Introduction & Course Overview

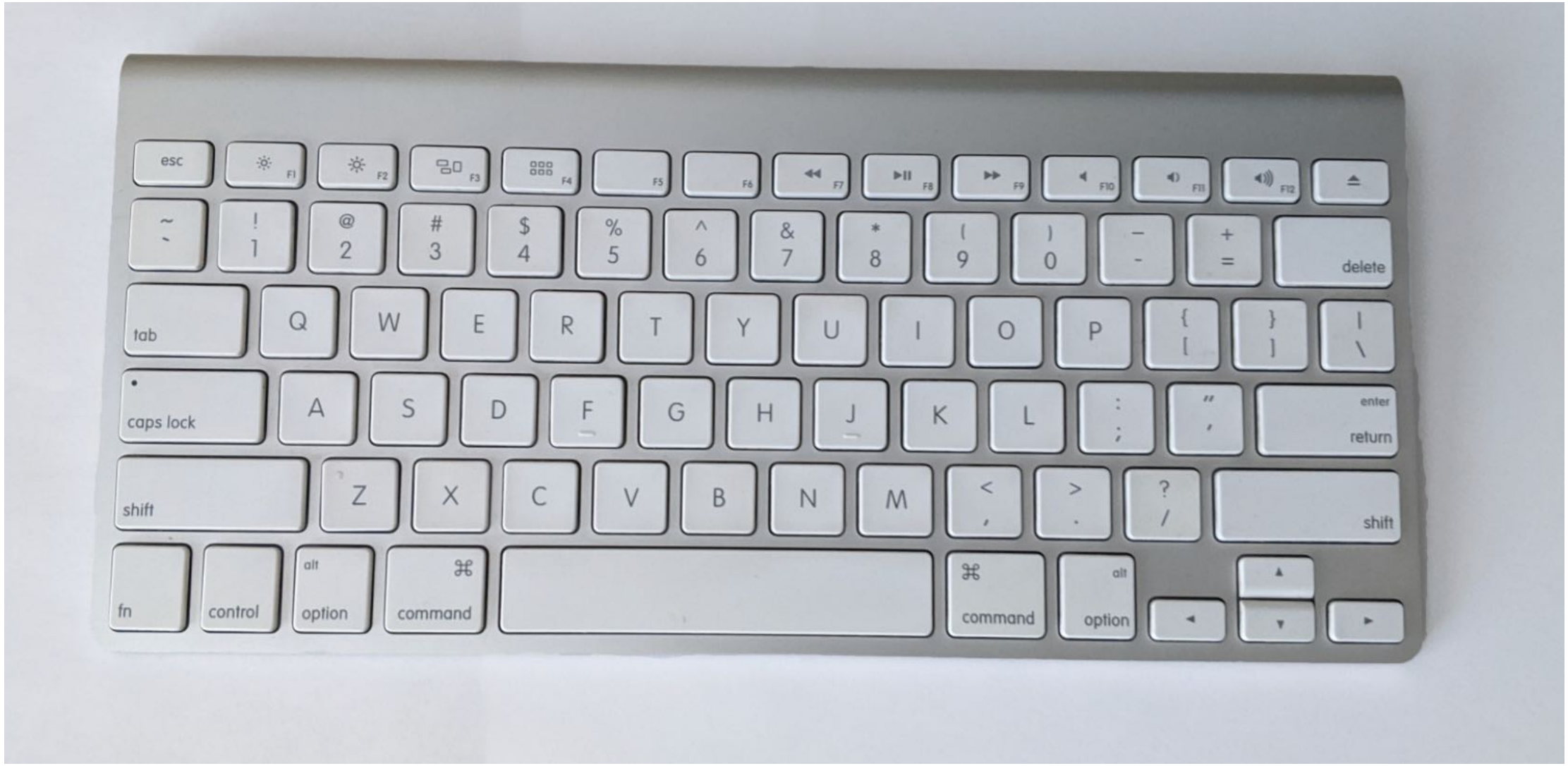
CS4501/6501: Engineering Interactive Technologies

Seongkook Heo

Spring 2020, Department of Computer Science

University of Virginia | School of Engineering & Applied Science

Computer User Interface?

