Projects!

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~mea‘ala~

How was career fair/IDHack?

Newsflash

- Twitter posted its first-ever profit (link)
- Amazon lays off hundreds of employees in HQ (link)
- In web design, everything easy is hard again (link)
- Facebook lost around 2.8 million U.S. users under 25 last year (link)
- German court rules FB use of personal data is illegal (link)
- Unilever to pull its $2.4B ads from Facebook and Google over toxic content (link)
- FCC report finds almost no broadband competition at 100Mbps speeds (link)

What is this personal project nonsense?

- Companies expect you to have personal projects on your resume
- There's not much time in a normal college education to do a project
- We can provide you with guidance
- Make something that you think is useful or a good learning opportunity for you

What we expect of you

- Project proposal
- Project specification & plan
- Prototype/MVP development
- Final project
  - You define what final means
- Final presentation

Options

Software

- Pick literally any language/stack you want
- Publish the end product on the internet somehow (even if you aren't working on a website project)
- Publish code through GitHub (open source)

Hardware

- Design in CAD
- Prototype something here at the maker space
- Order boards online
- Use Arduino/RPi/some other pre-made board
- Use FPGA

Academic Paper

- Want to publish some heavy investigative work?
  - Super valuable if your endgame plan is graduate school and/or academia
- Have a *new* and *exciting* idea that you think others could build on?
- Like writing and editing and making figures?

Topic of your choice

The world is your oyster! Propose something to us and we'll see if it's reasonable!

Example flow

Step 1: Brainstorm

- Think about what you want to accomplish through this project
  - Working on a particular hot topic of interest
  - Addressing or solving a particular issue
- Be proactive about being inspired
  - Hacker News
  - lobste.rs
  - Pay attention to what you want and need, day-to-day
  - *What industry can you disrupt? /s*

Brainstorming Time!

Step 2a: Draft Proposal

- *Very* informal
- Don't forget to explain what purpose of project is

Name: Carmichael Outlet Finder

Abstract: I noticed I often go to Carm to work, but my laptop battery life isn't great and sometimes the outlets are all taken. I want to make a website that maps which outlets in the dining area are available for use. It should update every couple of minutes so that I never get sniped. It should also predict if there will be any available when I get there, but maybe that can be a stretch goal.

Plan: I'll make an IoT hardware device that plugs into each outlet that notifies my server when that outlet is in use, which will be reflected on my website which I will also develop myself.

Step 2b: Proposal Review

- Bring *hard copy* proposal into class
- Mark up your neighbor's copy
- Post the edited versions on Piazza for commentary

"Yuki, I think that is an ambitious project. Not only are hardware projects by nature harder — you have added additional complexity by having to deal with Tufts admin. If you think you can design & fabricate the appropriate boards and set up the server, go for it.

This project also exists in some form; check out WattBox."

Step 3a: Specification & Timeline

- A formal specification of your project, along with a timeline on when you plan to finish what part
- List what technology to work with for what part
- Be realistic (or even conservative) with your goals, because *you will be evaluated on timeliness*
    - Include learning when planning your goals

Specification is too long/detailed to be listed here. Some samples available upon request.

Timeline:

March 1: Finish HTML/CSS Tutorial

March 8: Finish React Native Tutorial

March 10: Sketch out the design of the project in more detail

April 1: MVP done

April 14: Extended featureset done

April 30: Writeup finished

Step 3b: Spec + Timeline Review

- We will also provide suggestions on resources to use for learning

“Yuki, I’m a little concerned that you left the same amount of time for reading tutorials as doing the MVP. I think you will be a little bit crunched for time toward the back-end of your project. I would either allocate more time at the front for learning and prototyping or pick something slightly less ambitious.

I suggest the following resources:

Learning React Native:
https://facebook.github.io/react-native/docs/tutorial.html

Javascript Syntax:
https://learnxinyminutes.com/docs/javascript/

Step 4: Prototype & develop a Minimum Viable Product

- May not look pretty, but all the functionality is there
- Can be further built upon
- A reasonable amount of thought went into the design

May be a website, command-line tool, 3D-printed version of your final project, or rough write-up of your paper. Something like that. But it should contain the core of what you are trying to build.

In our case, it would probably be a small Raspberry Pi or other mobile computer that could detect if there was current on a wire and report that to another machine on the network.

Step 5: Features and polish

- You've made a small MVP, but now it's time to nail down exactly what you want your project to look like
- Should have all of the features outlined in the specification, unless you have adapted the specification along the way
- Documentation and "nice things" are good to have

Your project probably now has help menus, a better design (UI & UX), and you've taken into account some feedback from peers to improve it.

In our case, the small board would be put into some kind of housing and would have a model for how much current constitutes something being plugged in, and the data-collecting device now has a nice display & map for all of the networked outlets.

Step 6: Write-up + Presentation

- Blog-post style
- Has pictures, maybe snippets of code
- Documents some pain points and how you got around them
- Demo of final product
- Lessons learned

Write-up would be too long to post here in its entirety, but samples are available upon request.

Homework 2

- Proposal due Feb 21 **BEFORE CLASS**
  - Bring *paper copy* to class for critique!!
  - Post revised version on Piazza by 11:59pm