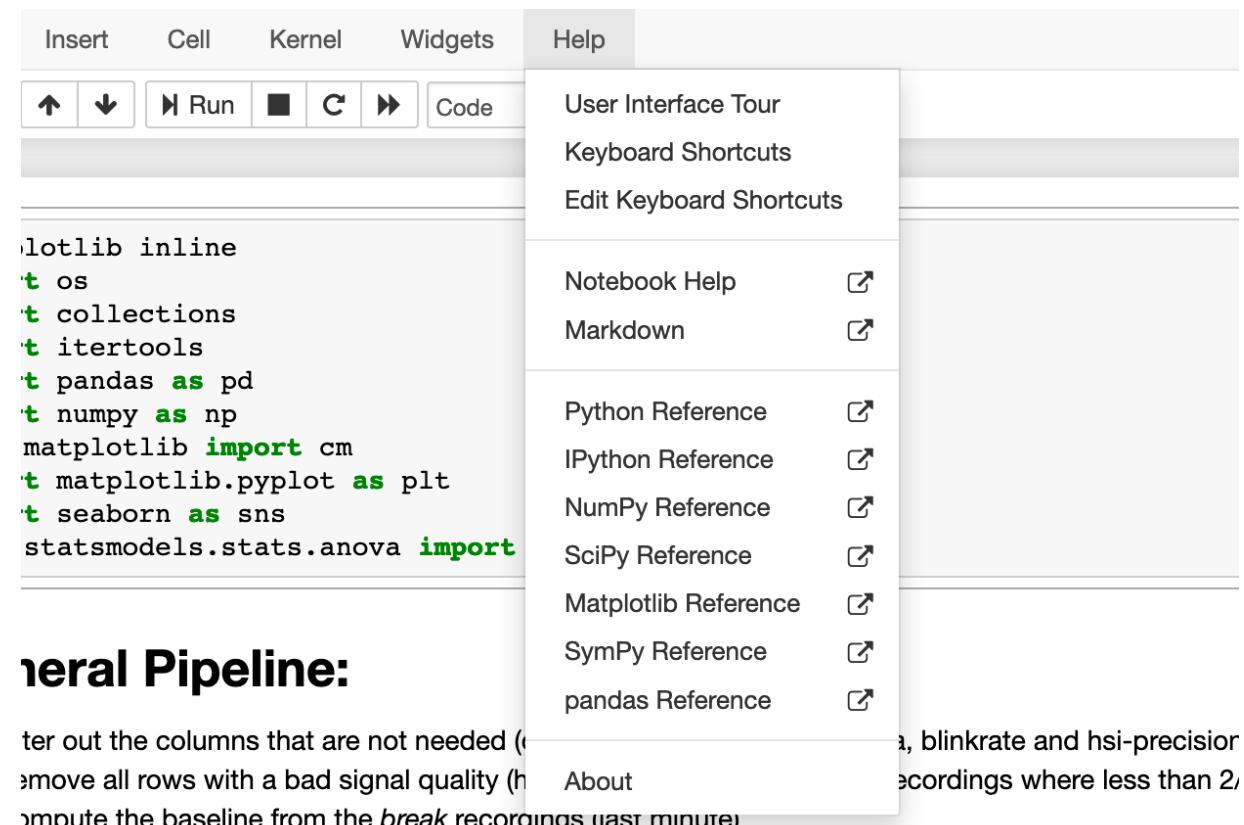
- Header:** jupyter eeg_analysis Last Checkpoint: 23 minutes ago (autosaved)
- Toolbar:** File, Edit, View, Insert, Cell, Kernel, Widgets, Help, Trusted, Python 3
- Toolbar Icons:** Save, New, Open, Close, Run, Cell, Code, Cell Kernel, Cell Type
- Code Cell (In [1]):**

```
%matplotlib inline
import os
import collections
import itertools
import pandas as pd
import numpy as np
from matplotlib import cm
import matplotlib.pyplot as plt
import seaborn as sns
from statsmodels.stats.anova import AnovaRM
```
- Input Cell Placeholder:** In []:

