Promises and chaining

Into callback hell … back again

About Hans

@otype

hans@otype.de

meltwater

```
function Disclaimer() {
  // Please note ...
}
```

Intro:

sync, async, callbacks

Humans are multi-threaded!

Javascript is single-threaded & synchronous.

Browsers provide asynchrony*.

start

a()

b()

c()

finish

a()

b()

c()

start

a()
b()
c()

finish

a() b() c() c(),a()
b() a() b() b() ...
c() c() a()


sync
async

Why async?

```
function getRemoteData() {
  // Long-running call
}

var remoteData = getRemoteData();
alert(remoteData);
```

Synchronous flow, here? Bad idea!

"Callbacks to the rescue!"

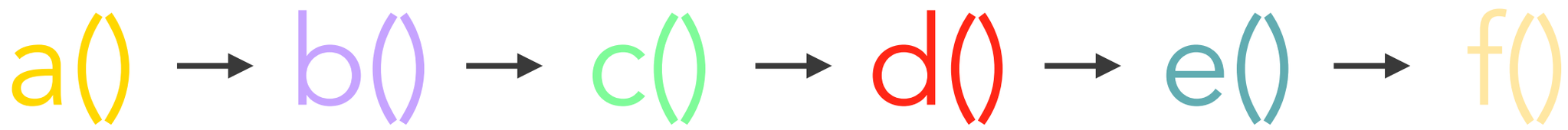

"Call me back!"

```
function getRemoteData(done) {
  var results = {};
  // ... long-running call with results ...
  done(results);
}

getRemoteData(function (remoteData) {
  alert(remoteData);
});
```

Use a callback! Way better!

Got it!



Callbacks in order?

```
a(function (resultsFromA) {
  b(resultsFromA, function (resultsFromB) {
    c(resultsFromB, function (resultsFromC) {
      d(resultsFromC, function (resultsFromD) {
        e(resultsFromD, function (resultsFromE) {
          f(resultsFromE, function (resultsFromF) {
            console.log(resultsFromF);
          })
        })
      })
    })
  })
});
```

"Pyramid of doom!"

```
a(function (resultsFromA) {
  b(resultsFromA, function (resultsFromB) {
    c(resultsFromB, function (resultsFromC) {
      d(resultsFromC, function (resultsFromD) {
        e(resultsFromD, function (resultsFromE) {
          f(resultsFromE, function (resultsFromF) {
            console.log(resultsFromF);
          })
        })
      })
    })
  })
});
```

"I am NOT going to debug that!"

"Free ticket into callback hell!"

```
95          };
96
97          /**
98           * Retrieve data from REST API, then store into database
99           *
100          * @param companyId
101          * @param done
102          */
103         campaignsService.retrieveAndStore = function (companyId, done) {
104             Log.d('Retrieving Campaigns for companyId=' + companyId + '.');
105
106             /* 1. Get all from DB */
107             DbCampaigns.fetchByCompanyId(companyId, function (dbCampaigns) {
108
109                 /* 2. Retrieve campaigns from API */
110                 ApiCampaigns.fetchAllByCompanyId(companyId, function (apiCampaigns) {
111                     if (apiCampaigns.length !== 0) {
112
113                         /* Filter */
114                         var filteredCampaigns = campaignsService.filterCampaignLists(
115                             campaignsService.createIdList(dbCampaigns),
116                             campaignsService.createIdList(apiCampaigns)
117                         );
118
119                         /* convert the ID lists back into campaign lists with full objects */
120                         var dbCampaignsToDelete = campaignsService.createCampaignsListFromIdList(
121                                 filteredCampaigns.dbCampaignIdsToDelete,
122                                 dbCampaigns
123                             ),
124                             apiCampaignsToStore = campaignsService.createCampaignsListFromIdList(
125                                 filteredCampaigns.apiCampaignIdsToAdd,
126                                 apiCampaigns
127                             );
128
129                         if (dbCampaignsToDelete && dbCampaignsToDelete.length > 0) {
130                             DbCampaigns.deleteAll(dbCampaignsToDelete, function () {
131                                 DbCampaigns.storeAll(apiCampaignsToStore, companyId, done, done);
132                             }, done);
133                         } else {
134                             DbCampaigns.storeAll(apiCampaignsToStore, companyId, done, done);
135                         }
136                     } else {
137                         if (done) {
138                             done();
139                         }
140                     }
141                 }, done);
142             }, done);
143         };
144
145         /**
```

Core:

Promises to the rescue

"I hereby give you a promise that I will answer your question some time in the future … but not right now!"

My definition of a promise

Promise

fulfilled

rejected

pending

settled

kriskowal/q

cujojs/when

tildeio/rsvp.js

WinJS.Promise

Still experimental

```
function process() {
  var
    deferred = $q.defer(),
    results = {};

  // long-running process ...
  deferred.resolve(results);

  return deferred.promise;
}
```

$q.defer()

```
process().then(function (results) {
  alert(results);
});
```

.then()

```
processResponse()
  .then(successCb, errorCb)
  .catch(/* func */)
  .finally(/* func */);
```

.resolve()

.reject()

```
getApiData('https://my.api.com').then(function (apiResponse) {
  processResponse(apiResponse).then(function (results) {
    alert(results);
  });
});
```

.then() in .then() in .then() …

"I've seen that *$#%$* before …"

```
getApiData()
  .then(processResponse)
  .then(storeToDatabase)
  .then(provideToUI);
```

Chaining


“Wicked, Hans!”

