

# Mobile Application Development

Higher Diploma in Science in Computer Science

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Produced  
by

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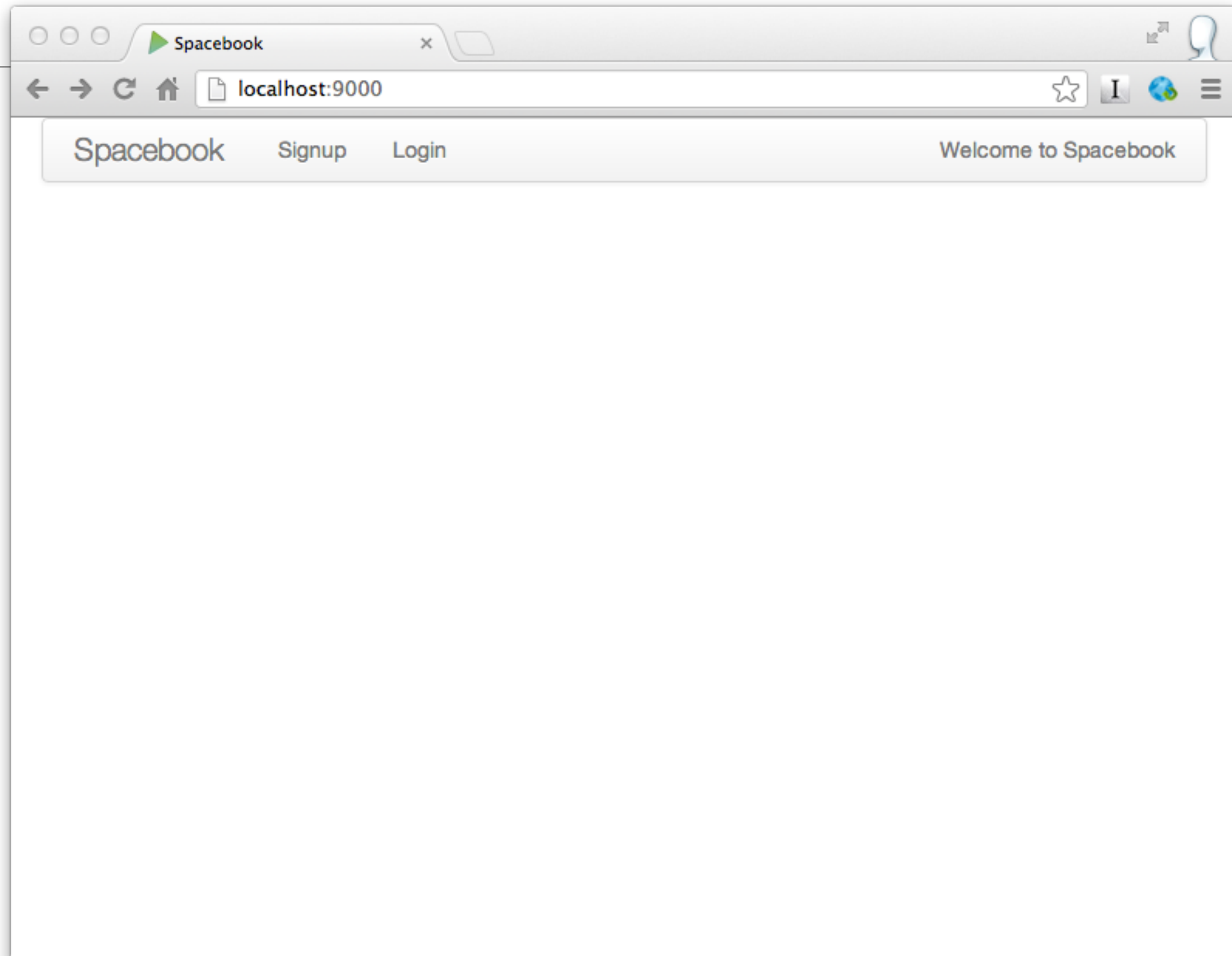
Waterford Institute of Technology  
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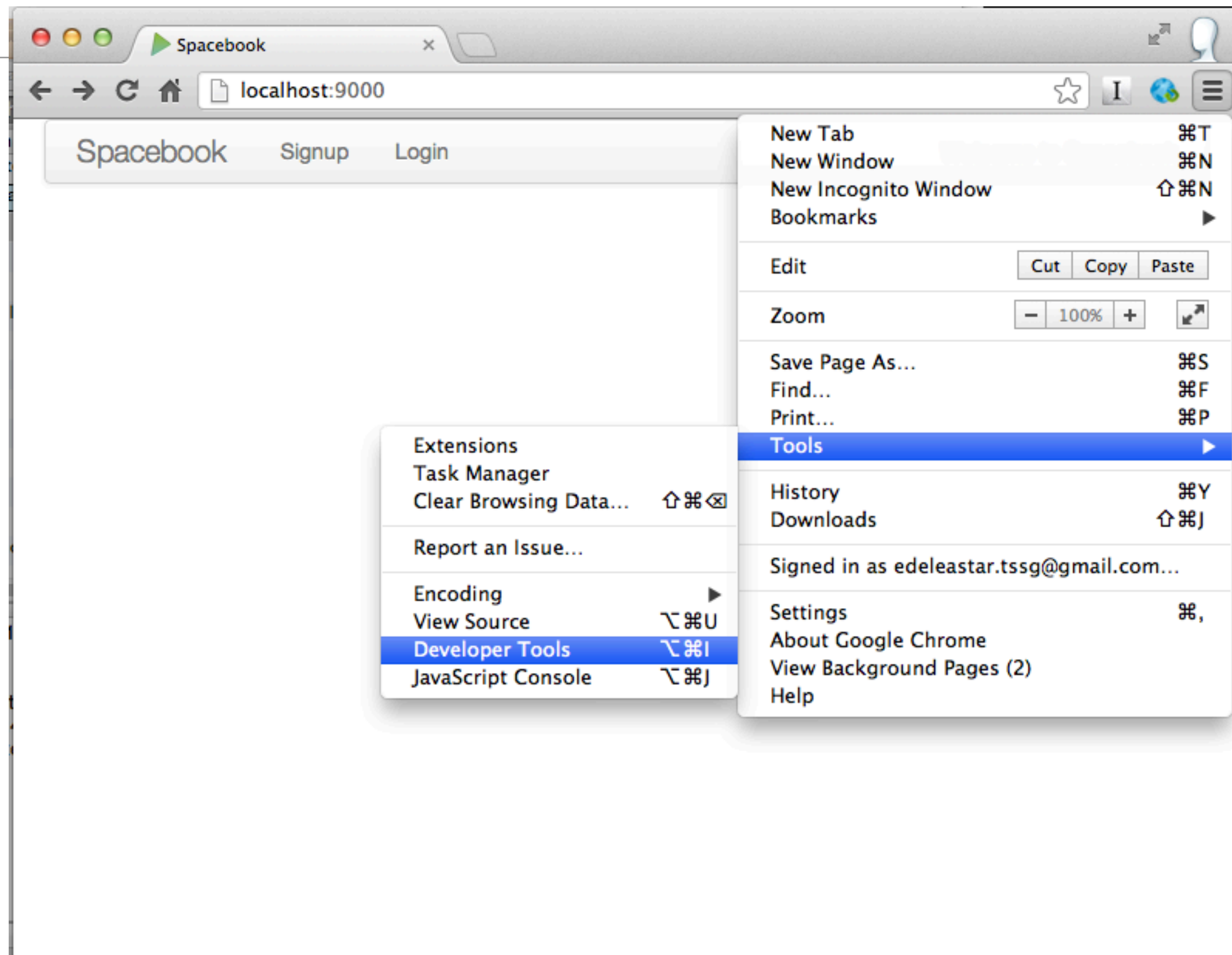
# Tracing the HTTP messages in a Web App