Nielsen's Principles - #10

Help and Documentation

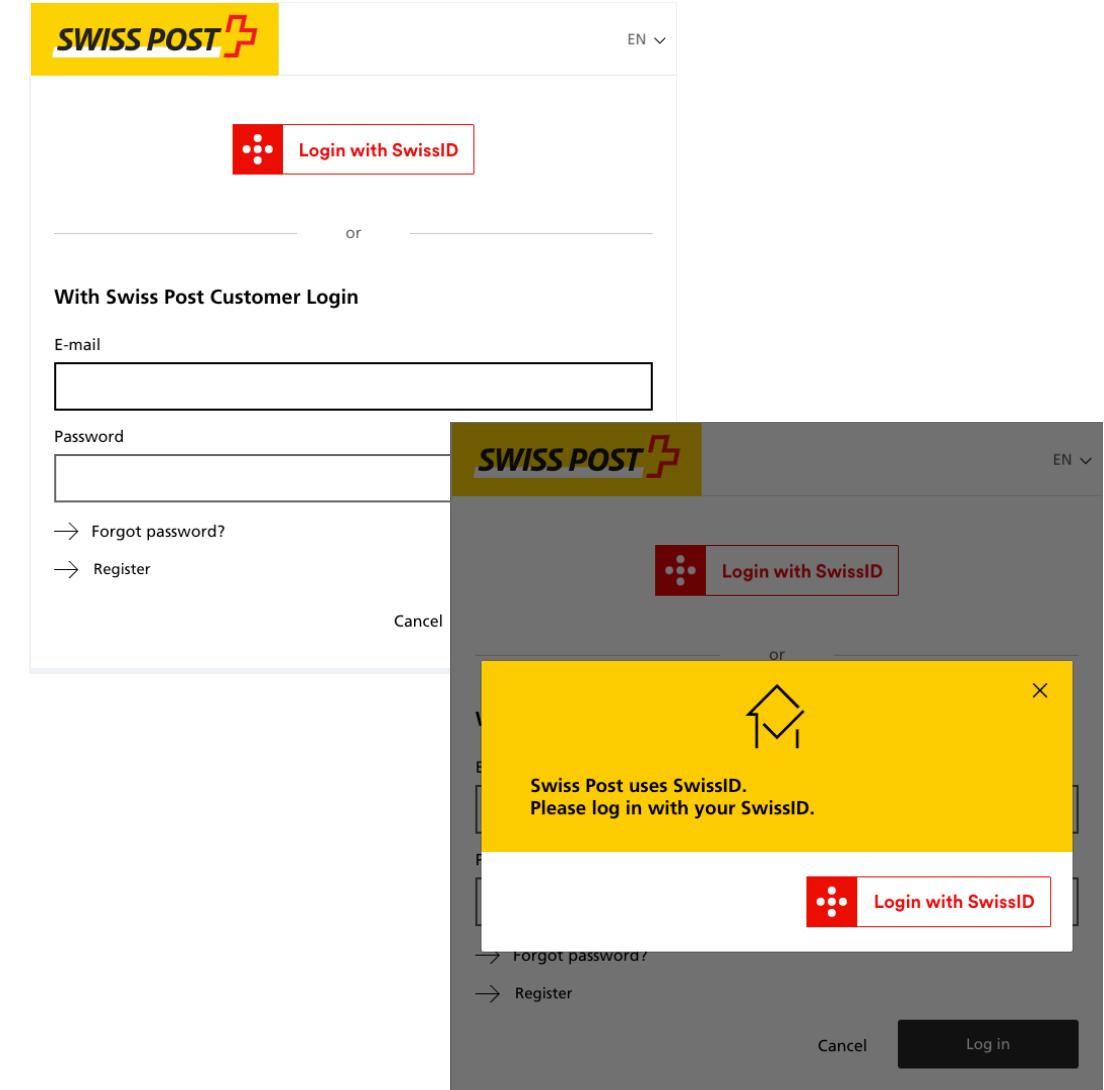
Help should be searchable,
focused on user's task, concrete
and short.



Exercise (2 mins)

Check out the two screenshots of the Swiss Post login dialogue. The top-left one is the login page to the Swiss Post Website. You have the options to Login with SwissID or your Customer login. If you use your customer login, you receive the message on the bottom-right screenshot saying "please log in with your SwissID".

Which of Nielsen's Principle(s) are violated?



When to Apply Usability Methods?

