CMPT 363: User Interface Design
Summer 2021

Week 6: Interface Types, Prototyping Tools & Techniques for UX

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Fun Watch – The Mysterious Life of UX Designers

https://www.youtube.com/watch?v=gfHcnig8Lo4

Typical Activities of a UX Designer

- Poll – what did you learn from the video?
  - A - Designers use Macs
  - B - Pixel paranoia
  - C - Usability Test is a crucial moment
  - D - Workshops with lots of sticky notes

- But for real… watch this (a day in the life of a UX designer): https://www.youtube.com/watch?v=gEYq6GFAFCs

Recap from Last Lecture

- Identifying Contexts & Users
  - Importance and how to describe them
- Task-Centered Design
  - What are tasks and how to describe them
- Gathering Requirements
  - What are requirements and how to capture them

Group Project Part 1 – Due 18 Jun 11:59p

- Overview
  - To design the interface for an online calendar that facilitates different kinds of activities for university students
- Part 1
  - Heuristic Evaluation on existing application(s)
    - Evaluate interfaces of online discussion forums, give a total of 3 usability issues and 2 good usability examples
    - Summary can include what's missing in all applications, or a comparison between them
  - Design requirements gathering
    - Context & user identification, 3 functional requirements (+sketchs), 3 non-functional requirements
  - Next Step (refer to the UCD process)

Feedback for Assignment 1

- Some students referred "Consistency & Standards" as how an application look across devices, which is only partially true
  - Layouts and operations can vary depending on the device (e.g., small screen vs big screen, type of interaction)
  - Consistency & Standards focuses on maintaining the functionalities and features so wording/actions mean the same thing while adhering to platform & industry standards
- Some students provide little background knowledge of the interface (e.g., games)
  - Readers might not know the feature that is missing and how important it is without knowing the background first
- Some student missed providing details such as app version and end-user details

TAs' Favourites (1)

Bad UI: Brother DCP-L2540DW Compact Monochrome Laser Multifunction Model: L2540DW

power button   start scanning

confirm selection
up
menu   direction   stop activity or exit setting

Scan

Options   2 in 1 (ID) Copy   WiFi   Menu   OK   Stop | Exit

Clear   Start

COPY

adjust wifi setting   back/undo   down direction   start printing

- Function: for both printing and scanning documents.
- The interface is very minimalistic such that it becomes a hindrance because many functions are hidden and require only 'menu', '+' and '−' buttons to access them. Furthermore, with a very small display, some of the function names are shortened or replaced with words that are not understandable.

2. Bad UI

The picture gives a decent hint of what Information Overload refers to switches. This one is a highly overused utility and can be found in every house or building. It can be very confusing sometimes and people are accustomed with it only when they have been turning switches wrong for few times.

I believe it is an example for a bad UI, UX design since the problem with theses switches is that they have no mapping and information. Therefore, you have to switch it on to tell what it is going to do for example turn on the light, turn on the fan, ... And every time you want to turn the switch, it requires you to think and remember the last time you did it wrong

TAs' Favourites (2)

The Bad: Ikea "Koppla" 6-way adapter plug, grounded white
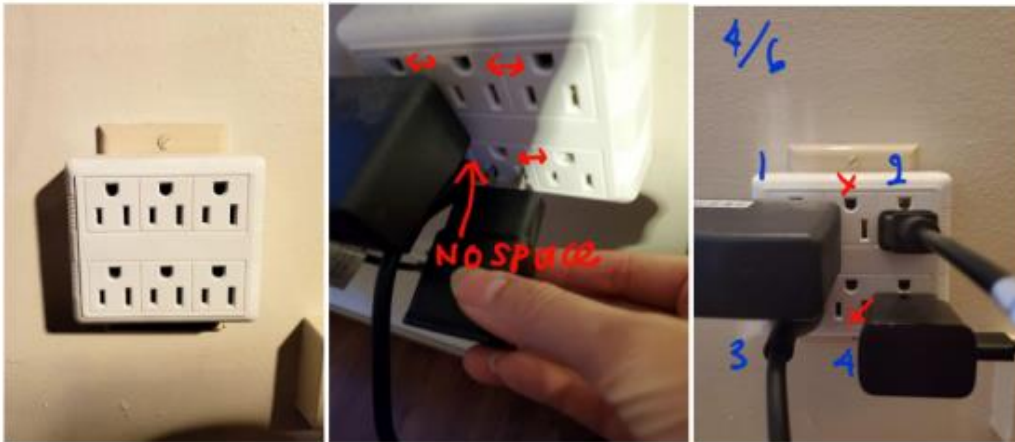
https://www.ikea.com/ca/en/p/koppla-6-way-adaptor-plug-grounded-white-70085345/?utm_source=google&utm_medium=surfaces&utm_campaign=shopping_feed&utm_content=free_google_shopping_clicks_Lighting&gclid=Cj0KCQjwnueFBhChARIsAPu3YkQBIEU9hbWMSYOONpiimXpLECcTWTVGlHOGEqeXOUQlpW_k8UJ1i5YaAgJDEALw_wcB

This is a regular, adaptor plug marketed for 6 plugs/inputs.