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# Spacebook-3 - Standard Chrome Browser



# Tools-Developer tools menu option...



Spacebook

localhost:9000

☆ I 🌐 ☰

Spacebook    Signup    Login    Welcome to Spacebook

✕ Elements

Resources

Network

Sources

Timeline

Profiles

Audits

Console

Name Path	Met...	Status Text	Type	Initiator	Size Conter	Time Latenc	Timeline					
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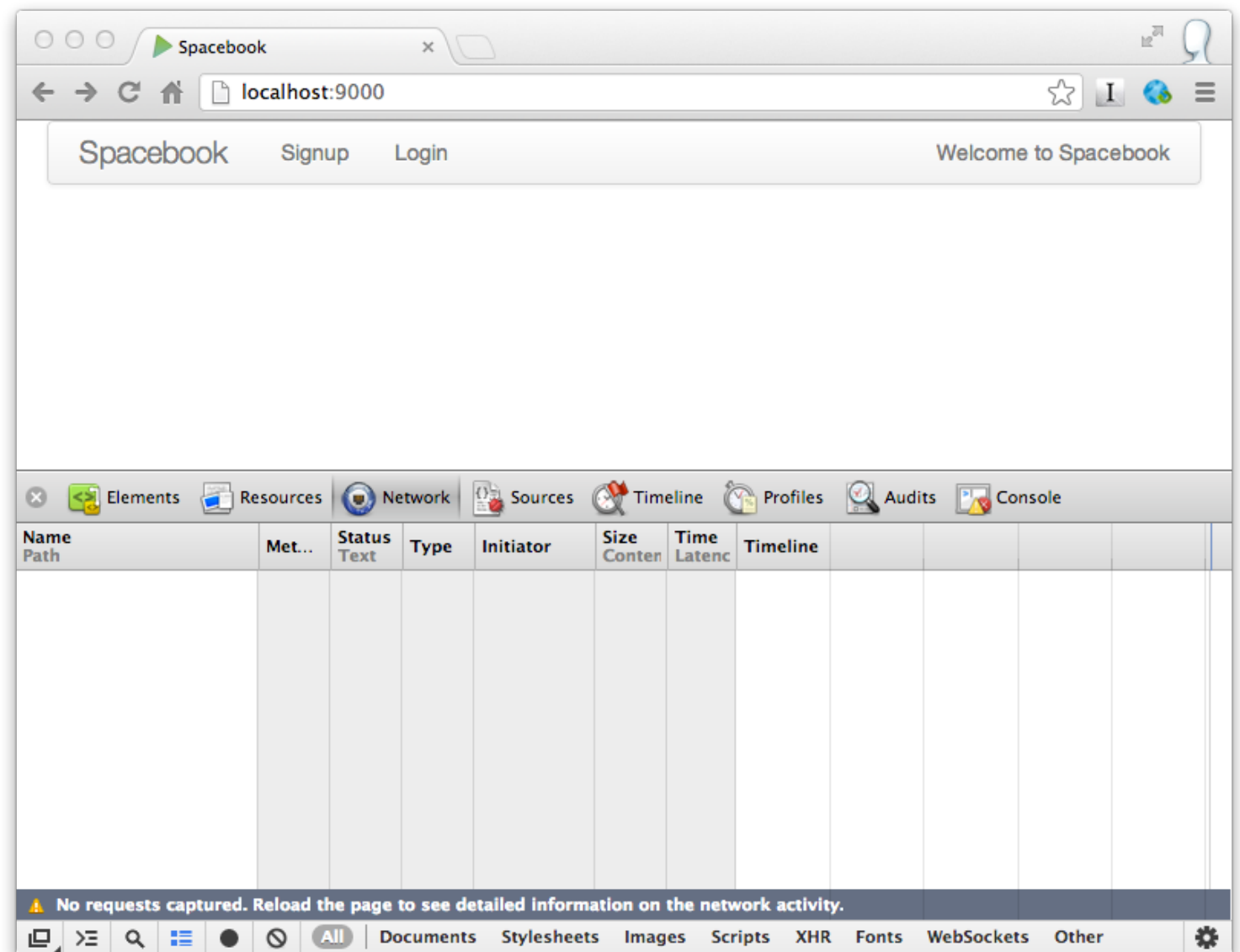
⚠️ No requests captured. Reload the page to see detailed information on the network activity.

>≡ 🔍 📄 ● ⛔ All

Documents    Stylesheets    Images    Scripts    XHR    Fonts    WebSockets    Other

# Tracing HTTP Request/Response

- Operate Browser as normal
- Control panel shows considerable range of diagnostic information, including:
  - Html
  - CSS
  - Javascript
  - Network traces
  - + much more....



# Simple Trace Example

- Run spacebook from localhost:9000 as usual.

- “Network” activity shows requests/responses....

The screenshot shows a web browser window with the address bar set to `localhost:9000`. The page title is "Spacebook" and the URL is `localhost:9000`. The page content includes a header with "Spacebook", "Signup", and "Login" links, and a "Welcome to Spacebook" message. Below the header, the browser's developer tools are open, showing the "Network" tab. The network tab displays two requests:

Name Path	Met...	Status Text	Type	Initiator	Size Content	Time Latenc	Timeline
localhost	GET	200 OK	text/...	Other	902B 555B	22ms 22ms	
bootstrap.min.css /public/bootstrap/cs:	GET	304 Not Mo	text/...	localhost:5 Parser	124B 98.89K	2ms 2ms	

The bottom status bar of the developer tools shows: "2 requests | 1.00KB transferred | 63ms (onload: 65ms, DOMContentLoaded: 61ms)". The bottom of the developer tools shows a filter bar with "All" selected and various resource types: Documents, Stylesheets, Images, Scripts, XHR, Fonts, WebSockets, and Other.

# http://localhost:9000 - Request

---

- This is the actual text sent across the wire:

```
GET /login HTTP/1.1
Host: localhost:9000
Connection: keep-alive
Cache-Control: max-age=0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_8_2) AppleWebKit/537.17
(KHTML, like Gecko) Chrome/24.0.1312.56 Safari/537.17
Accept-Encoding: gzip,deflate,sdch
Accept-Language: en-US,en;q=0.8
Accept-Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.3
```



