IN4MATX 133: User Interface Software

Lecture 1: Introduction & History

Professor Daniel A. Epstein
TA Jamshir Goorabian
TA Simion Padurean
I’m thrilled that you have decided to take this class!
Product design process

Human-Centered Design, IDEO

Agile Development, Agile Manifesto
Product design process, simplified
User interface implementation

• Has the power to turn ideas into reality

• Often dictates design decisions and timelines, for better or for worse

• Either you will be implementing, or you will need to communicate with your colleagues who are
What is interface implementation today?

Often HTML, CSS, and JavaScript
There are lot of languages and development frameworks. Why do most people use web tools?
Today’s goals

By the end of today, you should be able to...

● Describe how society got to today’s ubiquitous computing

● Hypothesize why web technology has become the de-facto tool for interface development

● Identify your course staff

● Summarize this course’s goals and know how to find policies

● Describe upcoming course tasks
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The Computer for the 21st Century

- By Mark Weiser, Chief Scientist, Xerox Parc
- Published in Scientific American, 1991
- Coined “Ubiquitous Computing”
  - Reflective and speculative
- https://dl.acm.org/citation.cfm?id=329126
Three waves of computing

1. Mainframe computing
2. Personal computing
3. Ubiquitous computing
Three waves of computing

1. Mainframe computing
2. Personal computing
3. Ubiquitous computing
First wave: mainframe computing

- Harvard Mark I
- Large (55 feet wide, 8 feet high, 5 tons)
- Expensive (enclosure alone was $50,000 in 1945!)
- Used to calculate implosion during the Manhattan Project
First wave: mainframe computing

- Batch processing
  - Write your program on punch cards
  - Wait your turn for the computer
  - Run program, hope it works
  - If it doesn't, you'll have to fix it and wait for your next turn
  - Efficient use of resources, but poor interactivity
First wave: mainframe computing

“Many to one”
Vanneaver Bush

- Faculty at MIT
- Oversaw National Defense Research Committee, which led the Manhattan Project
- Post-war, helped define mission of the National Science Foundation
  - Federal government funds universities
  - Universities do basic scientific research
  - Research helps economy and defense
As We May Think

- Published in Atlantic Monthly, 1945


- In part, set out to define a post-war scientific research agenda
  - Speculative, not reflective
Memex (1945 speculative design)

https://www.youtube.com/watch?v=c539cK58ees
(video from 1995 animation presented at SIGIR, not from 1945)
Memex (1945 speculative design)

- Linking information across devices and sources
  - Hypertext, the foundation of the web
- Pen-based annotation of primary sources
Command-Line interfaces (1960’s)

- Originally used in a terminal connected to a mainframe
  - Was eventually integrated into personal computing (in Unix, etc.)
- A person could change execution based on output
- Enabled real-time debugging
Doug Engelbart’s NLS (1968)

Doug Engelbart’s NLS (1968)

- First working hypertext system
- Invention of the mouse
- Simple graphics (earlier systems had this, but used in a full system here)
Doug Engelbart’s NLS (1968)

- It introduced other ideas as well
  - A chording keyboard
  - Remote collaboration
- Some people thought he “faked it”
- Others thought it was irrelevant because “the terminal can do the same”
- Won Turing Award in 1997
Three waves of computing

1. Mainframe computing
2. Personal computing
3. Ubiquitous computing
Second wave: personal computing

- First introduced by Xerox
- Xerox Alto, 1973
  - Mouse
  - Chording keyboard
- Xerox Star, 1981
- Xerox models were commercially unsuccessful
  - Still expensive, too few applications
Second wave: personal computing

Xerox Star (1981)

https://www.youtube.com/watch?v=ODZBL80JPqw
Second wave: personal computing

Xerox Star (1981)

- Software running in windows
- Desktop with icons for navigating between files and programs
- Super slow!
Second wave: personal computing

Macintosh (1984)
Second wave: personal computing

Windows 1.0 (1985)
Second wave: personal computing


- Windowing became primary
- Added games: Solitaire, Minesweeper, and FreeCell!
  - These were a trick to teach mouse skills
Second wave: personal computing