- Early and often!
- You can test with working code, a prototype, high-fidelity user interface mock-ups or even sketches on paper (paper prototyping)
- The earlier you can validate a certain approach, the less time spent writing wasted code
- **Prototype and test often!** before and during development; best to have an iterative testing cycle, not a one-off phase

Usability Cost/Benefit

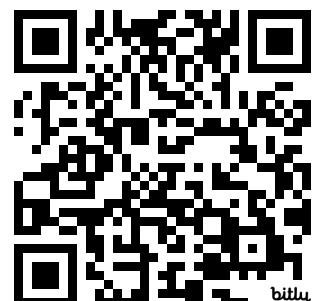
- Different methods take different amounts of time / money
- The expert evaluation methods are generally cheaper and you can still find the biggest usability problems

article from Nielsen on "Discount Usability Methods"

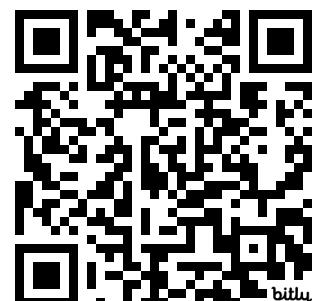
http://www.useit.com/papers/guerrilla_hci.html

Exercise (2 mins)

- Please answer the survey for your group (based on
- You are not expected to know the answer – do not Google it, just estimate and don't think too long about it
- Please only open the URL for your group
- 2 Groups:



Family name starting
with A-L:
<https://bit.ly/3wJocQN>



Family name starting
with M-Z:
<https://bit.ly/3Kkt5Ty>

Biases – quick outlook

Learning Objectives

Be able to:

- explain biases in software engineering and why they are important to be aware of

Cognitive Bias

“A cognitive bias is a systematic pattern of deviation from norm or rationality in judgment.”

- based on information we have, perceive to have or lack
- “mental shortcuts the human brain produces to quickly help it make sense of what it is seeing”
- may lead to perceptual distortion, inaccurate judgment, illogical interpretation, and severe and systematic errors.

Cognitive Biases

- Affinity Bias
- Anchor Bias
- Confirmation Bias
- Hyperbolic Discounting
- Negativity Bias
- ...

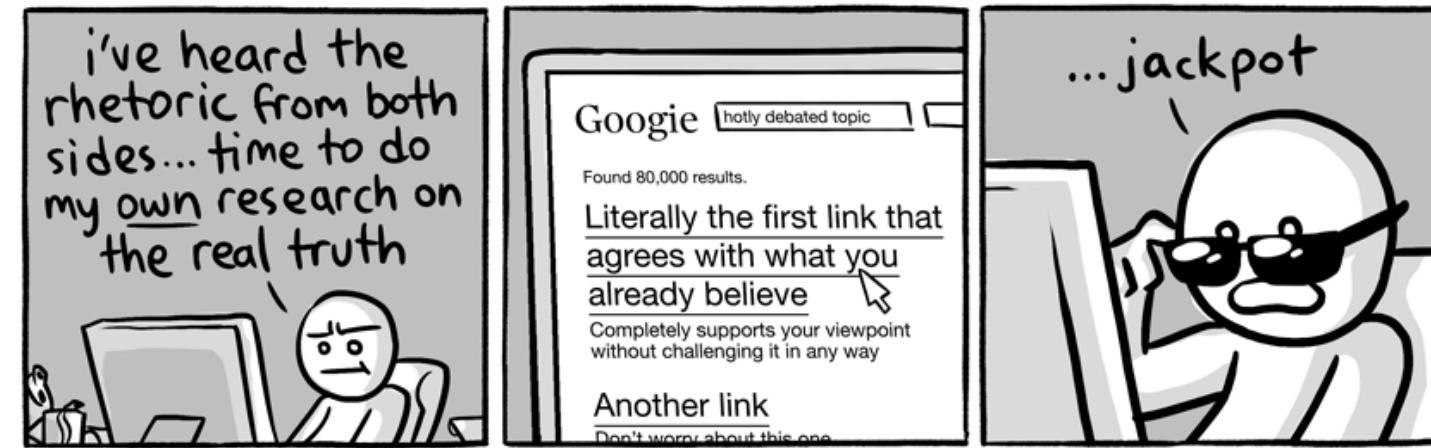


Image Source: <https://chainsawsuit.com/comic/2014/09/16/on-research/>

Cognitive Biases: what to do

- Be aware of them, learn about them, plan for them
 - Be transparent about your design decisions
 - Identify who your users are, what (special) needs they might have, how they use your system,...
 - Use personas / diversified test group
- ...

