

# Week 2-3

# **Design Principles: Part 1**

SFWRENG 4HC3/6HC3 Human Computer Interfaces

*\* Slides adapted from previous instructors of COMPSCI/SFWRENG 4HC3/6HC3*

# List of Usability & UX Goals

## Usability

- Effectiveness
- Efficiency
- Safety
- Utility
- Learnability
- Memorability

## UX Goals

- Satisfying
- Motivating
- Enjoyable
- Fun
- Entertaining
- Rewarding
- Helpful
- Emotionally fulfilling
- Aesthetically pleasing
- Supportive of creativity
- .....

# Week 2 Goals Overview

- ~~Monday~~
  - ~~Interface and Interaction~~
- **Wednesday**
  - ~~Usability and UX~~
- **Friday**
  - **Design Principles: Part 1**

# WHY?

Why us as software engineers need to know HCD (in practice)?

- Sometimes you need to play the role of UX/UI designers
  - Small companies/teams don't have enough resources
  - Advocate for user-centered products
- Know the bigger picture about what problem you are solving
  - Helps you better solve the problem
  - Helps when you transition to more senior roles (knowing the bigger picture)

# Fundamental Design Principles

- **Discoverability (Visibility)**
- **Feedback**
- Conceptual Model
- Affordances
- Signifier
- **Mappings**
- **Constraints**

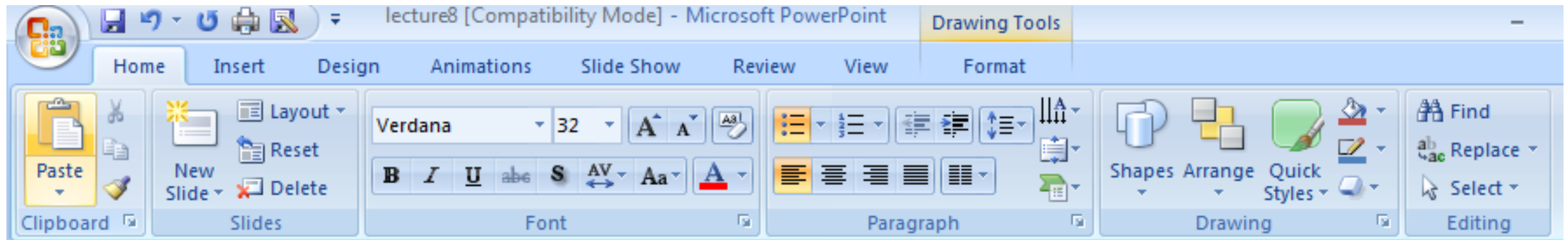
*Seven Fundamental Design Principles* by Don Norman from “The Design of Everyday Things”

# Design Principles: **Discoverability**

## **Discoverability (Visibility) of system capability**

- Make core user functions **clearly apparent**
  - (e.g., toolbars vs. menus)
- **Hide** secondary user functions
- **Visible properties guide users** as to what to do next
- **Structure** enhances discoverability

# Discoverability: Example #1



# Discoverability: Example #2

## Structure Can Enhance Discoverability

Op.	Flights	Depart	Arrive	Aircraft	Duration	Connections	Tango	Flex	Latitude	Business Class (lowest)	Business Class (flexible)
Direct Flights											
✳	AC256	05:45	09:09	320	2hr24		● \$189	● \$326	● \$795	● \$858	● \$994
✳	AC260	07:50	11:14	321	2hr24		● \$189	● \$326	● \$795	● \$858	● \$994
✳	AC264	10:45	14:09	E90	2hr24		-	● \$348	● \$795	-	● \$994
✳	AC266	12:30	15:54	320	2hr24		● \$289	● \$326	● \$795	● \$858	● \$994
✳	AC276	14:45	18:09	319	2hr24		● \$189	● \$326	● \$795	● \$858	● \$994
✳	AC270	16:20	19:42	E90	2hr22		● \$289	● \$326	● \$795	● \$858	● \$994
✳	AC272	18:45	22:09	320	2hr24		● \$189	● \$326	● \$795	● \$858	● \$994
✳	AC262	21:00	00:24 + 1 day	319	2hr24		● \$189	● \$326	● \$795	● \$858	● \$994
Connecting Flights											
✳	1 AC8596	07:05	10:37	CRA	5hr19	Montreal (YUL)	-	● \$725	● \$1334	● \$1376	● \$1649
✳	AC411	12:00	13:24	320							
✳	1 AC8596	07:05	10:37	CRA	7hr19	Montreal (YUL)	-	● \$595	● \$1334	● \$1376	● \$1649
✳	AC415	14:00	15:24	333							