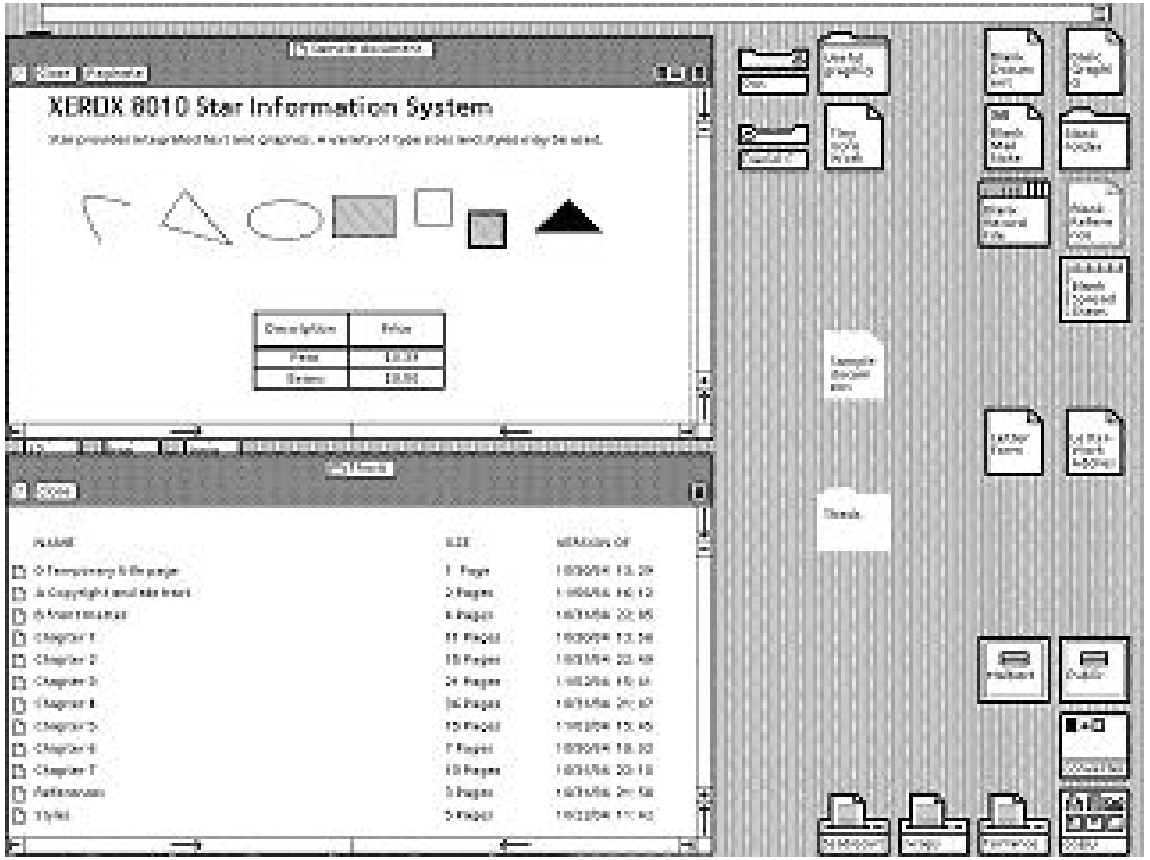

esc
F1
F2
F3
F4
F5
F6
F7
F8
F9
F10
F11
F12
delete
tab
Q
W
E
R
T
Y
U
I
O
P
caps lock
A
S
D
F
G
H
J
K
L
enter
return
shift
Z
X
C
V
B
N
M
shift
fn
control
alt
option
command
command
alt
option


logitech


Search
App Store
Safari
Mail
Contacts
Calendar
Reminders
Notes
FaceTime
Messages
Maps
Find My
Photo Booth
Photos
Preview
Music
Podcasts
TV
Voice Memos
GarageBand
iMovie
Numbers
Keynote
Pages
News
Stocks
Books
Dictionary
Calculator
Home
Siri
Mission Control
System Preferences
Other
Microsoft OneNote
Microsoft Word

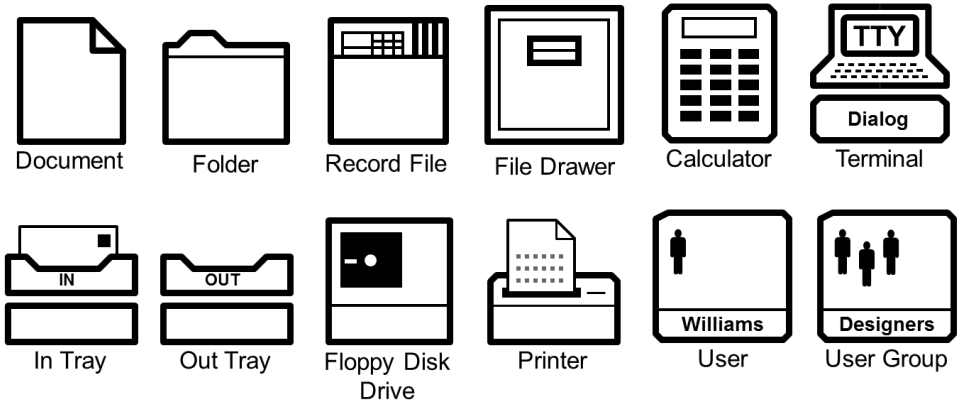
Graphical User Interface (GUI)

