Project Management 101: How to start your project

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Story Time!

6.148 Staff Implements Catbook

go.6148.io/catbook-designdoc
DISCLAIMER: This is how we worked on this project.

You do not have to do this.
Step 1: Decide what Catbook provides to its users

1. Users of the app are able to login using their facebook
2. Users can post stories and comments to stories
3. Stories can contain text and images
4. Comments can only be text

--- MVP features ---

5. Users can add other users as friends
6. Users can see their friends’ stories on their home pages (now it shows ALL posts)
7. Users can like stories and comments
8. Users can customize their Profile info
Step 2: Decide what technical features Catbook has

Server-side Features:

1. Catbook’s pages (index.html, profile.html) are served by an Express server
2. Catbook’s API for serving users, stories and comments are also provided by the Express server
3. The users, stories and comments are stored on mLab and fetched using Mongoose in the Express Server
4. Users authenticate using Passport.js
5. Image storage is handled by Amazon S3
6. Pages will be updated real-time using Socket.io
Step 2: Decide what technical features Catbook has

Client-side features:

1. Page layouting uses Bootstrap
2. Socket.io is used to allow real-time rendering of new stories and comments
Step 2: Decide what technical features Catbook has

Technologies used:

Server-side: Express, Mongoose, Passport
  Socket.io (be tuned for friday!), S3 (be tuned for friday!)

Client-side: Bootstrap, Socket.io (be tuned for friday!)
Step 3: Create a Design Document

What pages should we create:

View Endpoints

/ : home page shows most recent stories and comments
/u/profile? : profile page shows a user’s profile
/facebook/auth/ : Oauth login
/lougout : logout
Step 3: Create a Design Document

What does the Catbook API provide

**API Endpoints**

/api/whoami: GET currently logged in user
/api/story: GET existing stories, POST new stories
/api/comment: GET existing comments, POST new comments
Step 3: Create a Design Document

What do our data models look like

```json
UserSchema {
    name: String,
    fbid: String,
    last_post: String,
}

StorySchema {
    creator_id: String,
    creator_name: String,
    content: String,
}

CommentSchema {
    creator_id: String,
    creator_name: String,
    parent: String,
    content: String,
}
```
Step 3: Create a Design Document

Structure of codebase...

- `src/app.js` entry point of the app
- `src/db.js` configures mlab connection
- `src/passport.js` configures passport
- `src/models` contains Mongoose models
- `src/views` contains html templates
- `src/routes/api` api routing
- `src/routes/views` view routing
Step 3: Create a Design Document

(cont’d) Structure of codebase...

- **Clientside**
  - `public/js/api` helper functions for making GET and POST requests
  - `public/js/feed` helper functions for populating stories and comments and rendering the news feed
  - `public/js/navbar` helper functions for rendering the navbar
  - `public/js/index` main function call for `/` view
  - `public/js/profile` main function call for `/u/profile` view
  - `public/css` css styling
Step 4: Create Actionables

<table>
<thead>
<tr>
<th>Blocked</th>
<th>To do</th>
</tr>
</thead>
<tbody>
<tr>
<td>➔ Bootstrap the pages (stylish)</td>
<td>➔ Create home &amp; profile pages</td>
</tr>
<tr>
<td>➔ Secure POST requests to be allowed only from registered users</td>
<td>➔ Write client.js to render stories &amp; comments</td>
</tr>
<tr>
<td>➔ Socket.io real-time rendering of stories &amp; comments</td>
<td>➔ Create /api/story &amp; /api/annkat endpoints</td>
</tr>
<tr>
<td></td>
<td>➔ Figure out Amazon S3 image hosting</td>
</tr>
</tbody>
</table>
Step 5: Making Changes

During implementation, I realize I need to change the data model. I first:

1. Update the Design Document to be up to date to what I intend the implementation to be
2. Tell your teammates that you updated the design doc
3. Change the implementation as required
Episode 1

I started working on Catbook over winter break… this is what it looked like
Focus on what’s important

In all due honesty, in order for me to implement 40% of the client side js (namely api.js, feed.js, navbar.js etc.) this was enough…

When you’re working on a feature, zoom in on the feature at hand.

/.It’s hard to keep track of more than one thing when you’re writing new code.
Episode 2

At some point this shitty UI... started to make it difficult to continue development...

- The page was getting too cluttered so I couldn’t see what was going on
- I needed a grasp on how this will look like to decide how to implement how new story and comment forms should look (where they should be positioned)

... soooo I stopped procrastinating having to fiddle with some bootstrap and css and made a very minimalistic change to the UI so the page was easier to read
Ben: Foo bar baz
Alice: Baz bar foo
Eve: Bar baz foo

Monde Dinkharjav: foo
Monde Dinkharjav: baz
Monde Dinkharjav: foo
Monde Dinkharjav: new comment!!