Departs	Arrives	Flight Info	Econo	Flex	Plus
Winnipeg (YWG) Mon Oct 24 5:00 AM	Toronto (YYZ) Mon Oct 24 8:25 AM	WS 518 YWG to YYZ Nonstop   Duration 2h 25m Operated by WESTJET	N/A	● \$357.13 1 seat(s) left	● \$552.43
Winnipeg (YWG) Mon Oct 24 8:30 AM	Toronto (YYZ) Mon Oct 24 11:55 AM	WS 522 YWG to YYZ Nonstop   Duration 2h 25m Operated by WESTJET	N/A	● \$357.13 2 seat(s) left	● \$552.43
Winnipeg (YWG) Mon Oct 24 4:05 PM	Toronto (YYZ) Mon Oct 24 7:29 PM	WS 476 YWG to YYZ Nonstop   Duration 2h 24m Operated by WESTJET	N/A	● \$284.68	● \$552.43
Winnipeg (YWG) Mon Oct 24 7:45 PM	Toronto (YYZ) Mon Oct 24 11:10 PM	WS 536 YWG to YYZ Nonstop   Duration 2h 25m Operated by WESTJET	● \$189.13 6 seat(s) left	● \$357.13	● \$463.18 4 seat(s) left
Winnipeg (YWG) Mon Oct 24 9:30 AM	Toronto (YYZ) Mon Oct 24 6:53 PM	WS 3418 YWG to YQT Duration 1h 22m Operated by WESTJET ENCORE  WS 3122 YQT to YYZ Duration 1h 53m Operated by WESTJET ENCORE  1 stop Total duration 8h 23m	● \$239.66 1 seat(s) left	● \$490.61	● \$730.01 2 seat(s) left
Winnipeg (YWG) Mon Oct 24 9:47 AM	Toronto (YYZ) Mon Oct 24 2:53 PM	WS 318 YWG to YOW Duration 2h 25m Operated by WESTJET  WS 3465 YOW to YYZ Duration 1h 8m Operated by WESTJET ENCORE  1 stop Total duration 4h 6m	N/A	● \$425.51	● \$559.91 4 seat(s) left



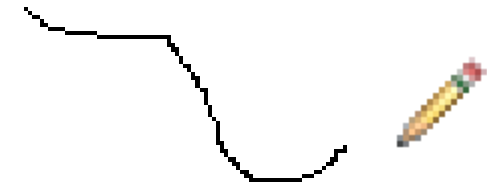
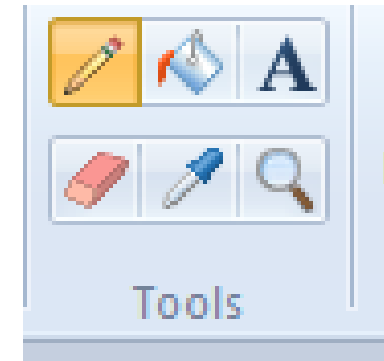
# Design Principles: **Feedback**

Feedback for the user

- **Continuously inform** the user about what the system is doing
- How **the system** is **interpreting the user's input**
- User should at all times be aware of what is going on

# Feedback: Example #1

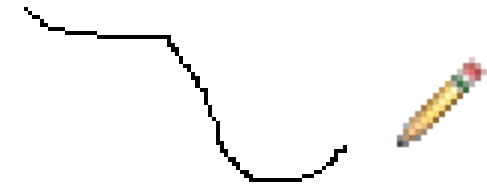
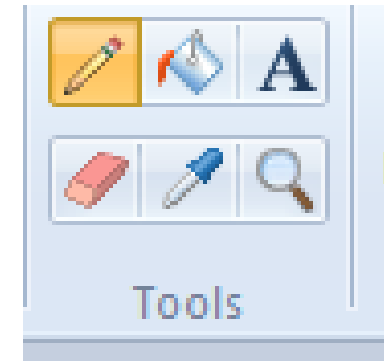
What type of feedback is being provided here?