Gender Mismatch

- Software Development dominated by men
 - Approximately 50% of population are female, most likely a significant part of your user group
 - Gender not binary, but most research focuses on male/female
- Biases with respect to gender that lead to issues in design

Gender Bias Issues



- Car Accidents
 - Female crash test dummies not used until early 2000s
 - Female crash test dummies scaled down male dummies
 - Women 47% more likely to be injured in car crashes
- Smart phones too big for most women's hands

*Examples from Criado Perez 2019, Invisible Women:
Exposing data bias in a world designed for men*

Gender Inclusive Design

- Designing software to be more gender-inclusive can benefit users of all genders
- Not only physiological differences, also in problem solving behaviour and more

The GenderMag Method

(<https://gendermag.org/>)

- Gender Inclusiveness Magnifier
- Method to detect gender-inclusiveness issues
- Set of faceted personas that bring five facets of gender difference research to life
- Embeds use of the personas into a concrete process through a gender-specialized Cognitive Walkthrough
- Demo at <https://www.youtube.com/watch?v=e5Ju0qjeztl>

The Facets (1)

- Motivations to use software
 - Females: motivation to use technology for what it enables them to accomplish
 - Males: motivation sometimes comes from the enjoyment of the technology for its own sake
- Information Processing Styles
 - Females: gather fairly complete information before proceeding
 - Males: follow first promising information, potentially backtracking

The Facets (2)

- Computer self-efficacy
 - Tend to be lower for females
- Risk aversion
 - Females tend to be more risk averse
- Tinkering
 - Females less likely to tinker with features new to them
 - Impacts which feature of software females vs males will elect to use

The Personas

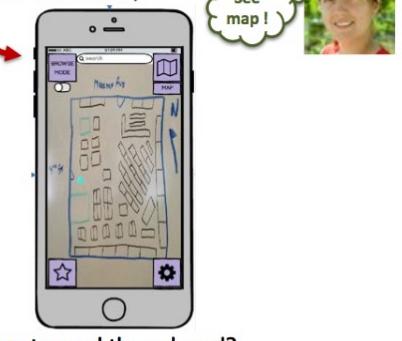
Tim, Abi, and Pat

- Only differ in the five facets
- Tim's facet values most seen in men
- Abi's facet values most seen in women that are the most different from Tim
- Pat's facet values add coverage of a large fraction of people different to Tim and Abi



GenderMag Process

Perform steps 1-2, then repeat steps 3a-e until the scenario is finished

<ul style="list-style-type: none">• 1. Pick a persona. eg: Abby• 2. Pick a use case/scenario in your tool, eg:<ul style="list-style-type: none">– in Book Store Navigator app...– “Find science fiction books” 	<ul style="list-style-type: none">• 3a-b. Pick a Subgoal for that scenario. eg: Subgoal #1: “See bookstore map”. Q: Will Abby have formed this sub-goal...?<ul style="list-style-type: none">• Yes/no/maybe. Why? Consider Abby's Motivations... 
<ul style="list-style-type: none">• 3c-d. Pick an Action for that subgoal. Action #1: “Tap ‘Browse Off’”:<ul style="list-style-type: none">– Q1. Will Abby <u>know what to do?</u><ul style="list-style-type: none">• Yes/no/maybe. Why? Consider Abby's ... Tinkering  <p>First answer Q1. <u>After answering it, then perform the action.</u></p>	<ul style="list-style-type: none">– 3e. Q2. If she performs the action, producing will Abby <u>see progress toward the subgoal?</u><ul style="list-style-type: none">• Yes/no/maybe. Why? Consider Abby's Self-Efficacy & ... 

Personas

Example: Abi Persona from GenderMag, a CW to discover gender inclusiveness issues

Abi (Abigail/Abishek)



- 28 Years Old
- Employed as an Accountant
- Lives in Cardiff, Wales

Abi has always liked music. When she is on her way to work in the morning, she listens to music that spans a wide variety of styles. But when she arrives at work, she turns it off, and begins her day by scanning all her emails first to get an overall picture before answering any of them. (This extra pass takes time but seems worth it.) Some nights she exercises or stretches, and sometimes she likes to play computer puzzle games like Sudoku

Background and Skills

Abi works as an accountant. She is comfortable with the technologies she uses regularly, but she just moved to this employer 1 week ago, and their software systems are new to her. Abi says she's a "numbers person", but she has never taken any computer programming or IT systems classes. She likes Math and knows how to think with numbers. She writes and edits spreadsheet formulas in her work. In her free time, she also enjoys working with numbers and logic. She especially likes working out puzzles and puzzle games, either on paper or on the computer.