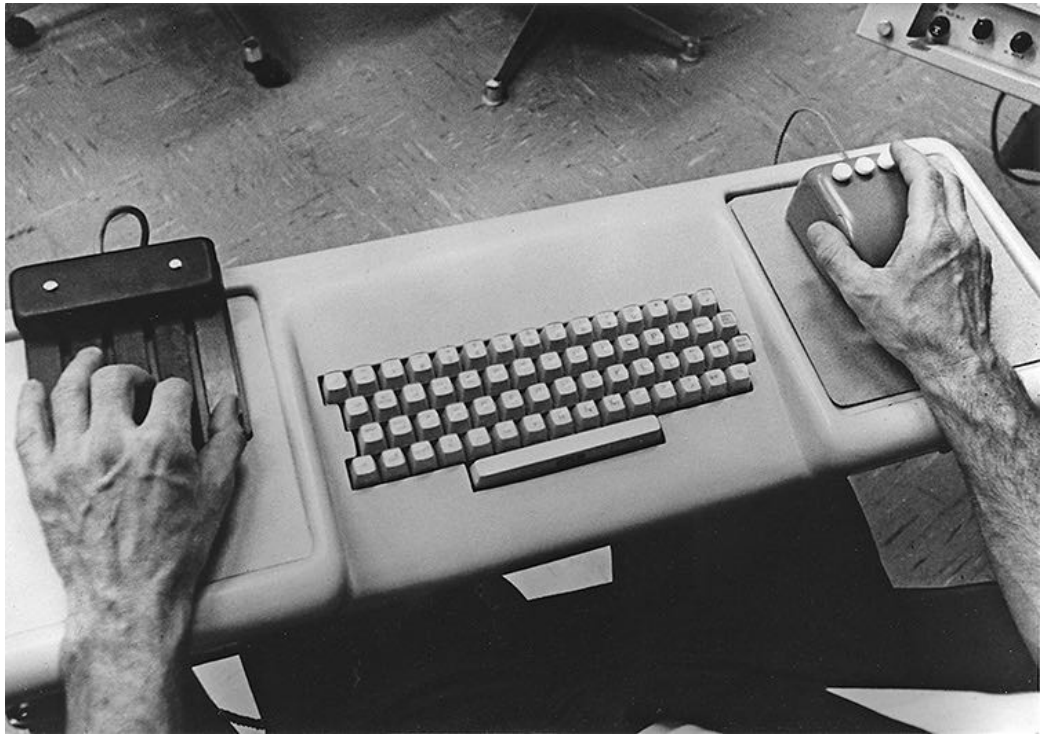
Windows
Icons
Menus
Pointer

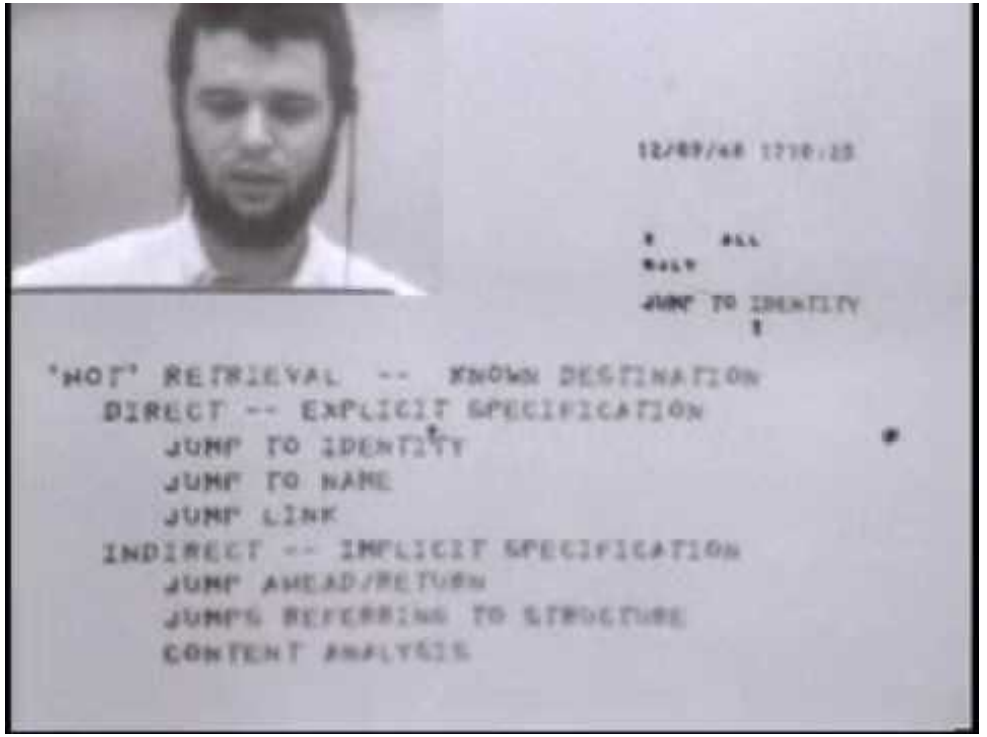


Xerox Star

Back in 1981…

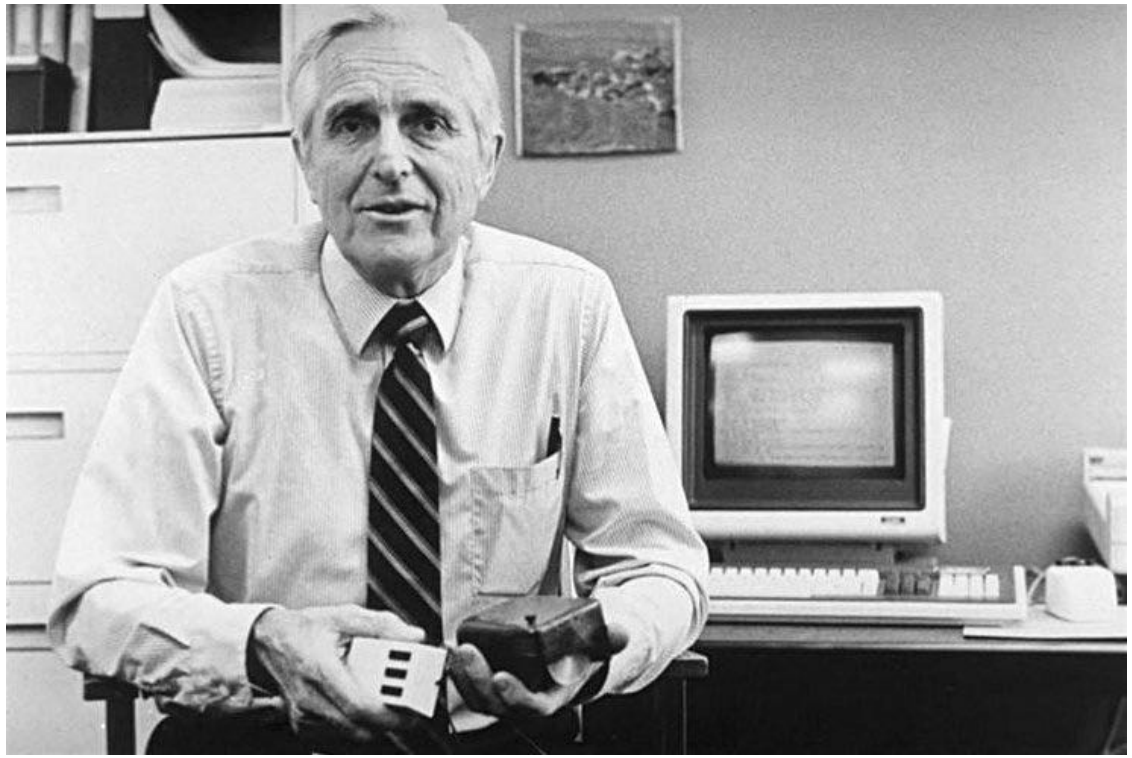