# Feedback: Example #1

**What type of feedback is being provided here?**

1. What item was selected
2. What mode the user is in now
3. How the system is interpreting the users actions



# Design Principles: **Feedback**

Lack of feedback **relates directly** to one of Don Norman's gulfs

**Which one is it and why?**

# Design Principles: **Feedback**

Lack of feedback relates directly to one of Don Norman's gulfs

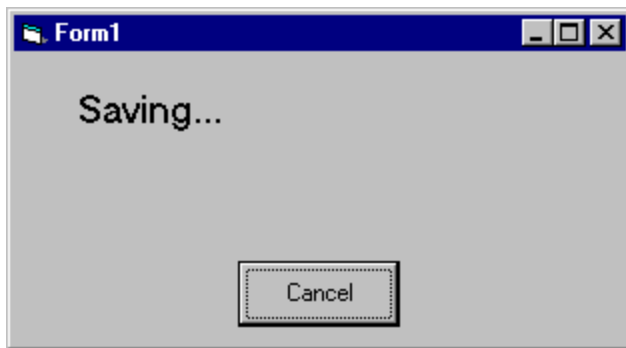
Which one is it and why?

## **Gulf of evaluation**

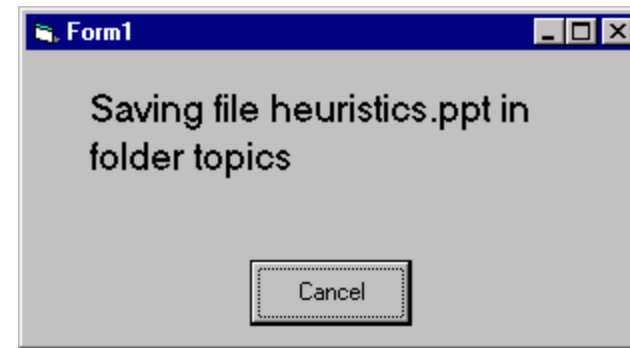
- User does not receive **enough information** from the system to construct an understanding
- User has trouble **interpreting system output** in light of their goals

# Design Principles: **Feedback**

Feedback should be **as specific as possible** based on **user input**



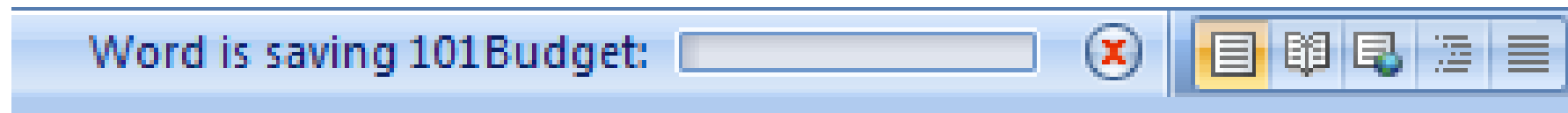
**VS.**



# Design Principles: **Feedback**

And ideally provided **in the context** of the user's action

research and for indentifying and meeting with potential  
er institutions. In my budget I have included funds to suppo:



# Feedback: Example #2

The screenshot shows a web browser window displaying the Oracle Employee Self-Service interface. The browser's address bar shows the URL: `https://www.efs.ualgary.ca:8445/psp/fsprd/EMPLOYEE/ERP/s/WEBLIB_TE_NAV.WEBLIB_FUNCTION.FieldFormula.iScript_`. The page features the Oracle logo and a navigation menu with links for Home, Worklist, Add to Favorites, and Sign out. The main content area is titled "Expense Report" and includes a search section with a "Find an Existing Value" button. Below this, there is a text input field for the "Maximum number of rows to return (up to 300):" with the value "300" entered. The "Search by:" section shows a dropdown menu set to "Report ID" and a text input field for "begins with". A "Search" button and a link to "Advanced Search" are also present. The "Search Results" section displays a table with the following data:

Report ID	Report Description	Name	Empl ID	Report Status	Creation Date
0000207073	Hosting Guests from SMART	Tang,Anthony Hoi Tin	04213948	Pending	2012/10/13

The table also includes navigation links for "View All", "First", "1-34 of 34", and "Last".



# Example #2: where did I click?

The screenshot shows a web browser window with the URL `https://www.efs.ualgary.ca:8445/psp/fsprd/EMPLOYEE/ERP/s/WEBLIB_TE_NAV.WEBLIB_FUNCTION.FieldFormula.iScript_`. The browser's address bar and tabs are visible. The page header includes the Oracle logo and navigation links: Home, Worklist, Add to Favorites, and Sign out. The main content area is titled "Expense Report" and contains a search form. The search form has a "Find an Existing Value" button, a text input for "Maximum number of rows to return (up to 300):" with the value "300", and a "Search by:" dropdown menu set to "Report ID" with a "begins with" text input. A "Search" button and a link to "Advanced Search" are also present. Below the search form, the "Search Results" section displays a table with 6 columns: Report ID, Report Description, Name, Empl ID, Report Status, and Creation Date. The table shows 1-34 of 34 results, with the first result being Report ID 0000207073, Description "Hosting Guests from SMART", Name "Tang,Anthony Hoi Tin", Empl ID 04213948, Status "Pending", and Creation Date 2012/10/13.

**Expense Report**

Enter any information you have and click Search. Leave fields blank for a list of all values.

**Find an Existing Value**

Maximum number of rows to return (up to 300):

**Search by:**  begins with

[Advanced Search](#)

**Search Results**

View All First 1-34 of 34 Last

Report ID	Report Description	Name	Empl ID	Report Status	Creation Date
0000207073	Hosting Guests from SMART	Tang,Anthony Hoi Tin	04213948	Pending	2012/10/13

# Example #2: where is my feedback?

The screenshot shows a web browser window displaying the Oracle Employee Self-Service interface. The browser's address bar shows the URL: `https://www.efs.ualgary.ca:8445/psp/fsprd/EMPLOYEE/ERP/s/WEBLIB_TE_NAV.WEBLIB_FUNCTION.FieldFormula.iScript_`. The page features the Oracle logo and a navigation bar with links for Home, Worklist, Add to Favorites, and Sign out. Below the navigation bar, the breadcrumb trail indicates the user is in the Employee Self-Service section. The main heading is "Expense Report", followed by instructions to enter information and click Search. A section titled "Find an Existing Value" includes a text input for the maximum number of rows (set to 300) and a "Search by" dropdown menu currently set to "Report ID" with a "begins with" text input. A "Search" button and a link to "Advanced Search" are provided. The "Search Results" section shows a table with one result, displaying details for a report titled "Hosting Guests from SMART" by Tang, Anthony Hoi Tin.

**Expense Report**

Enter any information you have and click Search. Leave fields blank for a list of all values.

**Find an Existing Value**

Maximum number of rows to return (up to 300):

**Search by:**  begins with

[Advanced Search](#)