# http://localhost:9000 - Response

- This is the actual text sent back from the server....
- Response is '200 ok' + the html for the page

```
HTTP/1.1 200 OK
Server: Play! Framework;1.2.4;dev
Content-Type: text/html; charset=utf-8
Set-Cookie: PLAY_FLASH=;Expires=Mon, 28-Jan-13 17:16:23 GMT;Path=/
Set-Cookie: PLAY_ERRORS=;Expires=Mon, 28-Jan-13 17:16:23 GMT;Path=/
Set-Cookie: PLAY_SESSION=;Expires=Mon, 28-Jan-13 17:16:23 GMT;Path=/
Cache-Control: no-cache
Content-Length: 876

!DOCTYPE html>
<html>
  <head>
    <title> Spacebook </title>
    <link rel="stylesheet" media="screen" href="/public/bootstrap/css/
bootstrap.min.css">
  </head>
  <body>
    <div class="container-fluid">
      <div class="navbar ">
        <div class="navbar-inner">
          <a class="brand pull-left" href="#">Spacebook</a>
          <ul class="nav">
            <li>          <a href="/signup"> Signup  </a></li>
            <li class="active">  <a href="/login"> Login    </a></li>
          </ul>
          <p class="navbar-text pull-right"> Login to Spacebook </p>
        </div>
      </div>
      <form id="login" action="/authenticate" method="POST">
        <label>Email</label>
        <input type="text" name="email" id="email" />

        <label>Password</label>
        <input type="password" name="password" id="password" />

        <input class="formbutton" type="submit" value="Login" />
      </form>
    </div>
  </body>
</html>
```

Developer Tools - http://localhost:9000/login

Elements Resources Network Sources Timeline Profiles Audits Console

Name Path

login

bootstrap.min.css /public/bootstrap/css

Headers Preview Response Cookies Timing

Request URL: http://localhost:9000/login  
Request Method: GET  
Status Code: 200 OK

▼ Request Headers view source

Accept: text/html,application/xhtml+xml,application/xml;q=0.9,\*/\*;q=0.8  
Accept-Charset: ISO-8859-1,utf-8;q=0.7,\*;q=0.3  
Accept-Encoding: gzip,deflate,sdch  
Accept-Language: en-US,en;q=0.8  
Cache-Control: max-age=0  
Connection: keep-alive  
Host: localhost:9000  
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10\_8\_2) AppleWebKit/537.17 (KHTML, like Gecko) Chrome/24.0.1312.56 Safari/537.17

▼ Response Headers view source

Cache-Control: no-cache  
Content-Length: 876  
Content-Type: text/html; charset=utf-8  
Server: Play! Framework;1.2.4;dev  
Set-Cookie: PLAY\_FLASH=;Expires=Mon, 28-Jan-13 17:16:23 GMT;Path=/  
Set-Cookie: PLAY\_ERRORS=;Expires=Mon, 28-Jan-13 17:16:23 GMT;Path=/  
Set-Cookie: PLAY\_SESSION=;Expires=Mon, 28-Jan-13 17:16:23 GMT;Path=/

2 requests | 1.32KB transferred

All Documents Stylesheets Images Scripts XHR Fonts WebSockets Other

- View Source

# Developer Tools View of request/response

The screenshot shows the Chrome Developer Tools interface with the Network tab selected. The top toolbar includes icons for Elements, Resources, Network, Sources, Timeline, Profiles, Audits, and Console. The Network panel on the left lists two requests: 'login' and 'bootstrap.min.css'. The 'login' request is selected, and its details are shown in the main pane. The details pane has tabs for Headers, Preview, Response, Cookies, and Timing, with 'Headers' currently active. The 'Request Headers' section shows the following information:

- Request URL: `http://localhost:9000/login`
- Request Method: `GET`
- Status Code: `200 OK`
- Request Headers (view parsed):
  - `GET /login HTTP/1.1`
  - `Host: localhost:9000`
  - `Connection: keep-alive`
  - `Cache-Control: max-age=0`
  - `Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8`
  - `User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_8_2) AppleWebKit/537.17 (KHTML, like Gecko) Chrome/24.0.1312.56 Safari/537.17`
  - `Accept-Encoding: gzip, deflate, sdch`
  - `Accept-Language: en-US,en;q=0.8`
  - `Accept-Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.3`
- Response Headers (view parsed):
  - `HTTP/1.1 200 OK`
  - `Server: Play! Framework;1.2.4;dev`
  - `Content-Type: text/html; charset=utf-8`
  - `Set-Cookie: PLAY_FLASH=;Expires=Mon, 28-Jan-13 17:16:23 GMT;Path=/`
  - `Set-Cookie: PLAY_ERRORS=;Expires=Mon, 28-Jan-13 17:16:23 GMT;Path=/`
  - `Set-Cookie: PLAY_SESSION=;Expires=Mon, 28-Jan-13 17:16:23 GMT;Path=/`
  - `Cache-Control: no-cache`
  - `Content-Length: 876`

The bottom status bar indicates '2 requests | 1.32KB transferred'. The bottom toolbar includes icons for All, Documents, Stylesheets, Images, Scripts, XHR, Fonts, WebSockets, and Other.