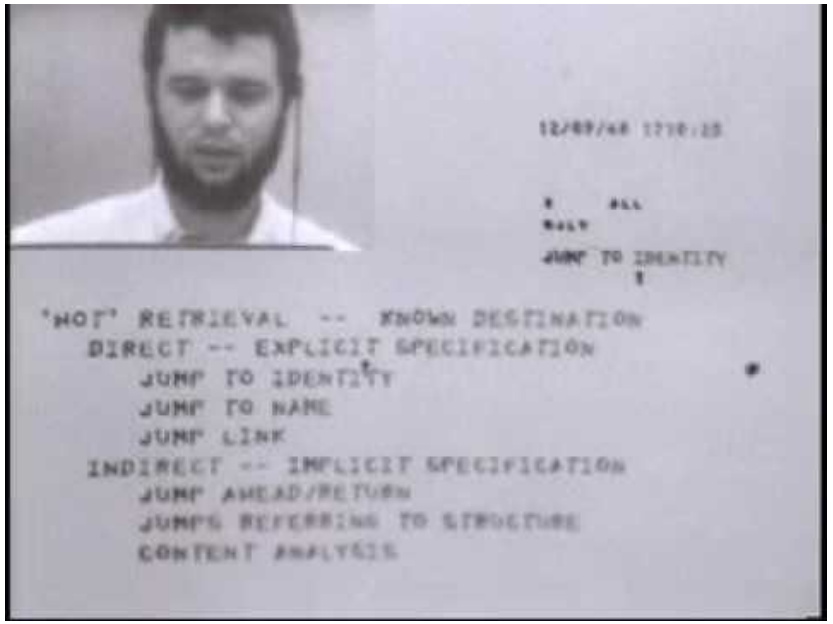
Back in 1968…

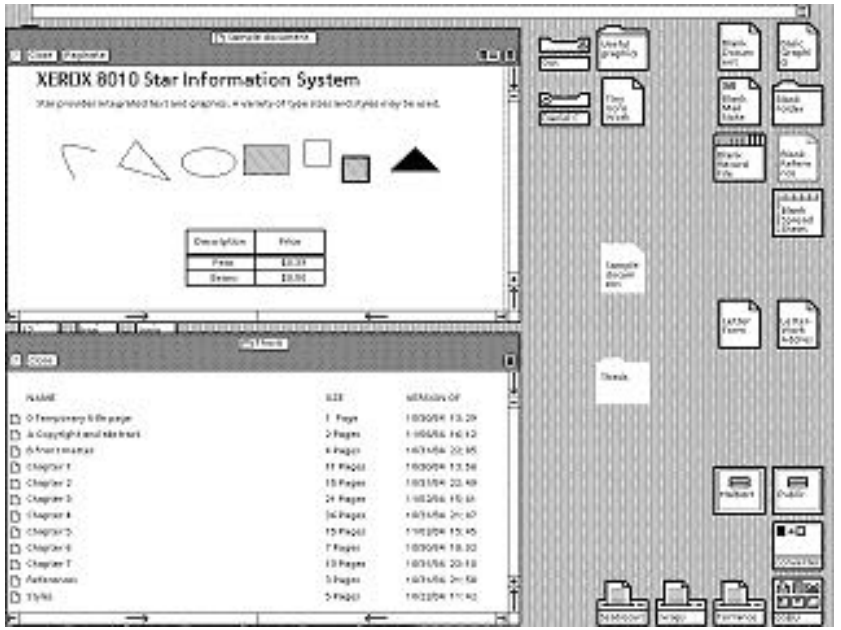
oN-LineSystem,
Augmentation Research Center,
Stanford University

