From setting up stack to an API client library in one evening

A Haskell Workshop

Motivation

- Haskell is too elegant to be confined to a small niche, let's not take the "Avoid success at all costs" to an extreme.

- For simple projects the initial boiler-plate can be more daunting than the code itself.

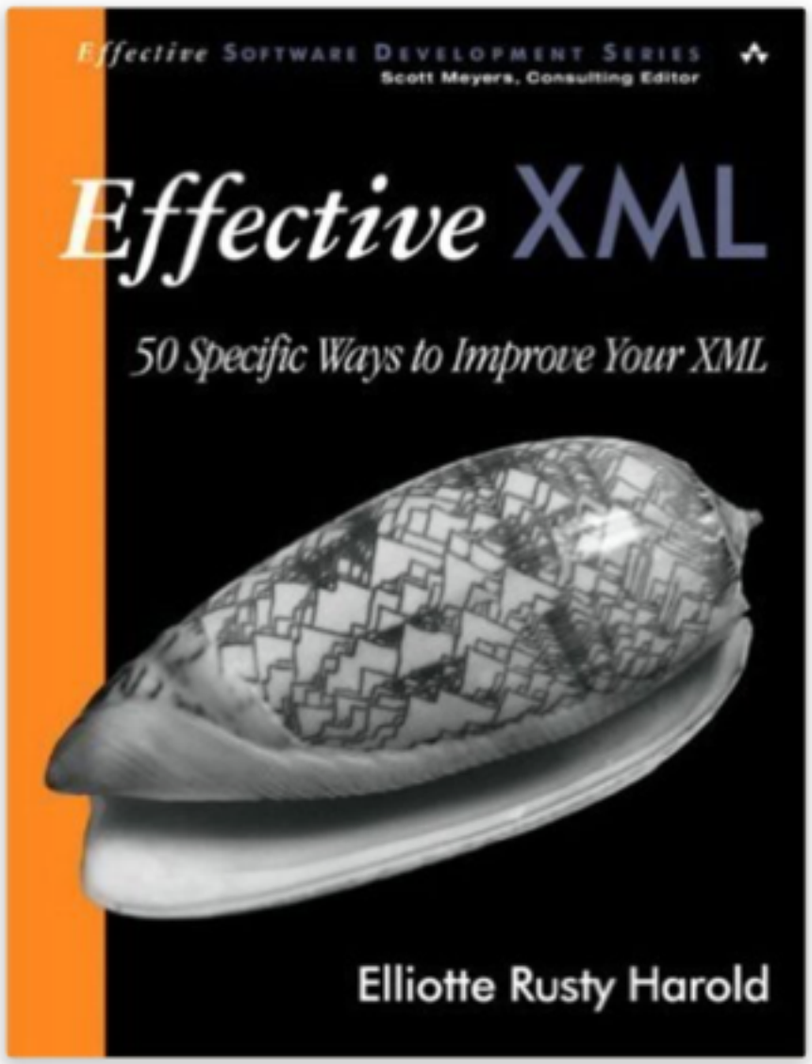
- API wrappers are easy to create and quite useful.

- As an added bonus we get to learn a bit about lenses and a tool for more general HTTP interaction.