The problem with this interface is that the space between the plugs is too small, so it is impossible to fit 6 plugs at once. At any given time I am only able to fit 4 out of the 6 spaces available, because there is a restriction for the middle spaces.

The interesting

What

Pictured above is a massage roller purchased from Miniso. (Exact model unknown)

Why

I believe this massage roller is an example of interesting design because it hides its true functionality so well. Initially, I thought the plant itself was what was used to massage with and felt really foolish when I learned that the roller was hidden inside. Because of this design, it can also serve as a decorative piece when you are not in need of a massage.

TAs' Favourites (3)

3. Interesting UI

AirPods are wireless headphones designed by Apple, first launched in 2016 and two years later they became Apple's most popular accessory (Wikipedia) AirPods - Wikipedia. Back in the day, they have been widely mocked since they look like the old EarPods without the wires.

There are many reasons that I believe they are the interesting UI design. First, start with the case, it is small and it feels good in a pocket. The charging case is made of glossy white premium plastic. If you are an AirPods owner, when you close the lids that click is satisfying, smooth and comforting. Secondly, the minimalization of the design makes it easy for the owner to use. All you have to do is pop them into your ears to start listening. There are no buttons to push, touch the right airpod to pause and resume play, double tap an earphone to talk to Siri. That is why I think AirPods are the great design of the decade.

The Interesting:

I think this is an interesting interface as they decided to use a single button to represent two different numbers. I can understand why this would be a decision as it requires less components to manufacture, however I find it kind of silly, as it is not secure as it could be. Instead of 10! Combinations you have less than half of that at 5!. This item is an electronic programmable door lock made by Weiser. I believe you can program 8 user access codes and it comes with physical keys in the case that the lock runs out of battery power.

Today

- Different (computer) user interface types
  - History, characteristics, benefits/drawbacks
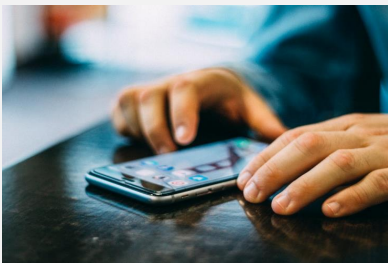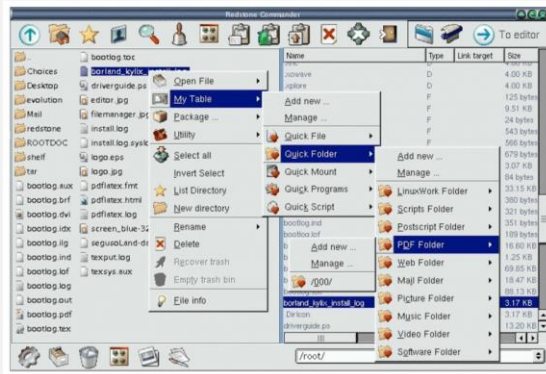- Prototyping tools and techniques

(Computer) User Interfaces

- They control the way data and instructions are entered (input) from the user into the computer, and how the computer presents information from itself to the user
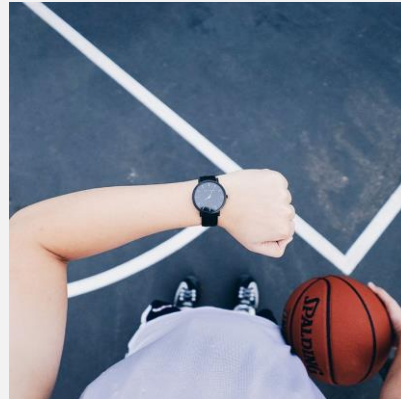
Computer User Interfaces (Cont'd)

- Screen-based (most common one these days)
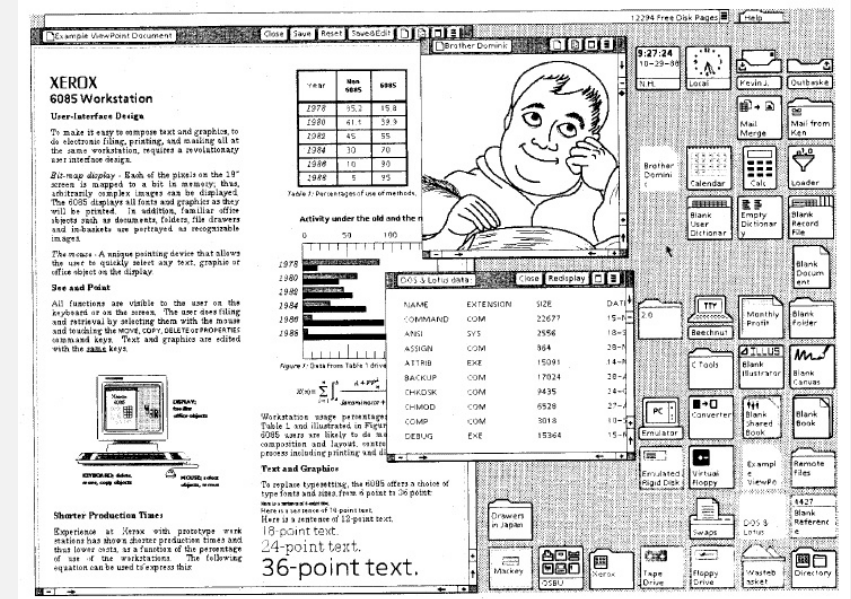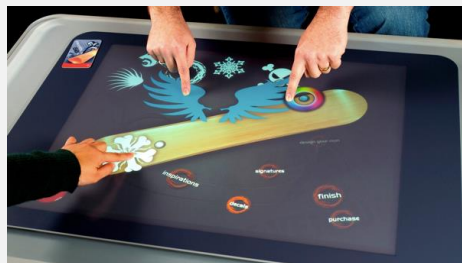
Beyond Desktop Computers