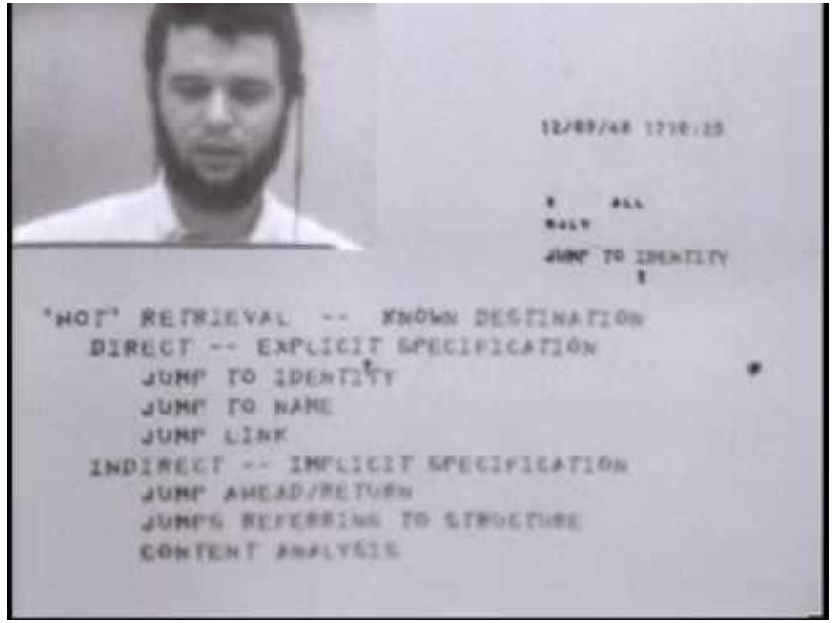


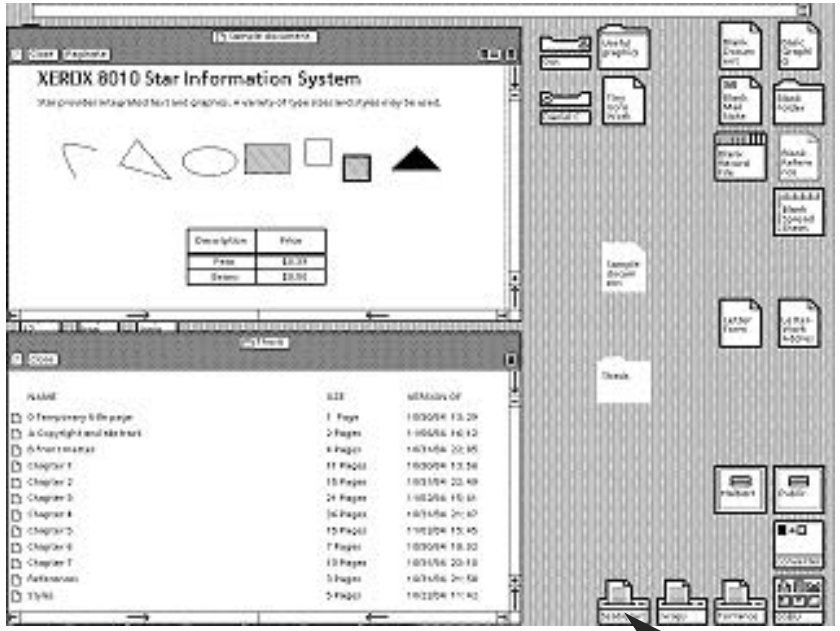
Back in 1963…

Invention of the Mouse
Doug Engelbart and Bill English

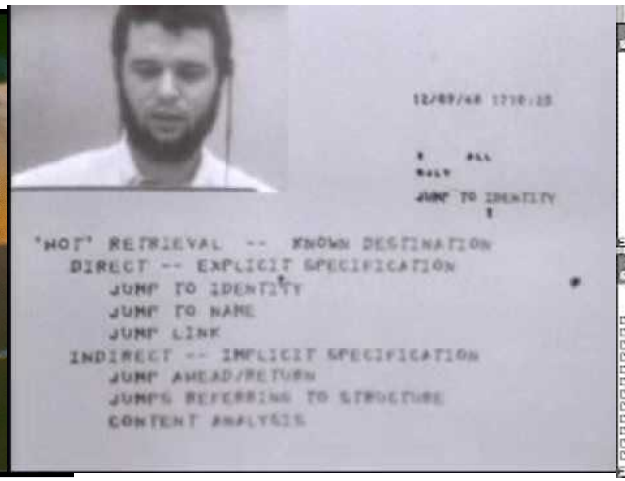

'HOT' RETRIEVAL -- KNOWN DESTINATION
DIRECT -- EXPLICIT SPECIFICATION
JUMP TO IDENTITY
JUMP TO NAME
JUMP LINK
INDIRECT -- IMPLICIT SPECIFICATION
JUMP AHEAD/RETURN
CONTENT ANALYSIS