Developer Tools - http://localhost:9000/login

×

Elements

Resources

Network

Sources

Timeline

Profiles

Audits

Console

Name

Path

login

bootstrap.min.css

/public/bootstrap/css

×

Headers

Preview

Response

Cookies

Timing

```

1 <!DOCTYPE html>
2 <html>
3   <head>
4     <title> Spacebook </title>
5     <link rel="stylesheet" media="screen" href="/public/bootstrap/css/bootstrap.min.cs
6   </head>
7   <body>
8     <div class="container-fluid">
9
10
11
12     <div class="navbar ">
13       <div class="navbar-inner">
14         <a class="brand pull-left" href="#">Spacebook</a>
15         <ul class="nav">
16           <li>         <a href="/signup"> Signup   </a></li>
17           <li class="active"> <a href="/login">  Login    </a></li>
18         </ul>
19         <p class="navbar-text pull-right"> Login to Spacebook </p>
20       </div>
21     </div>
22
23
24 <form id="login" action="/authenticate" method="POST">
25   <label>Email</label>
26   <input type="text" name="email" id="email" />
27
28   <label>Password</label>
29   <input type="password" name="password" id="password" />
30
31   <input class="formbutton" type="submit" value="Login" />
32 </form>
33   </div>
34 </body>
35 </html>