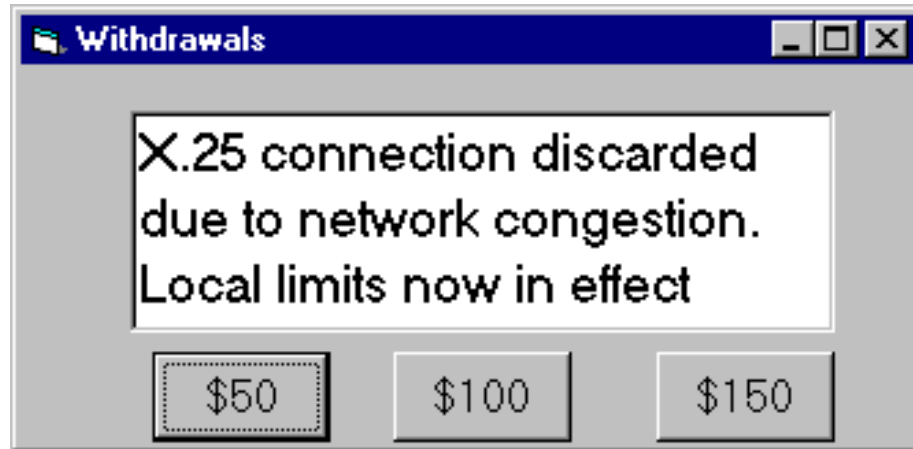
**Search Results**

View All First 1-34 of 34 Last

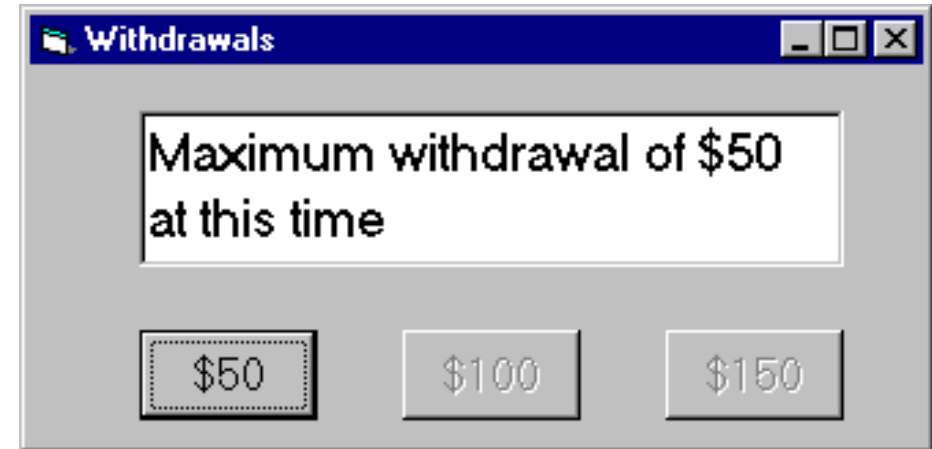
Report ID	Report Description	Name	Empl ID	Report Status	Creation Date
0000207073	Hosting Guests from SMART	Tang,Anthony Hoi Tin	04213948	Pending	2012/10/13

# Design Principles: **Feedback**

System status feedback should be specific, **in the user's language**



**vs.**



# Design Principles: **Feedback**

System status feedback should be specific, **in the user's language**

**Could not login. Valid authentication  
credentials were not provided.**

# Design Principles: **Feedback**

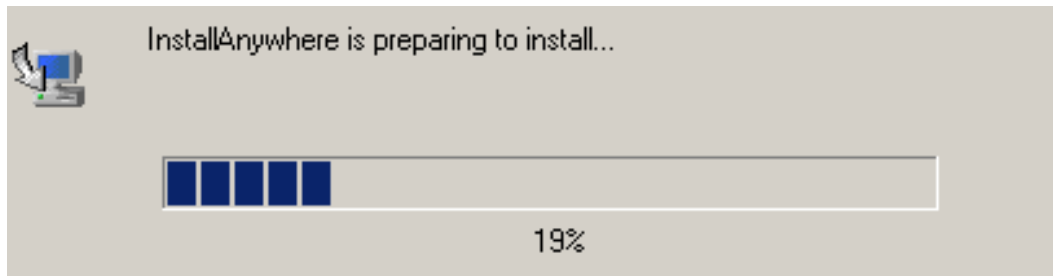
System status feedback should be specific, **in the user's language**