Motivation

- So I was browsing the fiction shelves in a local bookstore and saw this…

Motivation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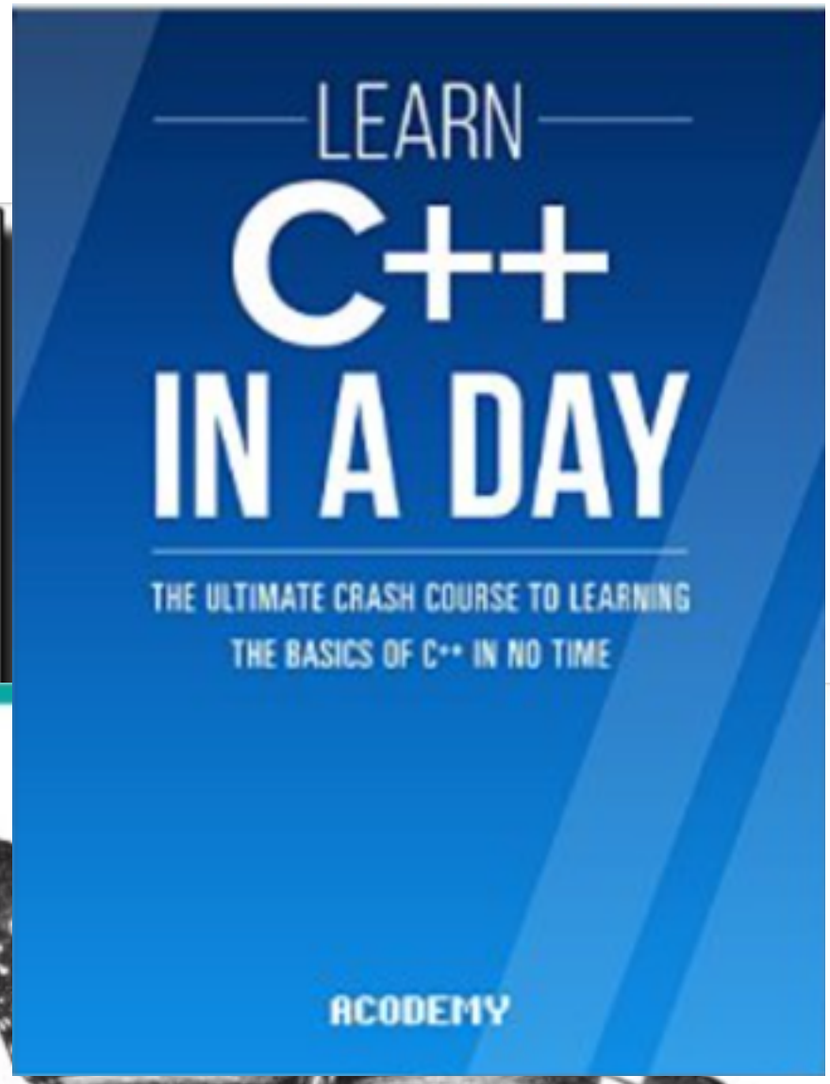
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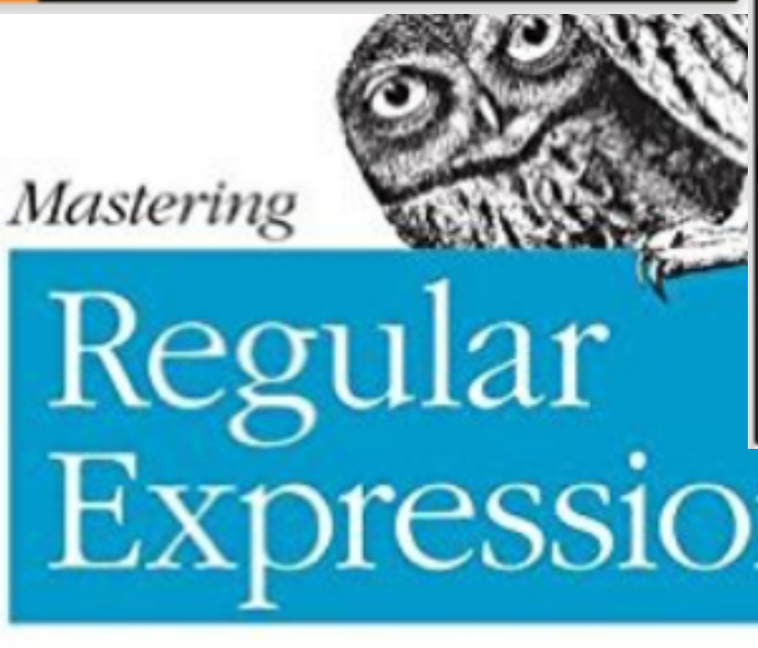
Mastering
Regular
Expressions


JavaScript:
The Good Parts

Stack

- Created to solve some shortcomings of the cabal toolchain, specially the “reproducible build” problem.