```

2 requests | 1.32KB transferred

☐

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🚫

All

Documents

Stylesheets

Images

Scripts

XHR

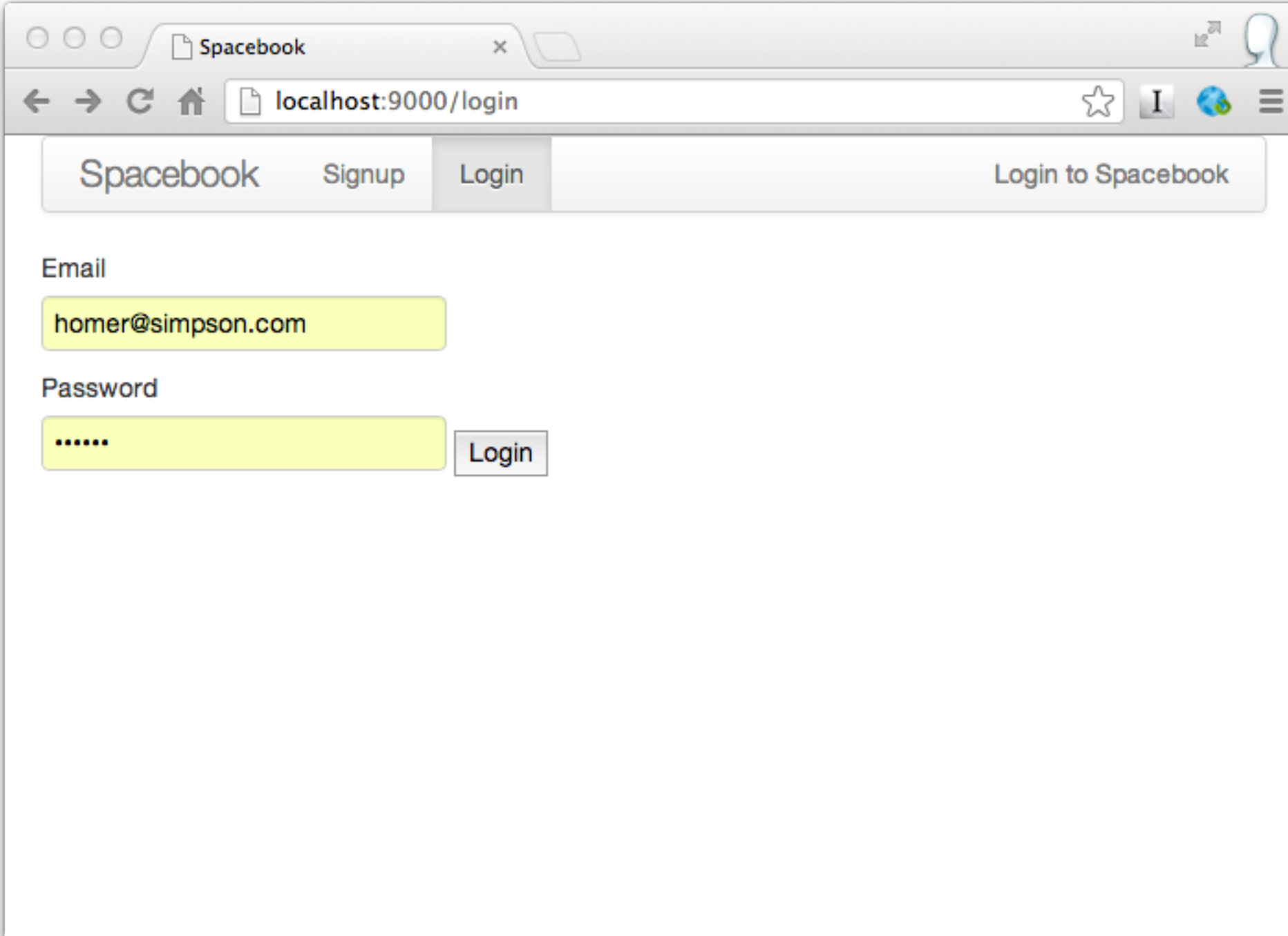
Fonts

WebSockets

Other

⚙️

# Try Submitting a Form...



A screenshot of a web browser window. The browser's address bar shows 'localhost:9000/login'. The page has a header with 'Spacebook', 'Signup', and 'Login' links, and a 'Login to Spacebook' button. Below the header, there is a form with two input