Mosaic Web Browser (1993)

- Originally for Unix systems, later ported to Mac and Windows
- “First” graphical web browser
- Microsoft IE came in 1995
- Apple didn’t make a browser until Safari in 2003
Second wave: personal computing

“One to one”
Three waves of computing

1. Mainframe computing
2. Personal computing
3. Ubiquitous computing
Third wave: ubiquitous computing

- Weiser speculated people would interact with three types of computers
  - Tabs: inch-scale devices, like post-its
  - Pads: foot-scale devices, like paper
  - Boards: yard-scale devices, like whiteboards
- Speculated devices would have shared ownership
Third wave: ubiquitous computing
Third wave: ubiquitous computing

- Lines up with what we use today, for the most part
  - Tabs = phones and watches
  - Pads = tablets and laptops
  - Boards = interactive projectors? smart TVs? augmented reality?
- Still a strong sense of device ownership
Third wave: ubiquitous computing

“One to many”
Three waves of computing

1. Mainframe computing
   "Many to one"

2. Personal computing
   "One to one"

3. Ubiquitous computing
   "One to many"
Think-pair-share:
Why are web tools now the standard for interface development?
One to many, synced over the cloud
One to many, synced over the cloud

- Use HTTP requests to send data to the cloud and receive data from it
  - JavaScript provided early tools to do this
- Render that data with HTML
- Style it with CSS
Ubiquitous computing is, in large part, why web tools are the current standard for interface development
Web tools as the standard

- Nearly every platform needs to communicate with a cloud system
- Most need a web browser so people can access sites
- Shared programming language and development environment enables efficient work
- Developers can write once, deploy to many platforms
  - Hopefully customize style and functionality to the device
- Other reasons?
Today’s goals

By the end of today, you should be able to...

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● Identify your course staff

● Summarize this course’s goals and policies

● Describe upcoming course tasks
Course Overview

- Course staff introductions
- Administraviah
- Topics covered
- A0 (due Monday)
Who we are

Professor Daniel A. Epstein (he/his/him)

- Ph.D. Computer Science & Engineering, University of Washington 2018
- B.S. Computer Science, University of Virginia 2012
- Joined UCI Informatics this July as an Assistant Professor
- Internships at Microsoft & Adobe
Who we are

Way to go! You averaged 8,427 steps on Thursdays!

Anne D. and 62,942 other Fitbit users averaged about the same.
Who we are

Jamshir Goorabian (he/his/him)

• 2nd year Masters in Software Engineering
• B.E. University of Mumbai, Computer Engineering
• Interest in backend development, information retrieval
• Table tennis, video games, alternative rock music
Who we are

Simion Padurean (he/his/him)

- 1st year Masters in Computer Science
- B.S. UC Irvine, Computer Science and Business Economics
- Research in Ubiquitous computing, interest in web development
- Coaches the UC Irvine Kendo Club (looking for new members!)
Staying in touch

- Web: http://inf133-fa18.depstein.net/ (or http://depstein.net/133/)
- Email us: informatics-133-staff@uci.edu
- Slack: https://uci-inf133-fa18.slack.com/
  - Information will go out to Slack first!
- Office hours: on calendar
- Submission: through GitHub Classroom, occasionally on Canvas
- YuJa: I’ll probably mess it up at least once
The syllabus

- Explains due dates/times, assignment policies, quiz goals, etc.
- It probably answers your question
- Please check it before you ask us
Course goals

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

- Build web and mobile interfaces in HTML, CSS, and JavaScript which are sensitive to screen size and a person’s abilities

- Leverage external web APIs (databases, information sources) and device resources (photos, sensors) to lower development burden and enable new capabilities

- For a given design, choose appropriate devices to support and development frameworks to use
Course goals

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Assignments (subject to change)

- A1: Personal web portfolio
- A2: Web communication
- A3: Client/server and authentication
- A4: Mobile development
- A5: Native resources and databases
Quizzes