**Could not login. Valid authentication  
credentials were not provided.**

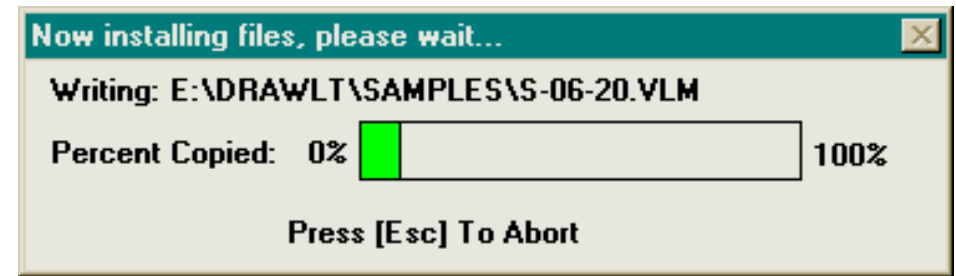
People know the words **“username”** or **“password.”**

# Design Principles: **Feedback**

With longer jobs, **the more detail** you can **provide on the status**, the better



**vs.**



# Design Principles: **Feedback**

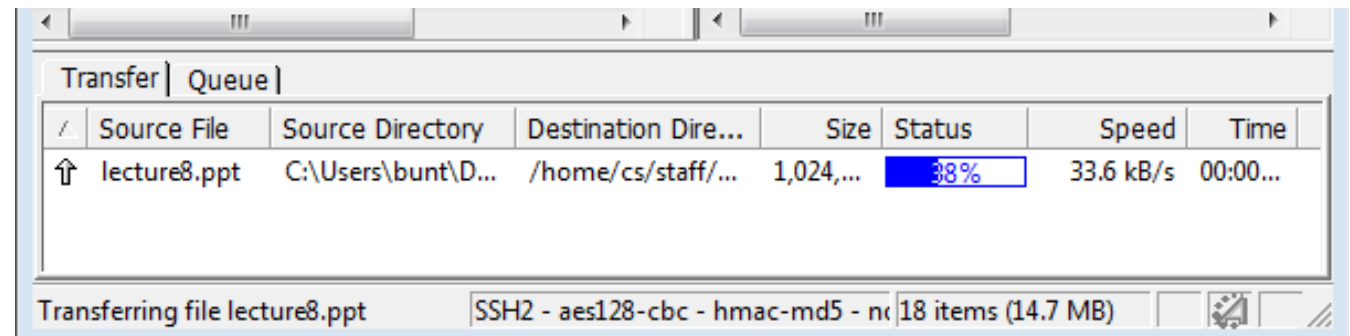
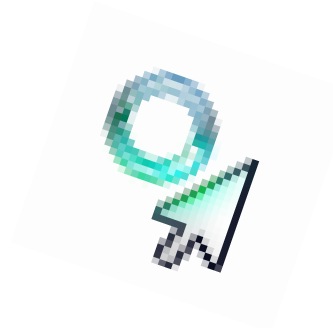
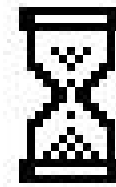
## **How users perceive delays for response time:**

- 0.1 second max: perceived as “instantaneous”
- 1 second max: user’s flow of thought stays uninterrupted, but delay noticed
- 10 seconds: limit for keeping user’s attention focused on the dialog
- > 10 seconds: user will want to perform other tasks while waiting, i.e. get a cup of coffee

# Design Principles: **Feedback**

Feedback during long delays:

- **Cursors**
  - For short transactions
- **Percent done dialogs**
  - For longer transactions
    - How much left
    - Estimated time
    - What it is doing...





# Feedback: Long Delays

During the long system delays

- Other parts of the interface **should continue working (if possible)** as the long task completes
- Should be possible to pause/cancel long jobs
- How you design your code will impact your ability to do this at the interface level

**But there is value with a "fake progress bar"!**

<https://www.theatlantic.com/technology/archive/2017/02/why-some-apps-use-fake-progress-bars/517233/>

<http://www.cond.org/deception.pdf>

# Week 2 Goals Overview

- **Monday**
  - ~~Interface and Interaction~~
- **Wednesday**
  - ~~Usability and UX~~
- **Friday**
  - **~~Design Principles: Part 1~~**