fields: 'Email' containing 'homer@simpson.com' and 'Password' containing six dots. A 'Login' button is positioned to the right of the password field.

Spacebook Signup Login Login to Spacebook

Email  
homer@simpson.com

Password  
..... Login

- When we press the button, we are generating a request...

Developer Tools - http://localhost:9000/home

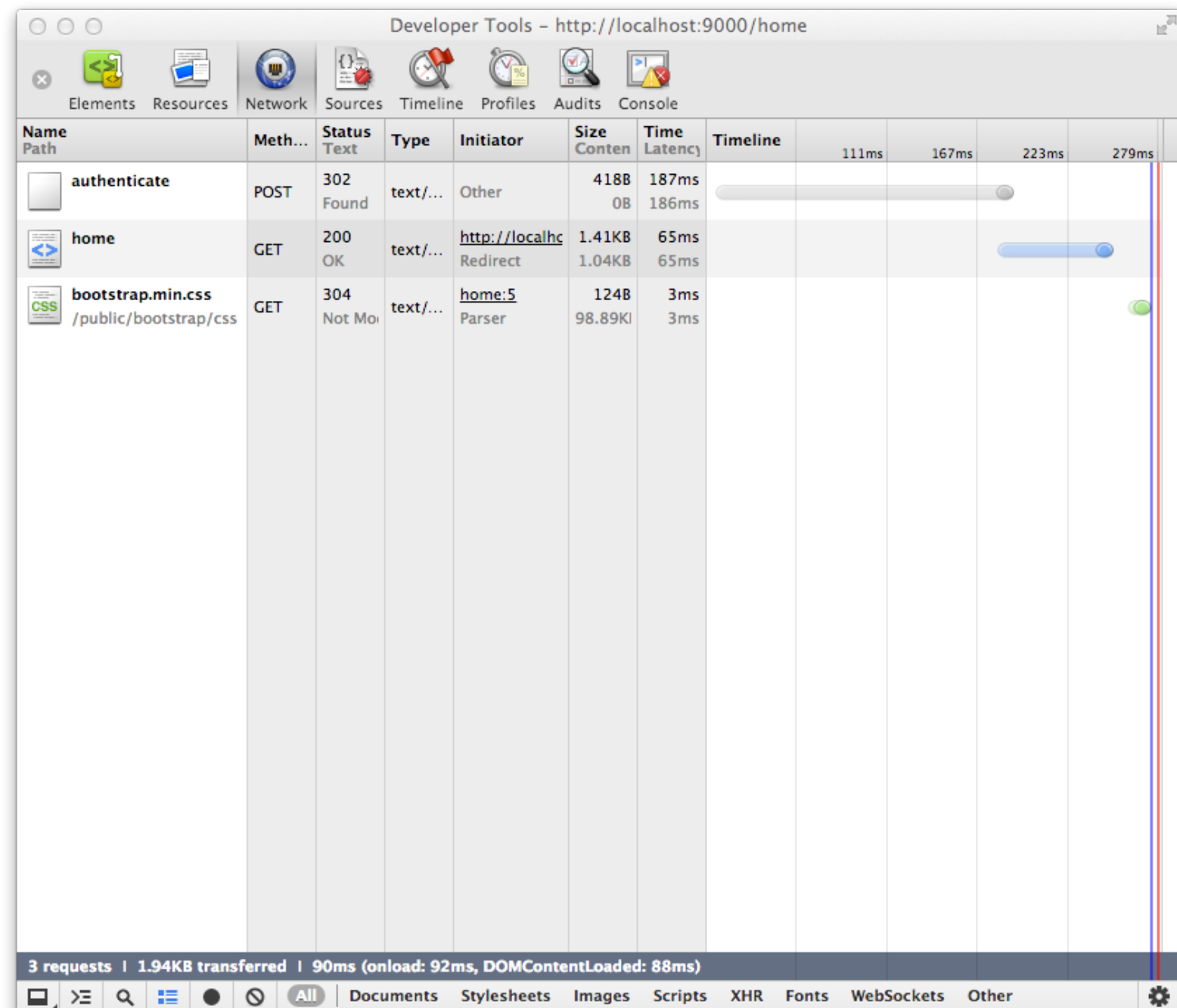
×

×






# 3 Requests?

- First one is ok - this is the 'Action' from the form
- What about the other two?