- Will cover more theoretical knowledge discussed in lecture
  - Rarely (or never) coding, syntax, etc.
  - But may ask what a coding feature, practice, etc. is or when it should be used over another
- In-person, first half of discussion
- Every other week
Participation

• Clicker question, think-pair-share, ask again, discuss
• Device, app, website: it’s all up to you
• Opening laptops, phones, etc. is a risk
  • Students who use electronics during lecture take worse notes and perform worse on exams
  • Devices also distract classmates in the vicinity
• Will start Wednesday, October 3rd
  • “Warm-up” next class
# Calendar overview

Subscription link: [inf133-fa18.depstein.net/calendar.ics](inf133-fa18.depstein.net/calendar.ics)

All deadlines are subject to change, particularly prior to the start of the quarter.

<table>
<thead>
<tr>
<th>Sep 23</th>
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<td></td>
<td><strong>Introduction &amp; History</strong>&lt;br&gt;2:00-2:50</td>
<td><strong>DBH 1100</strong></td>
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<td><strong>A0 Due</strong>&lt;br&gt;Getting to Know You, Getting to Know Us&lt;br&gt;HTML &amp; Accessibility&lt;br&gt;2:00-2:50</td>
<td><strong>DBH 1100</strong></td>
<td><strong>Discussion</strong>&lt;br&gt;7:00-7:50</td>
<td><strong>SH 134</strong></td>
<td><strong>CSS</strong>&lt;br&gt;2:00-2:50</td>
<td><strong>DBH 1100</strong></td>
<td><strong>Responsive Design</strong>&lt;br&gt;2:00-2:50</td>
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<td><strong>Bootstrap</strong>&lt;br&gt;2:00-2:50</td>
<td><strong>DBH 1100</strong></td>
<td><strong>Quiz</strong>&lt;br&gt;HTML, CSS, &amp; Responsiveness&lt;br&gt;7:00-7:50</td>
<td><strong>SH 134</strong></td>
<td><strong>Discussion</strong>&lt;br&gt;7:00-7:50</td>
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<td><strong>A0 Due</strong>&lt;br&gt;Responsive Portfolio in HTML and CSS&lt;br&gt;2:00-2:50</td>
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<td><strong>Jamahir Office Hours</strong>&lt;br&gt;5:00-7:00</td>
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<td><strong>DOM Manipulation</strong>&lt;br&gt;2:00-2:50</td>
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<td><strong>Simhon Office Hours</strong>&lt;br&gt;3:00-5:00</td>
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<td><strong>SH 124</strong></td>
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<td><strong>SH 134</strong></td>
<td><strong>AJAX, Fetch, &amp; Promises</strong>&lt;br&gt;2:00-2:50</td>
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<td><strong>Separation in Angular</strong>&lt;br&gt;2:00-2:50</td>
<td><strong>DBH 1100</strong></td>
<td><strong>Quiz</strong>&lt;br&gt;Asynchronous JavaScript &amp; Data Retrieval&lt;br&gt;7:00-7:50</td>
<td><strong>SH 124</strong></td>
<td><strong>A0 Due</strong>&lt;br&gt;JavaScript &amp; TypeScript&lt;br&gt;2:00-2:50</td>
<td><strong>DBH 1100</strong></td>
<td><strong>HTTP Requests &amp; Security</strong>&lt;br&gt;2:00-2:50</td>
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A0 due Monday!

- Background survey
  - What other classes you’ve taken
- 1-slide upload
  - Preferred name, pronouns, picture
- Syllabus quiz
  - Take it until you get 100%
  - Have to re-take the whole quiz, rather than per-question
  - Sorry about that, I’ll find a better tool next year
Reflection

• This is an applied course with a lot of programming.
• We’ll teach principles and languages at a high level, but you’ll need to pick up the specifics of APIs, packages, etc. on your own.
• We’re happy to help, but we haven’t used every aspect of every API.
Reflection

- We have high expectations
  - We want you to make cool things
- But we also care and will listen
  - Let us know how things are going, ask questions
- Be “all in”
  - If you’re not ready to commit, please drop now
  - Someone else will be happy to take your spot
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