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Interface Types by Decades

1980'S

- Command line
- WIMP/GUI

1990'S

- Advanced graphical (multimedia, VR, information visualization)
- Web
- Speech/voice
- Pen, gesture, & touch
- Appliance

2000'S

- Mobile
- Multimodal
- Shareable
- Tangible
- AR & MR
- Wearable
- Robotic
- Brain

14

Adapted from slides by Stacey Scott and also from materials in ID-Book Ch 7.

A Brief Survey on Computer User Interfaces (& Interactions)

- We'll go over some of the significant ones, input & output mechanisms, cover benefits & drawbacks
  - Command line
  - WIMP/GUI
  - Speech/Voice
  - Mobile
  - Wearable
  - AR & VR

Command Line Interfaces (CLI)

- Text-based, available since 1960's

- Input via keyboard with "commands" (e.g., ls, dir, copy, move), short-cuts (e.g., Ctrl+Alt+Del), or function keys

- Output via screen display

- Benefits: fast, precise, require less resources

- Drawbacks: hard to learn, hard to recall, look intimidating

- Still in use these days (usually for system admin/maintenance)

WIMP/GUIs

- Windows, Icons, Menus, Pointing Device, available in 1980's
  - Windows hold content, can be scrolled, stretched, overlapped, opened, closed, move around
  - Icons represent applications, objects, commands, and tools
  - Menus list available options/commands
  - Pointing Device allows user to physically control a cursor as point of entry
- Input via the pointing device (in theory) and keyboard (in practice)
- Output via graphical displays using WIMs

- Benefits: easy to learn (recognition over recall), metaphorical
- Drawbacks: slower, content occupies more space, require pointing precision
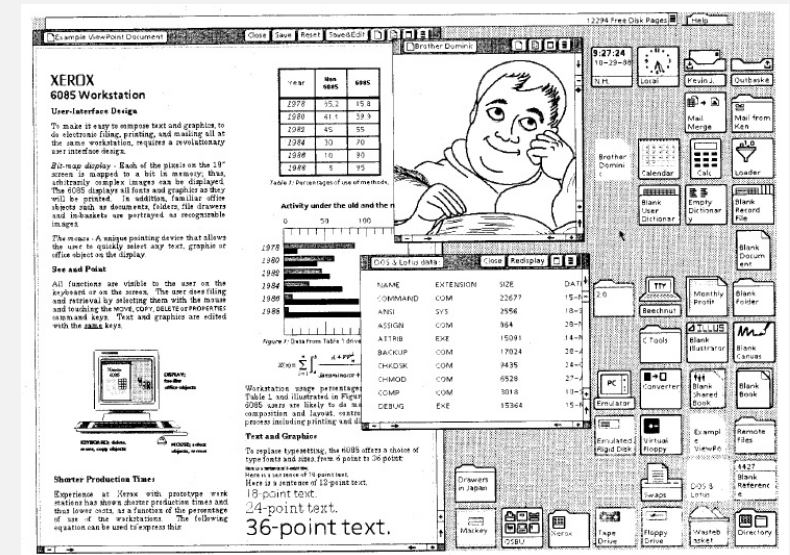
Modern GUIs

- Same basic building blocks as WIMPs
  - Add more varieties to the components, for example
    - Colour, sound, animation, contextual menus, …etc.
  - New graphical elements
    - Toolbars, docks, rollovers, tooltips, …etc.
- Combined with touchscreens and other devices, allowing gestures


18

Notes on Windows

- Windows in WIMPs were invented to overcome physical constrains of a computer display

  - Enable more information to be viewed and tasks to be performed, for example

    - Scrollbars allow viewing of documents larger than the window viewport

    - Resizable windows accommodate content of different dimensions

    - Movable windows allow comparison between multiple content

  - Having too many windows can make things difficult (some layout techniques could help)
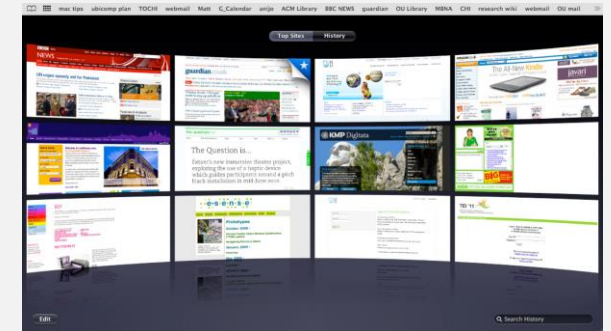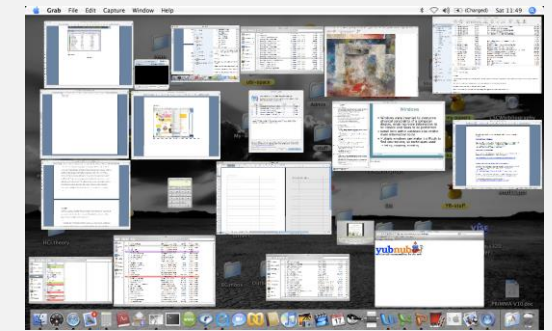
Top: OSX's Exposé
Bottom: panorama view in browser