Monde Dinkharjav: foo
Monde Dinkharjav: new post
Monde Dinkharjav: hi friends
Monde Dinkharjav: foo
Monde Dinkharjav: hello world
Monde Dinkharjav: this is a new post
Monde Dinkharjav: Newest Post!
Monde Dinkharjav: sick new post
Monde Dinkharjav: things seem to be working
Monde Dinkharjav: and new comments too
Monde Dinkharjav:
Monde Dinkharjav:
Monde Dinkharjav: Newest Story
Monde Dinkharjav: new story!!!!
You can add temporary features if necessary

Designing a good look took me some time (I’m bad at bootstrap).... but

Applying this change in the html, css and client side js was really easy...

the process was mindless. I knew what adjustment every element needed to have... so I just did it.

There was little room for me to screw it up because the application logic worked already.

I was just adding dressing.
Episode 3

My flight from home to Boston had one layover and took a total of 19 hours. 19 hours I was offline for. But we needed to get work done on Catbook in time for classes.

- I had completed most of these tasks. There were tasks that were to be completed
- Socket.io wasn’t working yet
- The app was still ugly

When I loaded up the app after I got off my flight… this is what I saw
This is lit bois and gurls. I am using MIT OpenID. You can check out this branch with "git checkout mitopenid" on Catbook bois and gurls.

Roebert M Vunanbandi
Yo what's up!!!!!

Andrea Jackson
hi!

Robert M. Vunanbandi
hello!
UNBLOCKING!

Try to unblock as many tasks during development.

It allows you to parallelize a lot of work and have high efficiency within your team.
Episode 4

By this point, everything about our project was different:

- The Database models had changed
- The client-side javascript no longer used Promises. We switched to callbacks
- Names of endpoints changed several times

During this, the 4 people who were closely working on Catbook were always on the same page as we could refer to the Design Document and update it when necessary

Evidence of old StoryModel -->

```javascript
// define a schema
var StoryModelSchema = new mongoose.Schema({
  owner: String,
  message: String,
  comment_ids: String,
});
```
Iterative design... It’s the journey that matters

1. Design the website iteratively. Without the process of writing small scale code and adding more complexity, you can’t reach the goal of having a complex codebase
2. Keep good communication! That’s the most important thing in working on these projects! It’s important to get efficient communication without micromanaging your teammates.
   - Your implementation of some helper functions, for the most part, doesn’t matter to your teammates. If it works it works
   - The specs of the functions you’re sharing with teammates is IMPORTANT
Episode 5... the last one

In the making of these slides, I needed to pull up older versions of the app to get you guys screenshots. I opened the repo and typed:

git log --graph --oneline --decorate
Small details to make life better

1. Don’t think too hard about this (it really doesn’t matter for the scale of project we’re doing for 6.148) but try to make sensical commit messages.
2. Commit often. Try not to commit completely broken things.
Git gud
Monde Duinkharjav
Last time

git add <filename>

git commit -m "some commit name"

git pull

git push
Today

Inspecting the state of your machine

Inspecting the state of the cloud

Some useful commands
git status
# On branch master
# Changes to be committed:
# (use "git reset HEAD <file>..." to unstage)
#
# modified: hello.py
#
# Changes not staged for commit:
# (use "git add <file>..." to update what will be committed)
# (use "git checkout -- <file>..." to discard changes in working directory)
#
# modified: main.py
#
# Untracked files:
# (use "git add <file>..." to include in what will be committed)
#
#hello.pyc
git log --graph --decorate --oneline
Merged parallel code into master

c6314fe (origin/parallel, parallel) Made a few changes to reduce number of races, renamed sort incremental function to sort races yet
c7bb2bb Added CILKSAN flag to Makefile
cf440c Added initial parallelization, haven't gotten CILKSAN to work and check yet
d28f848 Inlined evaluate_move
b8ba827 Inlined most of move_gen.c into move_gen.h.
b59f3cb Addressed MITPOSSE comment

69a4f33 Dependency directories satisfied

38b6f41 Got rid of pcentral
55205c61 Revert "Saving pcentral. Not very useful"
cd23ff4 Saving pcentral. Not very useful
690d2a3 directory dependencies satisfied

b7a61d7 Revert "Compressed moves"
44b0565 Compressed moves
62580e2 Compressed piece representation
6931d08 Revert "Reusing some laser maps"
2a0e87 Reusing some laser maps
fb89a5 reference 3.0 added
dc89531 fen_boards.txt added
d98f9298 Sped up mark_laser_path very slightly
4fb74c3 Merge branch 'master' of /afs/athena.mit.edu/course/6.6.172/student-repos/fa16/projects/project4/budmonde-jefflu-parke-rsridhar

80e3a5a small correctness checks made
6f4c7dc dump files included in gitignore
7a3da2a new reference binary
999d388 Working version 1.0 merge

16de87b correctness tests were extended further
019d3ce Rounded after multiplying hsquares by factor

1abef9 Merge branch 'board_state_changes'

