Building Responsive Websites
(CSCI-GA.3033-011)

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In the Beginning: Introductions
This Course Is Experimental!
I Am Teaching This Course for the First Time

• Built two small responsive websites last year
  • One private, one my NYU CS home page

• Strongly believe this is the future of web design
  • Mobile devices are becoming more popular by the month!

• But need to develop syllabus & materials as we go along
Technologies Are in Constant Flux

- Web technologies are standardized, but
  - Standards are changing
  - Browsers are changing much faster
    - Are experimenting with new features
    - Are incomplete and buggy
- Some best common practices, but no science
  - E.g., HTML5 Boilerplate
One Class Project

• Goal: develop a new, responsive website for this department

• Based on my believe in learning by doing
  • And having real impact!
    • Department will seriously consider our “product”

• But we may get overwhelmed by
  • Size of project itself
  • Managing the project
Please Please Please
Please Participate

• In and outside class
• On project and on class itself

• I am counting on you!
  • Please raise issues, ask questions, make comments, contribute code...
  • Ground rule: you are free to interrupt
Challenges in Building Websites
Mobile Devices Are Taking Over...

• According to StatCounter
  • December 2011: 8.04%
  • December 2012: 14.55%

• And this makes everything variable...
Screen Size

• Smartphones, tablets, laptops, desktops
  • Subpar phone: 240 by 320 pixels
  • 27” desktop: 2,560 by 1,440 pixels
Screen Density

• In the old days: one logical is one device pixel

• Nowadays: One logical is $x$ device pixels
  • $x=2$ on current iPhone and iPad
  • $x=1.0, 1.325, 1.5, 1.6, 1.7, \text{ or } 2.0$ on others
User Interaction

• In the old days: pointing devices
  • Mice, trackpads, tablets

• Nowadays: touchscreen
  • Cannot “hover” over content
Network Connectivity

- Wired ethernet, wifi, and cellular data
  - Both bandwidth and latency vary widely
    - Especially, for 2nd and 3rd generation cellular data networks
The Three Languages of the Web

- Hypertext markup language (HTML) for content
  - Focus on semantics
- Cascading style sheets (CSS) for presentation
  - Focus on layout, typography, etc.
- JavaScript for dynamic behavior
  - Focus on user interaction

- Reminiscent of Model-View-Controller separation for user interface libraries
One Website to Rule Them All?
Key Enabling Technology

• CSS Media Query
  • Rules specific for given media feature, incl.
    • Medium (e.g., screen vs print)
    • Size of medium
  • More fundamentally: CSS
    • Cascade determines which rule applies when many different rules do apply
So, What Do We Do?

• Screen size: media queries
• Screen density: responsive images
• User interaction: do not assume pointing device
• Network connectivity: keep website lean & mean
• “Design for mobile first!”
[Demo]
Challenges in Building One Website
There Is Lots to Do

• Organization
  • Structure of website: easy to browse & search
• Markup
  • Semantics of content, shared elements
• Search Engine Optimization
  • Making information easy to find
  • Think keywords, people’s addresses
There Is Lots to Do (2)

• Layout
  • Making the content responsive to media differences

• Styling
  • Detailed rules for different elements and different classes of same elements
    • E.g.: `<dl>` can encode
      • List of terms and explanations
      • Schedule
There Is Lots to Do (3)

• Dynamic behavior
  • Sometimes we just need code
    • Navigation on small devices
    • Responsive images
• Database integration
  • Not all content is static
There Is Lots to Do (4)

• Infrastructure & testing
  • We need tools to manage project
  • And we need to make sure website works
    • Chrome, Firefox, Internet Explorer, Safari,…
• Documentation
  • We need to make sure others can take over
Practical Matters
Textbook

• There is *no* required textbook
  • We will rely on internet sites and posts instead

• If you want to read a book, check out
  • Ethan Marcotte’s “Responsive Web Design”
    • Discount code from A Book Apart
Class Notes

• Each class, one student serves as scribe
  • Lets me focus on technical & organizational content
  • Notes capture spoken discussion
    • Written up using (responsive) HTML template
    • Emailed to me by Friday night
• One complication
  • 13 meetings vs (currently) 16 students
  • But also need project documentation
Mailing List

- `csci_ga_3033_011_sp13@cs.nyu.edu`

- You should already be subscribed
- Primary means of communication outside class
  - For announcements, questions, suggestions
  - About class *and* project!
Grading

• At end of term, I need to assign letter grades
  • Participation in class
    • One factor: note taking
  • Quality of contribution to project

• What do you think?
Questions?

Comments?
Our Starting Point: The Current Website
by Daniel Tsadok