The screenshot shows the Chrome Developer Tools Network tab for the URL `http://localhost:9000/home`. The table below represents the data shown in the 'Name Path' column of the Network tab.

Name Path	Meth...	Status Text	Type	Initiator	Size Conten	Time Latency
 <b>authenticate</b>	POST	302 Found	text/...	Other	418B 0B	187ms 186ms
 <b>home</b>	GET	200 OK	text/...	<a href="http://localhost:9000/home">http://localhost:9000/home</a> Redirect	1.41KB 1.04KB	65ms 65ms
 <b>bootstrap.min.css</b> /public/bootstrap/css	GET	304 Not Modified	text/...	home:5 Parser	124B 98.89KB	3ms 3ms

At the bottom of the Network tab, a summary bar shows: **3 requests | 1.94KB transferred | 90ms (onload: 92ms, DOMContentLoaded: 88ms)**. Below this is a filter bar with icons for All, Documents, Stylesheets, Images, Scripts, XHR, Fonts, WebSockets, and Other.

# /authenticate Request

---

```
POST /authenticate HTTP/1.1
Host: localhost:9000
Connection: keep-alive
Content-Length: 41
Cache-Control: max-age=0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Origin: http://localhost:9000
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_8_2) AppleWebKit/537.17
(KHTML, like Gecko) Chrome/24.0.1312.56 Safari/537.17
Content-Type: application/x-www-form-urlencoded
Referer: http://localhost:9000/login
Accept-Encoding: gzip,deflate,sdch
Accept-Language: en-US,en;q=0.8
Accept-Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.3
Cookie: PLAY_SESSION=08b5765778d75b6fbee191f2a44c8368e25f62e4-
%00logged_in_userid%3A1%00
email=homer%40simpson.com&password=secret
```



# /authenticate Request - form data

---

```
POST /authenticate HTTP/1.1
Host: localhost:9000

...

email=homer%40simpson.com&password=secret
```

- Request encapsulate 'form data' as a single string, separated by '&'s

# /authenticate - Response

---

```
HTTP/1.1 302 Found
Server: Play! Framework;1.2.4;dev
Content-Type: text/plain; charset=utf-8
Location: http://localhost:9000/home
Set-Cookie: PLAY_FLASH=;Expires=Mon, 28-Jan-13 17:28:55 GMT;Path=/
Set-Cookie: PLAY_ERRORS=;Expires=Mon, 28-Jan-13 17:28:55 GMT;Path=/
Set-Cookie: PLAY_SESSION=08b5765778d75b6fbee191f2a44c8368e25f62e4-
%00logged_in_userid%3A1%00;Path=/
Cache-Control: no-cache
Content-Length: 0
```

- Response with '302 Found' (previous response was '200 ok')
- '302 Found' means the requested resource is present - but at another location.
- This is provided as 'Location: <http://localhost:9000/home>
- Once a browser sees this response - it make a second request to this new location...

# /home request

---

```
GET /home HTTP/1.1
Host: localhost:9000
Connection: keep-alive
Cache-Control: max-age=0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_8_2) AppleWebKit/
537.17 (KHTML, like Gecko) Chrome/24.0.1312.56 Safari/537.17
Referer: http://localhost:9000/login
Accept-Encoding: gzip,deflate,sdch
Accept-Language: en-US,en;q=0.8
Accept-Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.3
Cookie: PLAY_SESSION=08b5765778d75b6fbee191f2a44c8368e25f62e4-
%00logged_in_userid%3A1%00
```


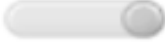




- Notice the 'logged\_in\_userid' field... remember that?
- What is its purpose?

HTTP/1.1 200 OK Server: Play! Framework;1.2.4;dev Content-Type: text/html; charset=utf-8 Set-Cookie: PLAY_FLASH=;Expires=Mon, 28-Jan-13 17:28:55 GMT;Path=/ Set-Cookie: PLAY_ERRORS=;Expires=Mon, 28-Jan-13 17:28:55 GMT;Path=/ Set-Cookie: PLAY_SESSION=08b5765778d75b6fbee191f2a44c8368e25f62e4-%00logged_in_userid%3A1%00;Path=/ Cache-Control: no-cache Content-Length: 1067 <!DOCTYPE html> <html> <head> <title> Spacebook </title> <link rel="stylesheet" media="screen" href="/public/bootstrap/css/bootstrap.min.css"> </head> <body> <div class="container-fluid">  <div class="navbar "> <div class="navbar-inner"> <a class="brand pull-left" href="#">Spacebook</a> <ul class="nav"> <li class="active"> <a href="/home"> Home </a></li> <li> <a href="/members"> Members </a></li> <li> <a href="/homeprofile"> Profile </a></li> <li> <a href="/logout"> Logout </a></li> </ul> <p class="navbar-text pull-right"> Spacebook Home Page for Homer Simpson </p> </div> </div> <div class="row-fluid"> <div class="span4"> <p> Homer Simpson, 0, </p> <h2> Friends </h4> <h2> Following (0) </h2> <ul> </ul> <h4> Followers </h4> </div> <div class="span8"> <h2> Messages </h2>  </div> </div> </div> </body> </html>	<h1>/home response</h1>
---	-------------------------