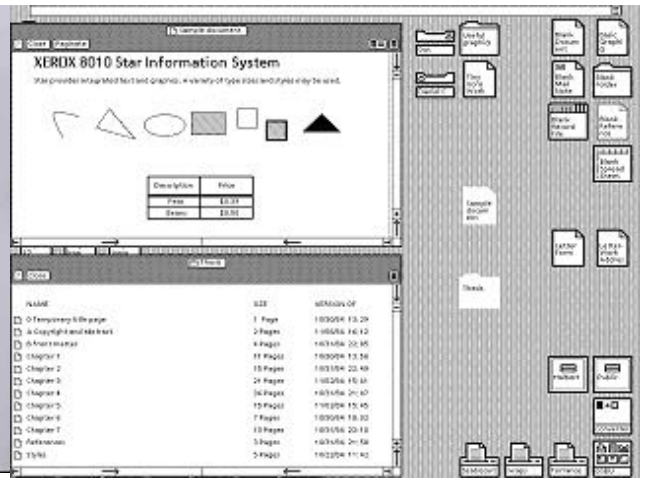

XEROX 8010 Star Information System

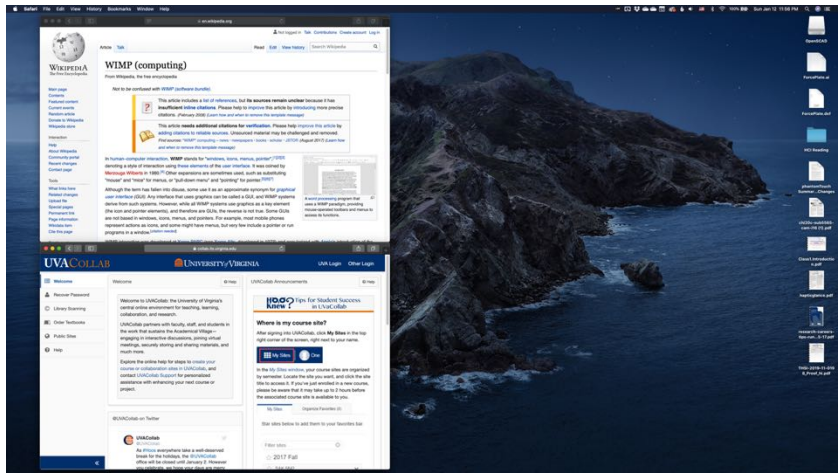




Images from http://dougengelbart.org







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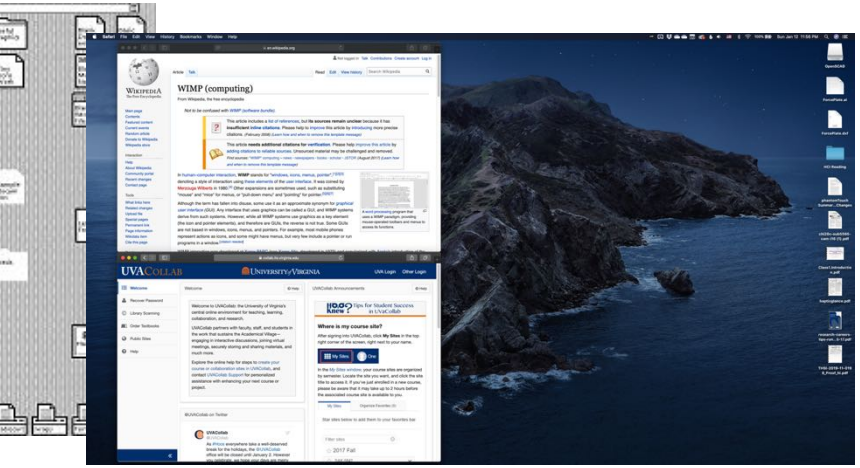
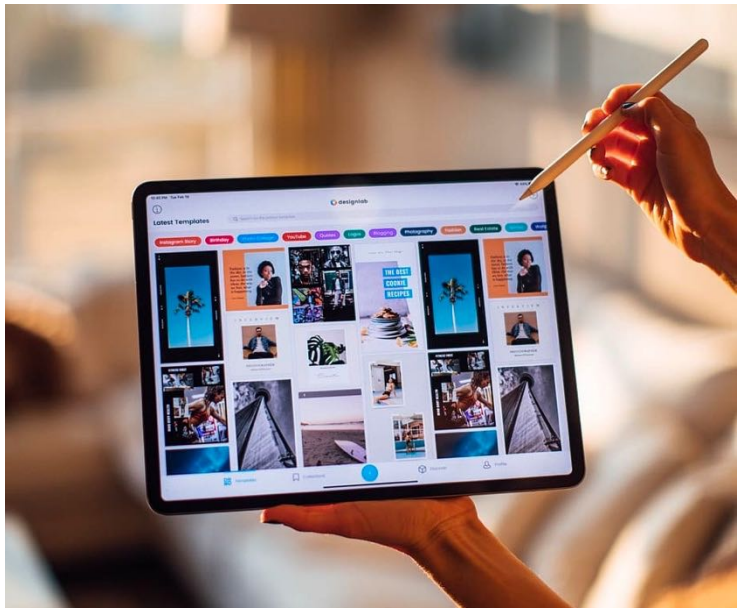
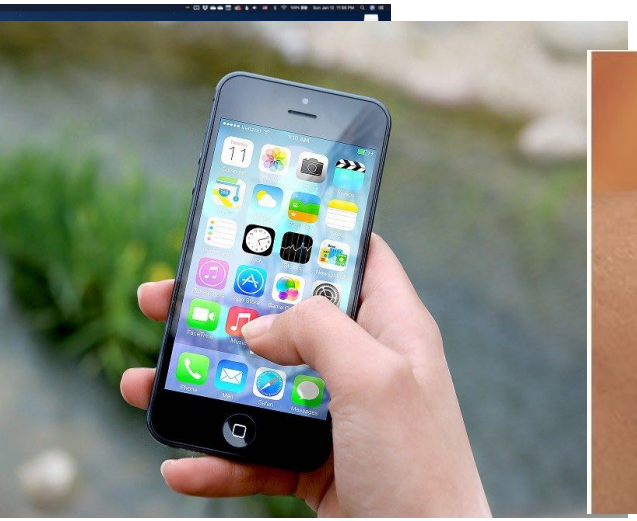
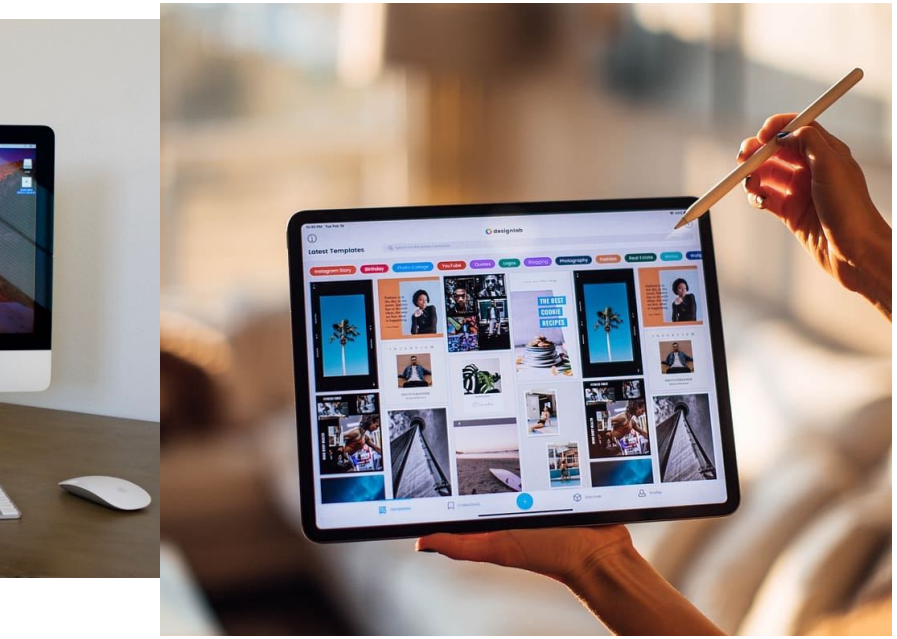
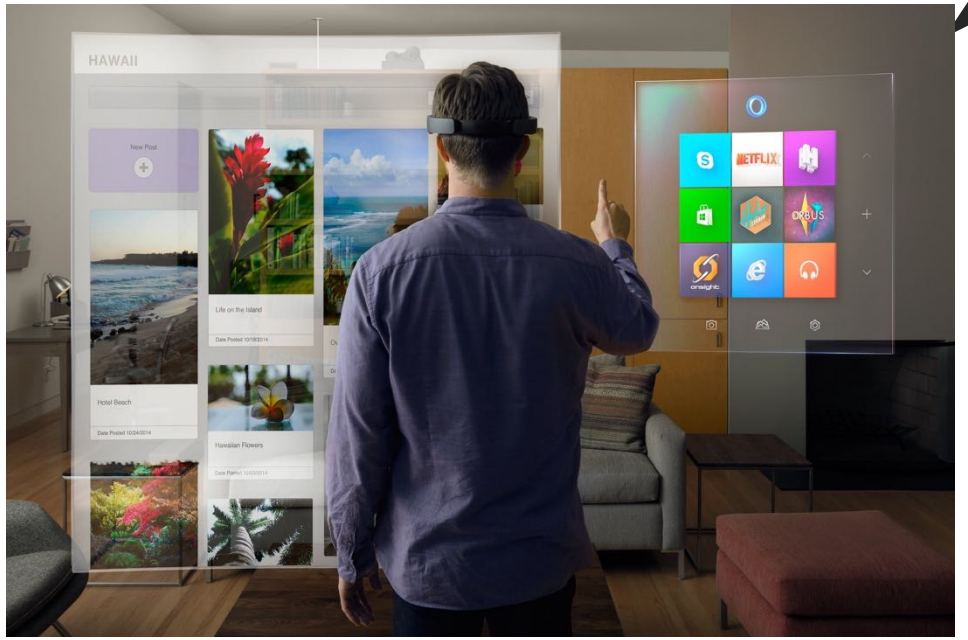