<https://gendermag.org>

Ethics

Why should we consider ethical behaviour beyond what is explicitly legislated?

- Lots of legal behaviours that are a bad idea societally
- Not all positive behaviour could or should be legislated
- Considering only what is legal will be pretty problematic for society
- As software becomes more and more (and more!) prevalent in society we, as developers, have to consider not just what is legal, but what is moral

ACM Code of Ethics

1. GENERAL ETHICAL PRINCIPLES.

- 1.1 Contribute to society and to human well-being, acknowledging that all people are stakeholders in computing.
- 1.2 Avoid harm.
- 1.3 Be honest and trustworthy.
- 1.4 Be fair and take action not to discriminate.
- 1.5 Respect the work required to produce new ideas, inventions, creative works, and computing artifacts.
- 1.6 Respect privacy.
- 1.7 Honor confidentiality.

2. PROFESSIONAL RESPONSIBILITIES.

- 2.1 Strive to achieve high quality in both the processes and products of professional work.
- 2.2 Maintain high standards of professional competence, conduct, and ethical practice.
- 2.3 Know and respect existing rules pertaining to professional work.
- 2.4 Accept and provide appropriate professional review.
- 2.5 Give comprehensive and thorough evaluations of computer systems and their impacts, including analysis of possible risks.
- 2.6 Perform work only in areas of competence.
- 2.7 Foster public awareness and understanding of computing, related technologies, and their consequences.
- 2.8 Access computing and communication resources only when authorized or when

compelled by the public good.

- 2.9 Design and implement systems that are robustly and usably secure.

3. PROFESSIONAL LEADERSHIP PRINCIPLES.

- 3.1 Ensure that the public good is the central concern during all professional computing work.
- 3.2 Articulate, encourage acceptance of, and evaluate fulfillment of social responsibilities by members of the organization or group.
- 3.3 Manage personnel and resources to enhance the quality of working life.
- 3.4 Articulate, apply, and support policies and processes that reflect the principles of the Code.
- 3.5 Create opportunities for members of the organization or group to grow as professionals.
- 3.6 Use care when modifying or retiring systems.
- 3.7 Recognize and take special care of systems that become integrated into the infrastructure of society.

4. COMPLIANCE WITH THE CODE.

- 4.1 Uphold, promote, and respect the principles of the Code.
- 4.2 Treat violations of the Code as inconsistent with membership in the ACM.

Ethics Scenario – Intellectual Property

[if time allows]

In order to protect against unauthorized use of your software, your company has built in an automatic kill switch that prevents it from running after a specific amount of time. An intensive care unit at the local hospital started using your software a year ago. The unit hasn't paid any of their bills and the kill switch is about to trigger. If the kill switch remains in place, the hospital will not be able to function as critical equipment will be disabled. You are capable of removing the kill switch for the hospital. What do you do?

- Edit the software to remove the kill switch
- Do nothing, allowing the kill switch to activate

Ethics Scenario – User data collection [if time allows]

Your company has been collecting anonymous usage statistics for their products for many years, but have recently been struggling to acquire new users, causing the company to consider scaling down operations. Seeing your company struggle and knowing the value of its customer data, an advertising company approaches you to use your company's user data to improve their ad recommendations. Your privacy policy does not explicitly mention selling user data to others, but turning down this offer may result in employees being fired. You are in charge of this decision; what do you do?

- Sign a contract with the advertising company
- Decline the offer with the advertising company

Quiz

Quiz

1. What is the main ethical problem if an IT consultant recommends software to a client while secretly receiving commissions from the software vendor. (only choose one)
 - A) Professional competence
 - B) Conflict of interest
 - C) Respect for privacy
 - D) Compliance with legal requirements

Quiz

2. Which one of the listed Nielsen's principles for interaction design is mostly violated in the following picture:
- A. User control and freedom
 - B. Aesthetic and minimalist design
 - C. Help users recognize, diagnose, and recover from errors
 - D. Flexibility and efficiency of use



Quiz

3. Efficiency and effectiveness are both about how fast users can accomplish their tasks. [True / False]

4. A UX designer is creating a fitness app primarily based on their own workout preferences and habits. For each of the following statements mark whether they are true or not.
 - A. This approach risks excluding users with different fitness levels and goals.
 - B. This approach is likely to result in a biased product.