- This is a '200 ok' delivering to us the 'home' page...
- Which in turn requests the css file

Developer Tools - http://localhost:9000/home


ElementsResourcesNetworkSourcesTimelineProfilesAuditsConsole

Name Path	Method	Status Text	Type	Initiator	Size Content	Time Latenc	Timeline
 <b>authenticate</b>	POST	302 Found	text/plain	Other	418B 0B	187ms 186ms	
 <b>home</b>	GET	200 OK	text/html	<a href="http://localhost:9000/authenticate">http://localhost:9000/authenticate</a> Redirect	1.41KB 1.04KB	65ms 65ms	
 <b>bootstrap.min.css</b> /public/bootstrap/c:	GET	304 Not Modifi	text/css	<a href="#">home:5</a> Parser	124B 98.89KB	3ms 3ms	

3 requests | 1.94KB transferred | 90ms (onload: 92ms, DOMContentLoaded: 88ms)







AllDocumentsStylesheetsImagesScriptsXHRFontsWebSocketsOther



# Visiting the Members Page

Developer Tools - http://localhost:9000/members

Elements Resources Network Sources Timeline Profiles Audits Console

Name Path	Met...	Status Text	Type	Initiator	Size Conte...	Time Latenc	Timeline	413ms	620ms	826ms
 members	GET	200 OK	text...	Other	1.63KE 1.26KE	800ms 799ms				
 bootstrap.min.css /public/bootstrap/c	GET	304 Not Modified	text...	<u>members:5</u> Parser	124B 98.89k	2ms 2ms				


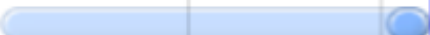






2 requests | 1.75KB transferred | 822ms (onload: 826ms, DOMContentLoaded: 820ms)

All Documents Stylesheets Images Scripts XHR Fonts WebSockets Other

# Visiting the Home Profile

Developer Tools - http://localhost:9000/homeprofile

Elements Resources Network Sources Timeline Profiles Audits Console

Name Path	Met...	Status Text	Type	Initiator	Size Content	Time Latenc	Timeline	1.95s	2.92s
 homeprofile	GET	200 OK	text/html	Other	2.14KB 1.77KB	2.18s 2.15s			
 bootstrap.min.css /public/bootstrap/c	GET	304 Not Moc	text/css	homeprofile:5 Parser	124B 98.89KB	24ms 3ms			
 1 /homeprofile/getpic	GET	200 OK	image/jpeg	homeprofile:24 Parser	1.52MB 1.52MB	397ms 321ms			
 1 /homeprofile/getthu	GET	200 OK	image/jpeg	homeprofile:31 Parser	838.85KB 838.46KB	676ms 672ms			







4 requests | 2.34MB transferred | 2.88s (onload: 2.92s, DOMContentLoaded: 2.20s)

Documents Stylesheets Images Scripts XHR Fonts WebSockets Other

# Logging out

Developer Tools - http://localhost:9000/

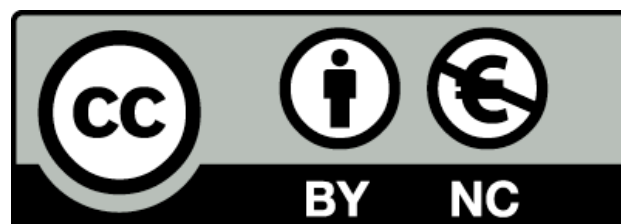
Elements Resources Network Sources Timeline Profiles Audits Console

Name Path	Met...	Status Text	Type	Initiator	Size Contei	Time Latenc	Timeline	92ms	138ms	183ms	229ms
 logout	GET	302 Found	text...	Other	383B 0B	199ms 198ms					
 localhost	GET	200 OK	text...	<a href="http://localhost">http://localh</a> Redirect	902B 555B	6ms 5ms					
 bootstrap.min.css /public/bootstrap/c	GET	304 Not Mo	text...	<a href="http://localhost:5">localhost:5</a> Parser	124B 98.89k	2ms 2ms					

3 requests | 1.38KB transferred | 29ms (onload: 30ms, DOMContentLoaded: 27ms)

All Documents Stylesheets Images Scripts XHR Fonts WebSockets Other





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