2e59768 (origin/board_state_changes) Added bigger input file, added fix to bug in endgame
<alphanumeric of len 7>
c6314fe (origin/parallel, parallel) Made a few changes to reduce number of races, renamed sort_incremental function to sort races yet
7cbb2bb Added CILKSAN flag to Makefile
e54440c Added initial parallelization, haven't gotten CILKSAN to work and check
69a4f33 Dependency directories satisfied
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5205f61 Revert "Saving pcentral. Not very useful"
cd3f4 Saving pcentral. Not very useful
69d6a3 directory dependencies satisfied
b7a61d7 Revert "Compressed moves"
447e655 Compressed moves
6280e2 Compressed piece representation
6931d08 Revert "Reusing some laser maps"
2de01e Reusing some laser maps
f8b9a5 reference 3.0 added
dc8931 file boards.txt added
d98fb29 Sped up mark_laser_path very slightly
4fb79e3 Merge branch 'master' of /afs/athena.mit.edu/course/6/6.172/student-repos/bdmonde/projects/project4/budmonde-jefflu-parke-rsridhar
80e3a5a small correctness checks made
6f47dc dump files included in gitignore
7a3da2 new reference binary
999d388 Working version 1.0 merge
16d87b correctness tests were extended further
019d3ce Rounded after multiplying hsquares by factor
1ab18f9 Merge branch 'board_state_changes'
2e59768 (origin/board_state_changes) Added bigger input file, added fix to bug in endgame
master
origin/master
c6314fe (origin/parallel, parallel) Made a few changes to reduce number of races, renamed sort_incremental function to sort races yet.

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69a4f33 Dependency directories satisfied.

38b6f41 Got rid of pcentral.

a520561 Revert "saving pcentral. Not very useful"

cd23ff4 Saving pcentral. Not very useful.

696d2a3 directory dependencies satisfied.

b7a61d7 Revert "Compressed moves"

447e655 Compressed moves.

62580e2 Compressed piece representation.

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fb489a5 reference 3.0 added.

dc89531 fen_boards.txt added.

d98fb29 Sped up mark_laser_path very slightly.


80e3a5a small correctness checks made.

6f4c7dc dump files included in gitignore.

7a3db2a new reference binary.

999d388 Working version 1.0 merge.

16d87b correctness tests were extended further.

019d3ce Rounded after multiplying h2abes by factor.

1ab18f9 Merge branch 'board_state_changes'.

2e59768 (origin/board_state_changes) Added bigger input file, added fix to bug in endgame.
<branch name>
What are remotes?
6512686 (HEAD, origin/master, origin/HEAD, master) Merged parallel code into master

* c6314fe (origin/parallel, parallel) Made a few changes to reduce number of races, renamed sort incremental function to sort races yet
* 7cbb2bb Added CILKSAN flag to Makefile
* e54440c Added initial parallelization, haven't gotten CILKSAN to work and check yet

* d27bf48 Inlined evaluate_move
* b8ba27 Inlined most of move_gen.c into move_gen.h.
* b59f36c Addressed MITPOSSE comment

69a4f33 Dependency directories satisfied

* 38b6f41 Got rid of pcentral
* a520561 Revert "Saving pcentral. Not very useful"
* cd23ff4 Saving pcentral. Not very useful
* 696d2a3 directory dependencies satisfied

* b7a6d17 Revert "Compressed moves"
* 447a655 Compressed moves
* 62580e2 Compressed piece representation
* 6931d08 Revert "Reusing some laser maps"
* 2de01e7 Reusing some laser maps
* fb489a5 reference 3.0 added
* dc89531 fen_boards.txt added
* 9d9fb29 Sped up mark_laser_path very slightly

4fb79e3 Merge branch 'master' of /afs/athena.mit.edu/course/6/6.172/student-repos/fal16/projects/project4/budmonde-jefflu-parke-rsridhar

* 80e3a5a small correctness checks made
* 6f4c7dc dump files included in gitignore
* 7a3daa new reference binary
* 999d388 Working version 1.0 merge

16d187b correctness tests were extended further
* 019d3ce Rounded after multiplying hsquares by factor

1ab18f9 Merge branch 'board_state_changes'

2e59768 (origin/board_state_changes) Added bigger input file, added fix to bug in endgame
HEAD
origin/HEAD
Detached HEAD
Detached HEAD

SPOOOOKY
It just means your HEAD is not on the tip of a branch
Cheat sheet

origin in the cloud

No origin on your machine

If you’re ahead of origin, push

If you’re behind origin, pull
git stash
Saves your changes since latest commit and saves it in a buffer
A short aside on using git

These are personal preferences: Commit messages should be

- shorter then say 70 or so characters (fits in one line)
- First letter capitalized (consistency in how commits look)
- Written in authoritative form (helps you think what you did in this commit)
A short aside on using git

Should your team use branches?

- Facebook and Google has only one master branch!
- I’ve found that for 80% of the projects I’ve worked on, branching was redundant.
- There was one very useful use case when I was taking 6.172. I was experimenting an implementation that I was 50%/50% sure I’d either apply all these changes to master if it works, or not apply any of them if it doesn’t.