COMS W4170
UI Background

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UI Concerns

- Functionality
  - What is necessary?
    - Pareto Principle (80/20 “rule”): “20% of the X does 80% of the Y”
    - Too little vs. too much

- Reliability
  - Does it do what it’s supposed to do?
  - Unreliability → user becomes unconfident, modifies behavior

Economist Vilfredo Pareto noted in 1906 that 20% of the people owned 80% of the wealth; generalized by management consultant Joseph Juran to “principle of the vital few and trivial many.” (Later, “trivial” changed to “useful” to be politically correct.)
UI Concerns

- Availability
  - How often is it up?
- Privacy and security
  - From: antifraud@citibank.com
    Subject: CitiBank: urgent security notification
- Standardization
  - “Standards are wonderful. That’s why there are so many of them.”
- Integration

UI Concerns

- Consistency
  - {Intra/inter} {application/OS}
- Portability
  - Of programs
  - Of programmers
- On schedule
- Within budget

From: antifraud@citibank.com
Subject: CitiBank: urgent security notification

This is a reminder that your CitiBank Card needs to be verified. In order to receive uninterrupted service, please verify your information immediately. To verify your card, please click the link below, log in and follow the provided steps:


NOTE: PIN not required.
Regards,
CitiCards Customer Service

Feiner, COMS W4170, Fall 2015
UI Concerns

- Aesthetics

UI Concerns

- Usability
Quantifiable Usability Measures

- Time to learn
- Time to use

Errors
- How many?
- What kind?
  - Goal: \textit{Italic vs. roman}
  - Result: \textit{Italic vs. roman} \textit{Italic vs. roman}
  - Cause(?): \textit{Italic vs. roman} <I>Italic vs. roman...
- How important?

Quantifiable Usability Measures

- Skill retention
  - For how long?
  - Frequent vs. casual user
    - “-” vs. “–” vs. “—”
- User impressions
  - Does user like the system?
  - User’s subjective impressions of objective measures
Other Quantifiable Human Factors

- Behavioral measures
  - Facial expressions
  - Vocalizations
  - Posture
  - Gaze
- Physiological measures
  - Temperature
  - Pulse
  - Respiration
  - Skin conductance
  - BCI
- Can be used to compare different systems, including real and virtual environments, by inferring user’s internal state
  - Measures of “presence” in virtual environments

Why are good UIs important?

- “Chess is like life.”
  — Boris Spassky
- “Chess is life.”
  — Bobby Fischer
Why are good UIs important?

- Distinguishing full and partial control rod levers in a nuclear plant

R. Sugarman, Nuclear power and the public risk, IEEE Spectrum, 16(11), November 1979, 58–79.

Why are good UIs important?

The trouble began Thursday morning, when Mizuho Securities tried to sell 610,000 shares at 1 yen (less than a penny) apiece of a job recruiting firm called J-Com Co., which was having its public debut on the exchange.

It had actually intended to sell 1 share at 610,000 yen ($5,041).

Worse still, the number of shares in Mizuho’s order was 41 times the number of J-Com’s outstanding shares, but the Tokyo Stock Exchange processed the order anyway.

http://www.msnbc.msn.com/id/10394551/
Why are good UIs important?

The command to reboot the select set of new systems that needed to be updated was mis-typed, and instead specified all servers in the datacenter. Unfortunately the tool in question does not have enough input validation to prevent this from happening without extra steps/confirmation, and went ahead and issued a reboot command to every server in us-east-1 availability zone without delay.”

Why are good UIs important?

According to multiple sources, a trader entered a "b" for billion instead of an "m" for million in a trade possibly involving Procter & Gamble [PG 60.75 ▼ .14 (2.27%) ▲], a component in the Dow. (CNBC's Jim Cramer)

Stock Selloff May Have Been Triggered by a Trader Error

Published: Thursday, 8 May (2013) 7:14 PM ET

By: CNBC.com with Reuters

In one of the most dizzying half-hours in stock market history, the Dow plunged nearly 1,000 points before paring those losses—all apparently due to a trader error.

According to multiple sources, a trader entered a "b" for billion instead of an "m" for million in a trade possibly involving Procter & Gamble, a component in the Dow. (CNBC's Jim Cramer)
Why are good UIs important?

As of April 3rd, 2014, Nest Wave has been disabled on all Nest Protects.

During internal testing, we discovered that movements near Nest Protect that are not intended as a wave can be misinterpreted by the Nest Wave algorithm. If this occurs during a fire, this could delay the alarm going off. So, we have removed this feature.

https://nest.com/support/article/Nest-Protect-Safety

Why are good UIs hard to build?

- **User** interface
- **Human**-computer interaction
You might think, then, that companies could avoid feature creep by just paying attention to what customers really want. But that’s where the trouble begins, because although consumers find overloaded gadgets unmanageable, they also find them attractive. It turns out that when we look at a new product in a store we tend to think that the more features there are, the better. It’s only once we get the product home and try to use it that we realize the virtues of simplicity.

A recent study by a trio of marketing academics—Delora Vian Thompson, Rebecca W. Hamilton, and Roland T. Rust—found that when consumers were given a choice of three models, of varying complexity, of a digital device, more than sixty per cent chose the one with the most features. Then, when the subjects were given the chance to customize their product, choosing from twenty-five features, they behaved like kids in a candy store. (Twenty features was the average.) But, when they were asked to use the digital device, so-called “feature fatigue” set in. They became frustrated with the plethora of options they had created, and ended up happier with a simpler product.
People differ

- Physical abilities
  - *Anthropometry*: Study of human body measurements
    - Static vs. dynamic properties
      - Height, weight, reach,…
      - Speed at which you read, “double click”,…
  - *Ergonomics*: Design of places and tools in and with which we work; “human engineering”
    - Design of work surfaces, chairs, keyboards, mice,…

People differ

- Perceptual abilities
  - Screen refresh rate, flicker
  - Depth perception
  - Hearing
  - Color
    - Color blindness
      - ~ 8% males vs. 0.4% females (“red-green” color blind)
    - Tetrachromacy
      - Rare: 4th cone with sensitivity between r and g, > 3-channel system, resulting in higher-dimensional perceptual experience (females only)

http://www.ncl.ac.uk/sndstaff/profile/gabriele.jordan
http://www.perceptionweb.com/abstract.cgi?id=i040075
People differ

- Cognitive processes
  - Individual differences
    - Short-term memory (STM)
    - Long-term memory (LTM)
    - Ability to solve problems, make decisions, search, attend

People differ

- Cognitive processes
  - Gender differences
    - Subjects navigate in 3D environment presented on
      - Small displays with a narrow field of view
      - Large displays with a wide field of view
    - Results
      - Narrow field of view: Men outperform women (well replicated finding)
      - Wide field of view: Women and men both perform better, and gender bias is significantly reduced
People differ

- Personality differences
  - Tests
  - Behavior

People differ

- Cultural differences
  - Tone of interface
  - Reading left-to-right, right-to-left, top-to-bottom
  - Formats
    - Date, time, currency, capitalization, spelling, punctuation, colors
  - Icons
    - Garbage can, mailbox
Cultural differences: color

P. Russo & S. Boor, How fluent is your interface? Proc. INTERCHI ’93

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</tbody>
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Geographic differences: time zones
People differ

- Age
  - Childhood
    - Literacy
    - Motor skills
    - Abstraction
  - Old age
    - Vision
      - Large fonts
      - Dark adaptation
      - Focus
    - Hearing
    - Memory