19

5min (think & share) + 5min (break)

- Look at your mobile phone/smartwatch
- Think about
  - What kind of input/output does it have?
  - What's the most fun/frustrating use of it?
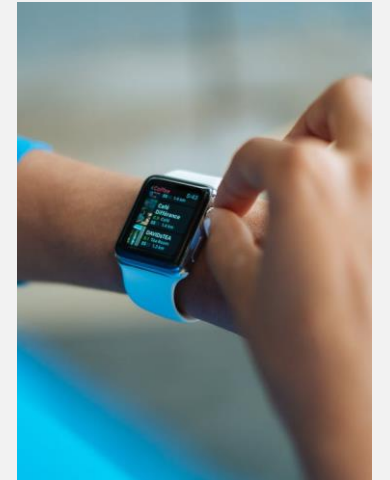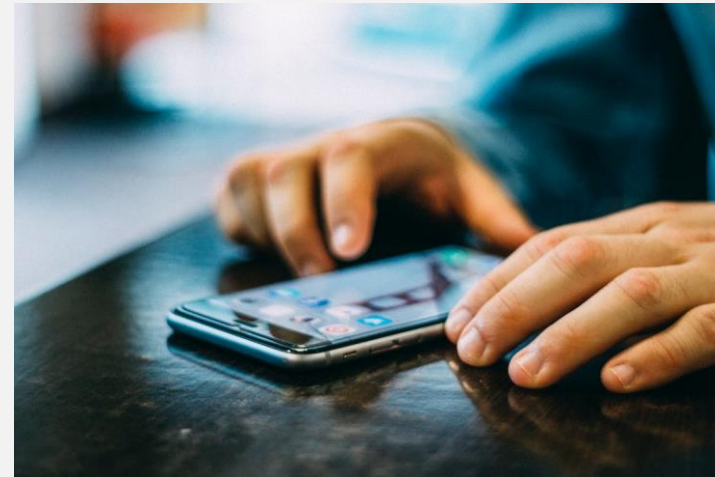
Mobile

- Pervasive and come in many forms with multiple ways to interact

- Input via touch, movements, voice, proximity, gestures, …etc.

- Output via screen displays, audio, haptics, …etc.

- Benefits: opportunities for good and engaging interfaces (e.g., tilting for driving games)

- Drawbacks: typically small screens with limited control space (e.g., "fat-finger" problem)

- Fun read: Sensors in your smartphone
https://gizmodo.com/all-the-sensors-in-your-smartphone-and-how-they-work-1797121002
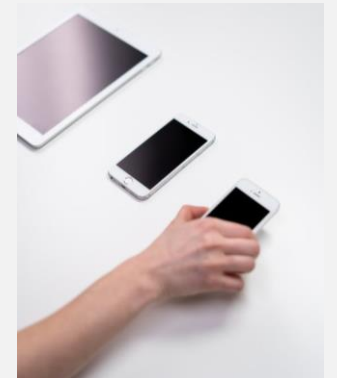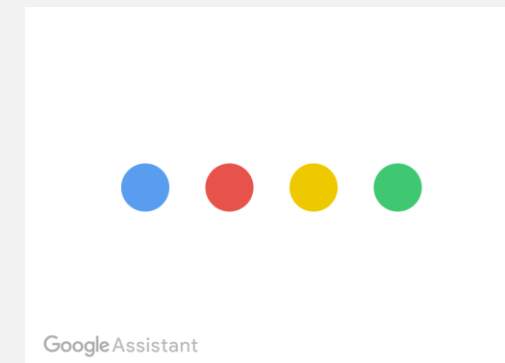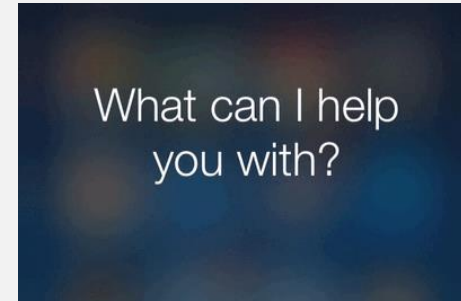
Touch Screens

- Poll – How old do you think touch screens are?
  - 10? 20? 30? 40? 50?
- Give more directness to the interaction
- Opportunities for improvement
  - Precision
 - Identity
  - States

https://www.youtube.com/watch?v=ac0E6deG4AU

Speech/Voice

- Conversation-based, for inquiry, simple tasks, speech-to-text

- Input via voice (with a "trigger phrase")