“And what about collecting results from multiple promises?”

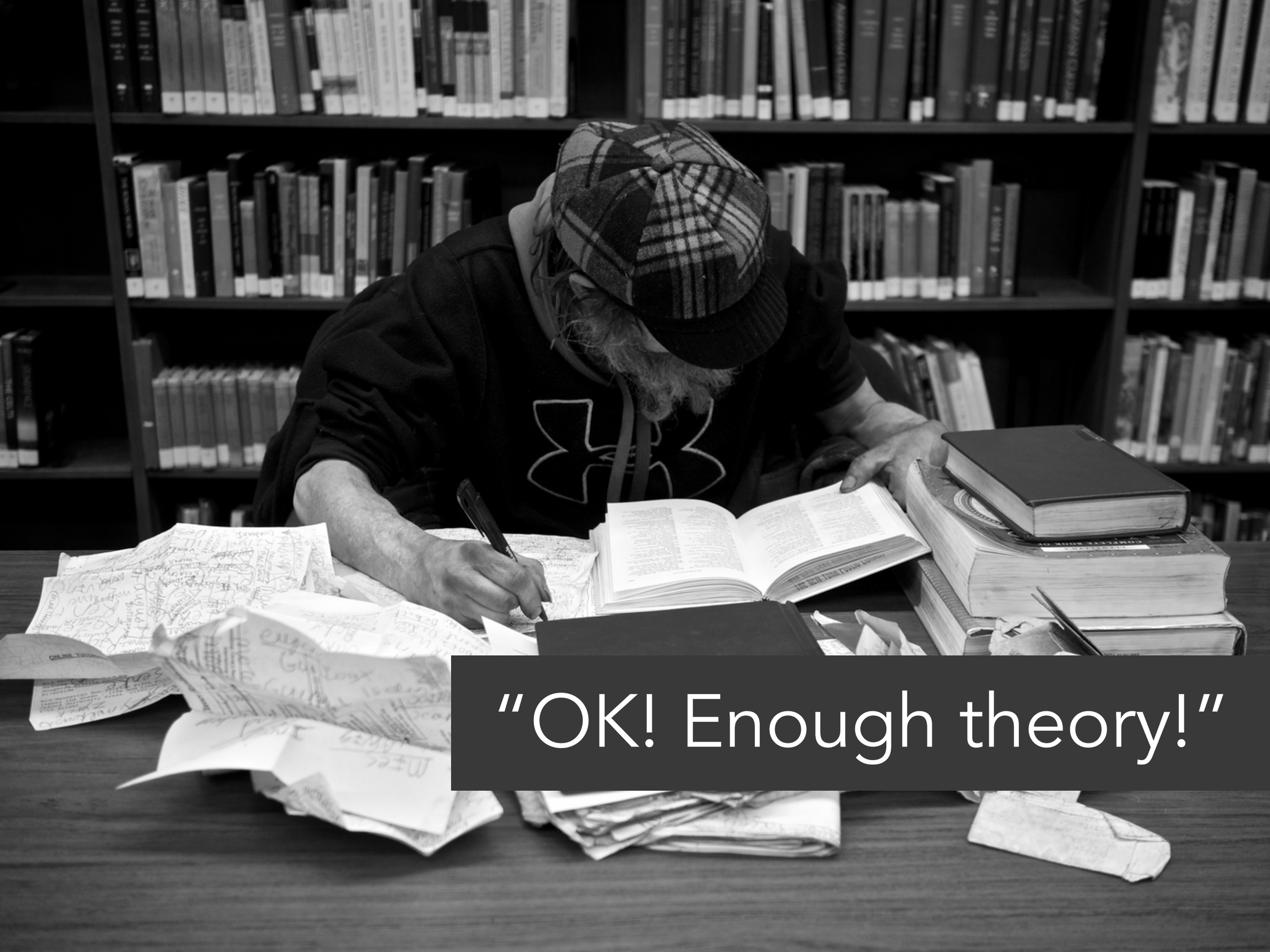
$q.all()

Combined results

```
function getAllApiData(urls) {
  var allPromises = [];

  angular.forEach(urls, function (url) {
    var deferred = $q.defer();
    getApiData(url).then(function (response) {
      deferred.resolve(response);
    });
    allPromises.push(deferred.promise);
  });

  return $q.all(allPromises);
}
```


"OK! Enough theory!"

Get fancy:

Demo Time!

Outro:

Questions?

http://ejohn.org/blog/how-javascript-timers-work/

http://www.html5rocks.com/en/tutorials/async/deferred/

https://docs.angularjs.org/api/ng/service/$q

https://github.com/kriskowal/q

https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise

https://www.promisejs.org/

https://github.com/promises-aplus/promises-spec

"Thank you! Over & out!"