WIMP (computing)
UVACOLLAB
UNIVERSITY of VIRGINIA


designlab
Latest Templates



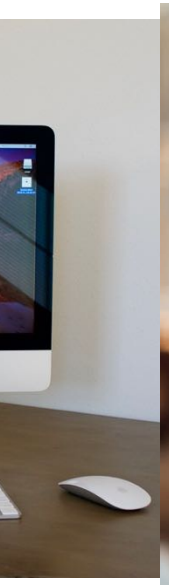


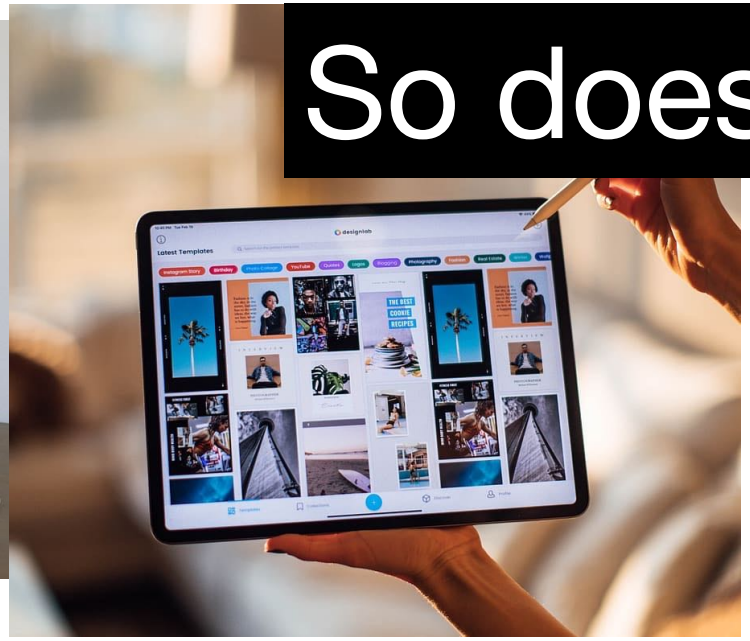


Images by Microsoft Sweden, from Flickr

Computing environment is changing

So does the user interface





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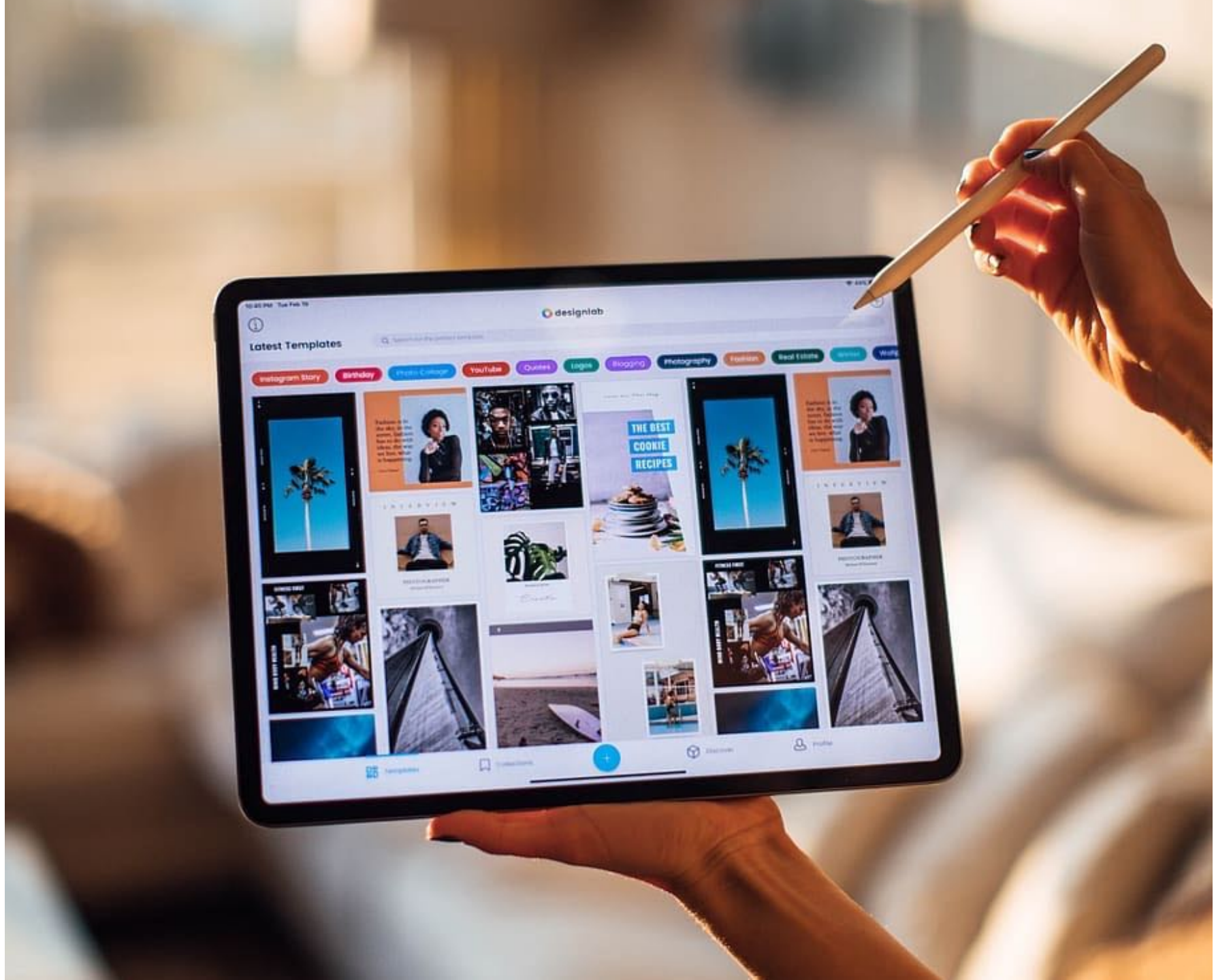

designlab
Latest Templates
Instagram Story
Birthday
YouTube
Quotes
Logos
Blogging
Photography
THE BEST
COOKIE
RECIPES

How do they work?