- Output via voice and some visuals

- Benefits: hands-free, better accessibility, feels more natural

- Drawbacks: susceptible to ambient noise & tone variation, realism debate

Left: https://www.cultofmac.com/296755/set-up-iphone-6/
Bottom: https://medium.com/orbismobile/my-experience-with-google-assistant-codelabs-and-why-you-should-also-take-them-right-now-8e7a77719d2c
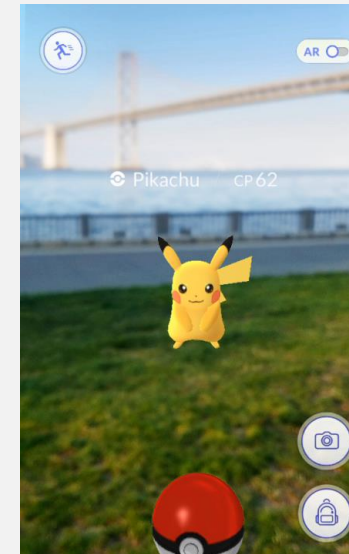
Wearable

- On-body, often screen-less (or with tiny screens)

- Input via motion, biometric sensing, touch/tap…etc.

- Output via screen displays, audio, haptics, …etc.

- Benefits: always-on/available

- Drawbacks: limited interactivity, privacy concerns


https://choosemuse.com/muse-2/

24
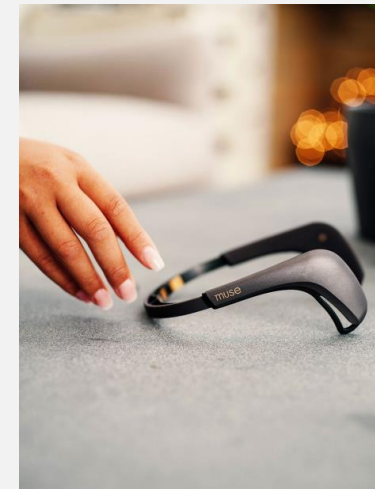
AR & VR

- An overlay that either augments (AR) or replace (VR) the view of the world

  - Mostly for educational/instructional and entertainment purposes

- Input via movements/gestures, hand-held controllers

- Output via screen (view), sound, haptics (more recent)

- Benefits: Immersive experience

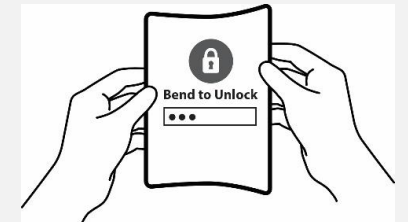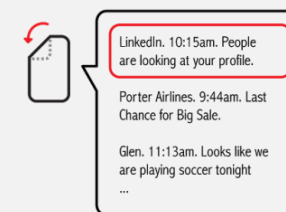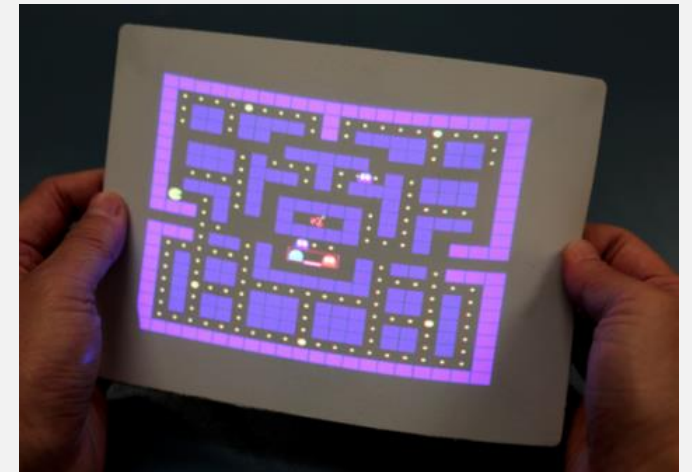- Drawbacks: Prone to out of sync issues, VR motion sickness

https://pokemongolive.com/en

https://www.oculus.com/
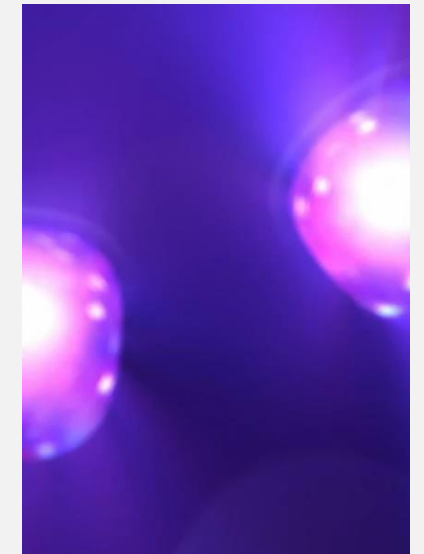
What's in the Future?