- It installs ghc, manages and shares dependencies, and keeps track of each project’s environment.

- LTS and Nightly repositories

Stack

```
# First let’s install and take a look at the options

$ brew install haskell-stack

# On linux take a look at http://docs.haskellstack.org/en/stable/
README.html

$ stack

# Now let’s see what are the available templates

$ stack templates

# Finally we can create our project

$ stack new api chrisdone
```

Stack

```
# Now we install our compiler and dependencies

$ cd api
$ stack setup
$ stack test
```

Wreq

- Oficial website: http://www.serpentine.com/wreq/
- Built on top of **http-client** and **lens**
- Session handling: keep-alive, pooling, and cookies
- Powerful multipart form and file upload handling
- **Basic** and **OAuth2** bearer authentication

Wreq Setup

- Let’s give it a try.

- Edit api.cabal

Wreq Setup

```
…

build-depends:       base >= 4.7 && < 5
                   , wreq
                   , lens
                   , aeson
                   , lens-aeson
                   , text
 default-language:    Haskell2010
 default-extensions:  OverloadedStrings

…
```

Stack and Dependencies

- We are using packages without version constraints just for easy discovery of current stockage versions
- DO NOT publish packages like this
- After install we can edit the cabal file and inform the proper versions constraints for each package.

Wreq Quick Tour

```
$ stack ghci
*Main Lib> import Network.Wreq
*Main Lib Network.Wreq> import Control.Lens
*Main …> import Data.Aeson.Lens

*Main …> let opts = defaults & param "q" .~ ["tetris"] & param
"language" .~ ["haskell"]
*Main …> r <- getWith opts "https://api.github.com/search/repositories"
*Main …> r ^. responseBody . key "items" . values . key "owner" . key
"login" . _String
```

Lenses

- Oficial website: http://lens.github.io
- Here is a good intro: http://begriffs.com/posts/2016-01-07-clear-intro-to-lenses.html
- Intimidating at first, they completely change the code style.
- Take a look at functional references

Lenses Cheat-Sheet

Operation	Operator	Function
Get	^.	view
Set	.~	set

Aeson

- JSON encoder/decoder
- Uses Type Classes FromJSON and ToJSON
- Can be used with Generics for fun and profit!

Aeson + Wreq

```
 …

default-extensions:  OverloadedStrings, DeriveGeneric

…
```

Aeson + Wreq

```
$ stack ghci
*Main Lib> import Network.Wreq
*Main Lib Network.Wreq> import GHC.Generics
*Main …> import Data.Aeson

*Main …> data Addr = Addr Int String deriving (Generic)
*Main …> instance ToJSON Addr
*Main …> let addr = Addr 1600 "Pennsylvania"
*Main …> post "http://httpbin.org/post" (toJSON addr)
```

What are we coding today?

- Very simple client for Pivotal Tracker API.
- It's a project management tool based on sprints and user stories.
- API docs: https://www.pivotaltracker.com/help/api
- We just want to show data of a specific story.

Pivotal Tracker API

- Returns JSON documents using a simple authentication token.

- Story resource: https://www.pivotaltracker.com/help/api/rest/v5#story_resource

- Story endpoint: https://www.pivotaltracker.com/help/api/rest/v5#Story

You should be able to run this code after implementing your library

```
module Main where

import Network.Wreq (defaults)
import Control.Lens ((^.))
import Lib ( withToken
           , getStory
           , name
           )

main :: IO ()
main = do
    story <- getStory authentication projectId storyId
    print $ story ^. name
    where
      authentication = withToken "7f3f76bc6ae8c48e7b528369c999c8d8"
defaults
      projectId = 1440520
      storyId = 104591424
```

To run your app

```
$ stack exec api-exe
```

Too easy?

- If you finished try implementing some tests.
- You can run them using **stack test.**
- There is already a template for you in the test dir.