https://youtu.be/0xZr0-_QvJA?t=430

In this course, you will learn

- Fundamentals
  - How these interactive technologies work

- Practices
  - How to use these technologies to create a new user interface

- Research
  - Foundational as well as state-of art research on interactive technologies

In this course, you will learn

- Fundamentals
  - How these interactive technologies work
  - Sensors
  - Signal Processing
  - Actuators
  - Fabrication Methods

In this course, you will learn

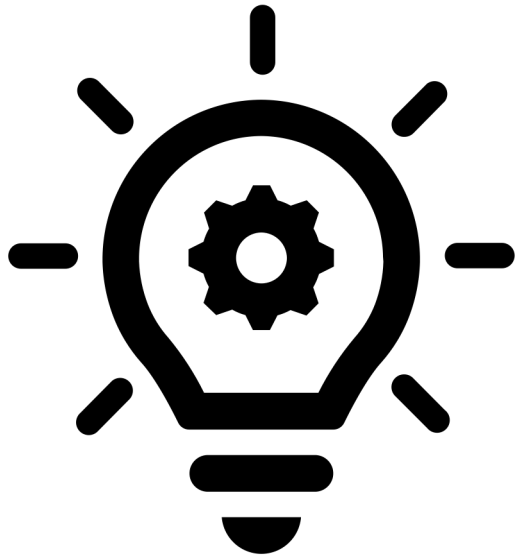
- Practices
  - How to use these technologies to create a new user interface
  - Basic electronics
  - Using Arduino
  - Connecting sensors, actuators, etc.
  - 3D printing

In this course, you will learn

- Research
  - Foundational as well as state-of art research on interactive technologies
  - You'll be exposed to cutting-edge research papers

In this course, you will build

an amazing user interface

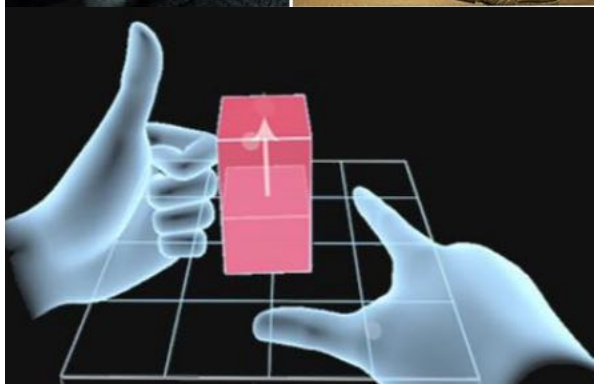


This course will *not* cover

- Basic concepts of HCI
  - If you're new to HCI, I recommend taking a short online course (https://www.coursera.org/learn/human-computer-interaction)

- Programming
  - You should be able to comfortably code in at least one program language to be successfully complete assignments and projects

Course Information



Hello! I'm Seongkook Heo

Assistant Professor
Department of Computer Science

I *build new user interfaces* and
design interaction techniques
for *mobile, wearable, AR/VR computers*

Learn more at:
www.seongkookheo.com

TAs

- Md Aashikur Rahman Azim (ma6zp@virginia.edu)
- 2nd year Ph. D. Student in Computer Science
- Studies HCI, wearable user interface

Learning Objective

You will master the skills

to design and build

an innovative user interface

Course Information

- Course schedule
  - Mon/Wed/Fri 1:00pm – 1:50pm
  - We will alternate between lectures and labs
- Collab for course materials and assignments
- Piazza (or Slack) on Collab for Discussions

Course Information

- Office hours
  - Seongkook Heo: Tue 1pm – 2pm, Rice 524
  - Md Aashikur Rahman Azim: Mon 5pm – 6pm, Rice 442

Course Schedule (Tentative)

	Monday	Wednesday	Friday
Week 1	Introduction	Designing User Interfaces	Touch Interfaces
Week 2	MLK Day	Basic Electronics + Arduino	Basic Electronics + Arduino Lab
Week 3	Sensors I	Sensors II	Sensors Lab
Week 4	Vision Sensors	Signal Processing I	Signal Processing II
Week 5	PROJECT: Team Building	Fabrication I	Fabrication II
Week 6	Actuators I	Actuators II	Actuators Lab
Week 7	PROJECT: Proposal Presentation	Control Systems	Communication
Week 8	Communication Lab	Wizard of Oz	Midterm
Week 9	Spring Break	Spring Break	Spring Break
Week 10	Haptics	Smart Materials	Building circuits
Week 11	Tangible User Interfaces	Wearable Interfaces	Evaluating Interfaces
Week 12	No Class	PROJECT: in-class consultation	PROJECT: in-class consultation
Week 13	Brain-computer interfaces	Soft Interfaces	VR/AR Interfaces
Week 14	Accessibility Design	Sensing from Environment	Pervasive Interfaces
Week 15	PROJECT Work time	PROJECT Work time	PROJECT: Demo & Presentation

In this course, you will

- Learn the fundamentals of interactive technologies
- Practice building interactive systems
- Build a new user interface

In this course, you will (CS4501)

- Learn the fundamentals of interactive technologies
  - Midterm (30%)
- Practice building interactive systems
  - Lab reports (10%), assignments (20%)
- Build a new user interface
  - Project (40%)

In this course, you will (CS6501)

- Learn the fundamentals of interactive technologies
  - Midterm (25%)
- Practice building interactive systems
  - Lab reports (5%), assignments (20%)
- Build a new user interface
  - Project (40%)
- Learn from research papers
  - Weekly reading responses (10%)

Reading responses (CS6501 only)

- Read the weekly paper and write a 300-word response, that may include
  - what you liked/disliked about the paper
  - what you think about the method used
  - what you think could’ve done better
  - what you think can be done from there

Course Policies

- Students must fully comply with all the provisions of the University's Honor Code. All lab reports, assignments, exams, and project must be pledged.
- No phone/laptop use during lecture classes
- Bring a laptop on lab classes

Course Policies

- All reports/assignments due 11:59pm
- You may submit reports until 3 days after the deadline, with 10%, 20%, and 40% penalty.

Assignment #0: Let me know you

- Please answer a short survey here:

http://tiny.cc/eit20

Thank you!