Advancements in materials and sensing techniques

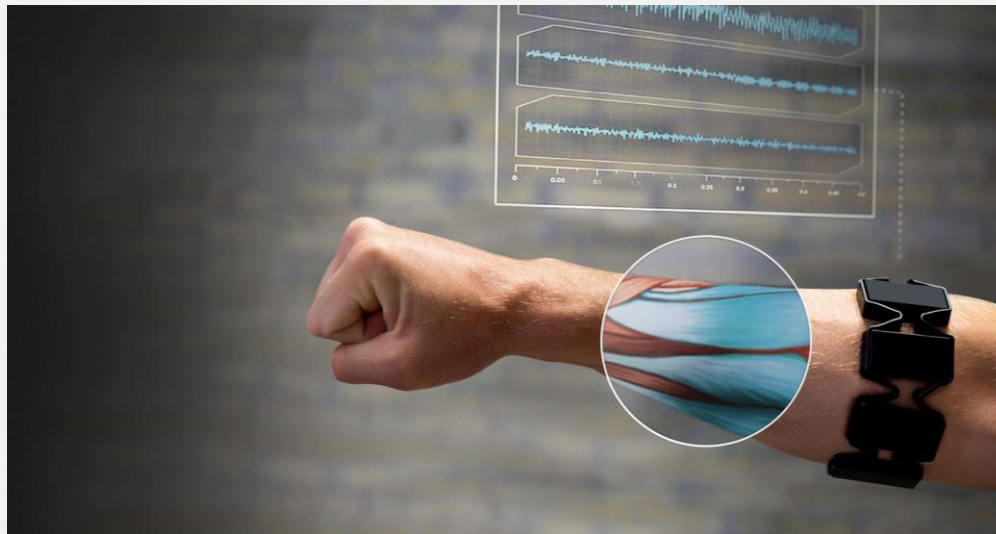# Flexible Displays

Flexible Displays – Foldable Devices

https://www.samsung.com/ca/smartphones/galaxy-fold/

https://www.motorola.ca/smartphones-razr/p

Wearables

- Electromyographic (EMG sensors)

- Photoplethysmography (PPG sensors)

https://developerblog.myo.com/raw-uncut-drops-today/

https://www.allaboutcircuits.com/news/fitness-technology-heart-rate-monitors/

Brain Activities

- Establishes a communication pathway between the user's brain waves and an external device

https://choosemuse.com/muse-2/

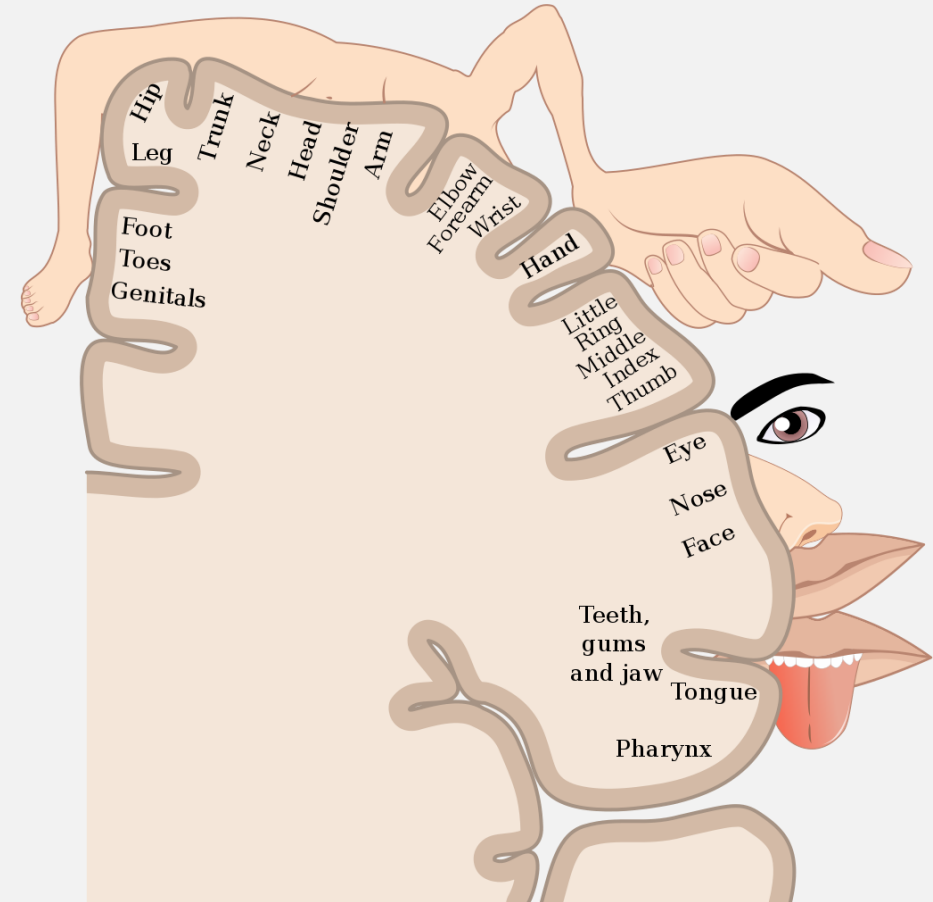CAUTION: Investigational Device. Limited by Federal (USA) Law to Investigational Use.
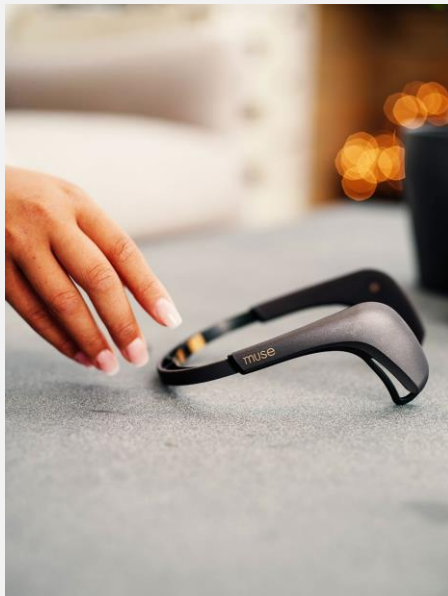
From ID-Book p251. Original source: Brown University

Future Visions

- How many of them are here now? Do they all make sense? What do they have in common?
  - Corning's Vision (in 2013): https://www.youtube.com/watch?v=PfgmIVxLC9w
  - Intel's Vision (in 2014): https://www.youtube.com/watch?v=9Tw-f3i-08k
  - Microsoft's Vision (2015): https://www.youtube.com/watch?v=w-tFdreZB94

The Cortical Homunculus

- A distorted representation of the human body based on a neurological "map" of the areas and proportions of the human brain dedicated to processing motor functions, or sensory functions, for different parts of the body – Wikipedia

- Shows opportunities on how we can design interfaces that best cater the capability of different parts of our body


Hip
Leg
Trunk
Neck
Head
Shoulder
Arm
Elbow
Forearm
Wrist
Foot
Toes
Genitals
Hand
Little
Ring
Middle
Index
Thumb
Eye
Nose
Face
Teeth, gums and jaw
Tongue
Pharynx

Prototyping Tools

Balsamiq

- For Low-Fidelity Prototyping, Wireframing: https://balsamiq.com/
  - You don't have to buy it! We'll get you a free licence key for the term. Stay tune to the Announcement.
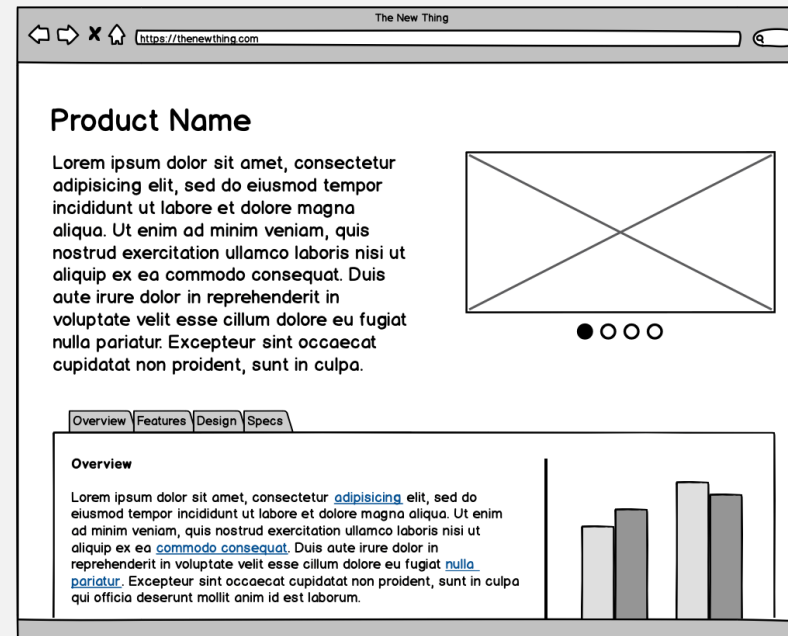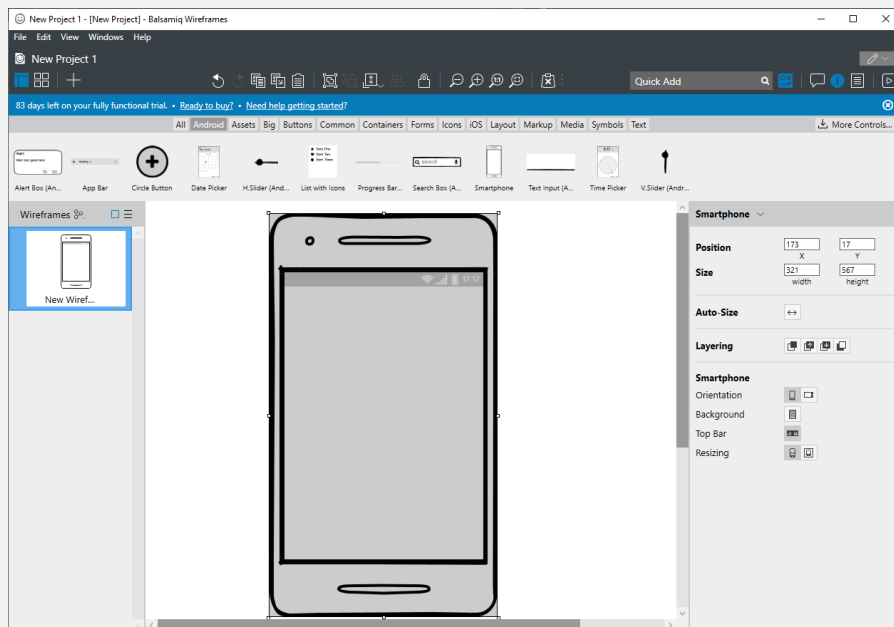
Figma

- For Medium-Fidelity Prototyping, with some interactivity: https://www.figma.com/
  - There is a free version from their website. You can use that for the course project.
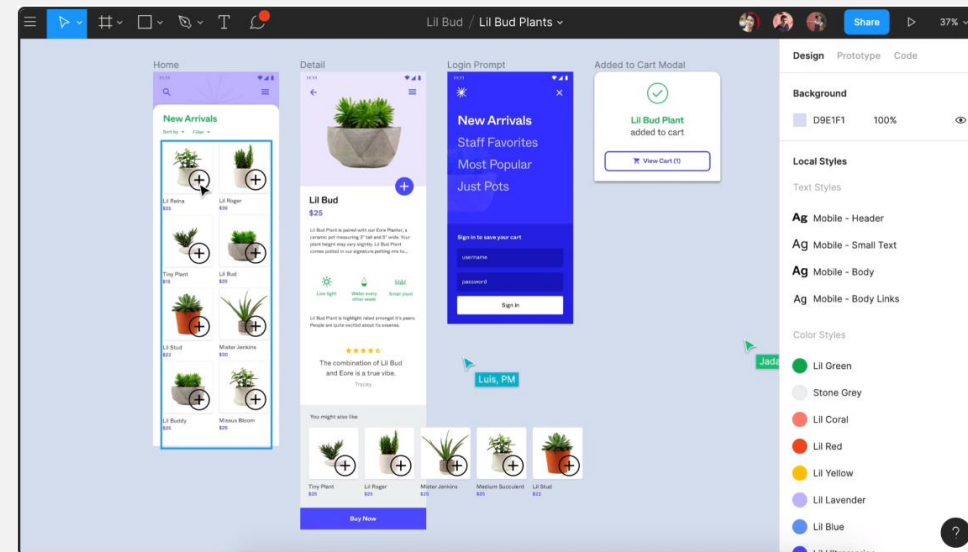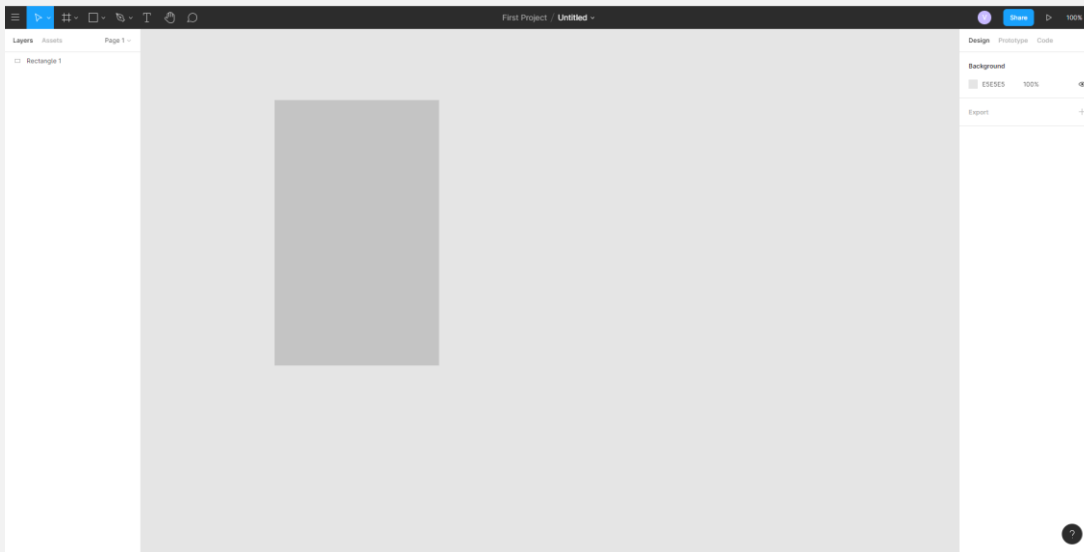
Summary

- Different (computer) user interface types
  - History, characteristics, benefits/drawbacks
  - Future
- Prototyping tools and techniques
  - Balsamiq & Figma

Post-Lecture Activity

- Read/watch these (and those in the slides)

  - Chapters 7 of ID-Book: Interfaces

  - Chapter 13: Fat Fingers in Brave NUI World book by Daniel Wigdor & Dennis Wixon
    https://sfu-primo.hosted.exlibrisgroup.com/permalink/f/15tu09f/01SFUL_ALMA51189009040003611

  - Deshdeep, N. How to Use C.R.A.P. Design Principles for Better UX?
    https://vwo.com/blog/crap-design-principles/

  - Gastalt Principles
    https://www.interaction-design.org/literature/topics/gestalt-principles

- Exercise

  - Try out Balsamiq & Figma

In-Class Activity (20mins)

- Work with your team on Project Part 1

  - Join this Zoom link (we'll close the BB-Ultra session) https://sfu.zoom.us/j/62539339303?pwd=L0thYkNwMXhOYnYxNlBlY0VqSThZQT09 (passcode: 571602)

  - Message instructor if you have questions

  - If you have already submitted it, try out Figma