

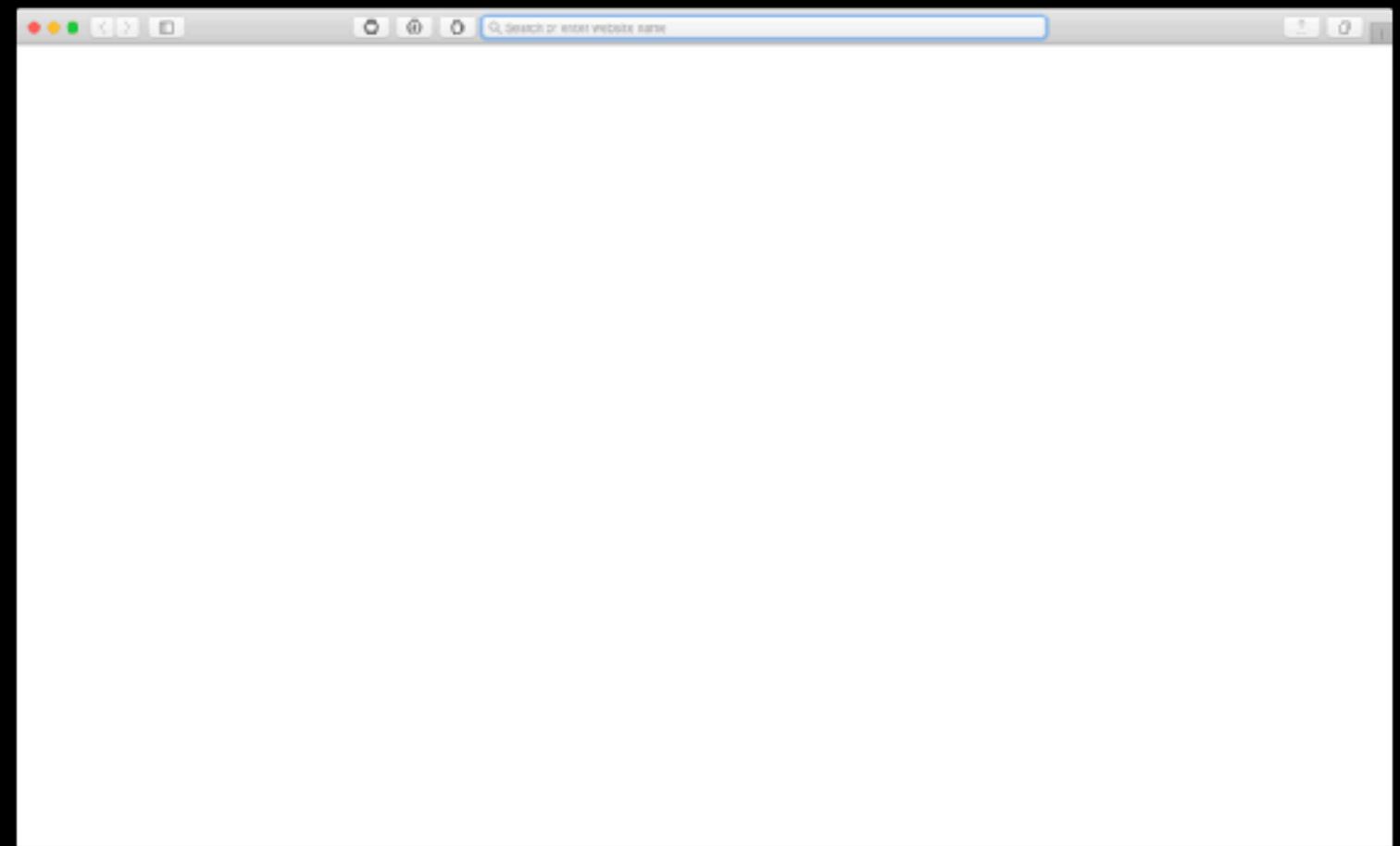
CS50 for MBAs

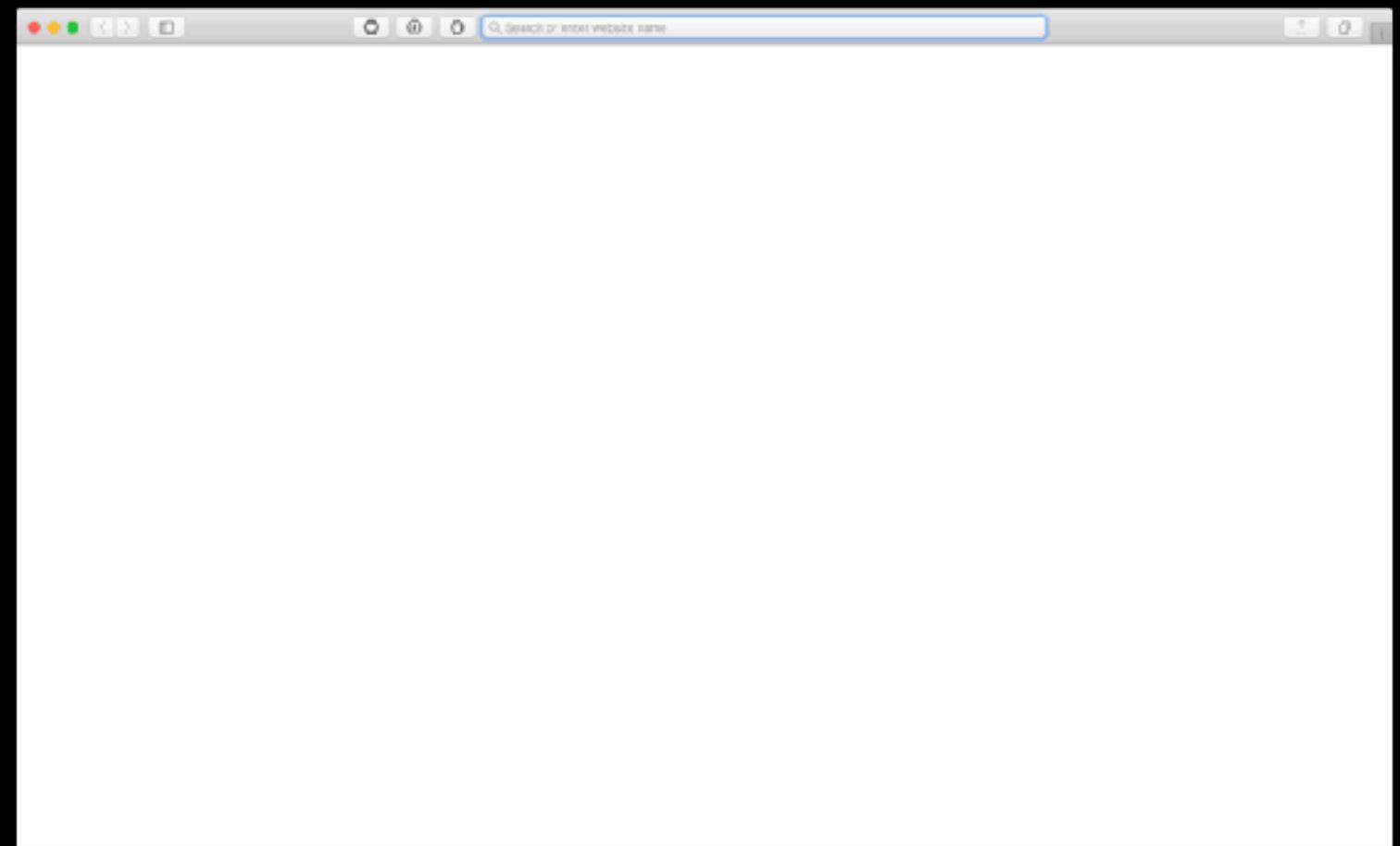
Web Programming

Today

- Backend vs. Frontend
- Javascript
- APIs

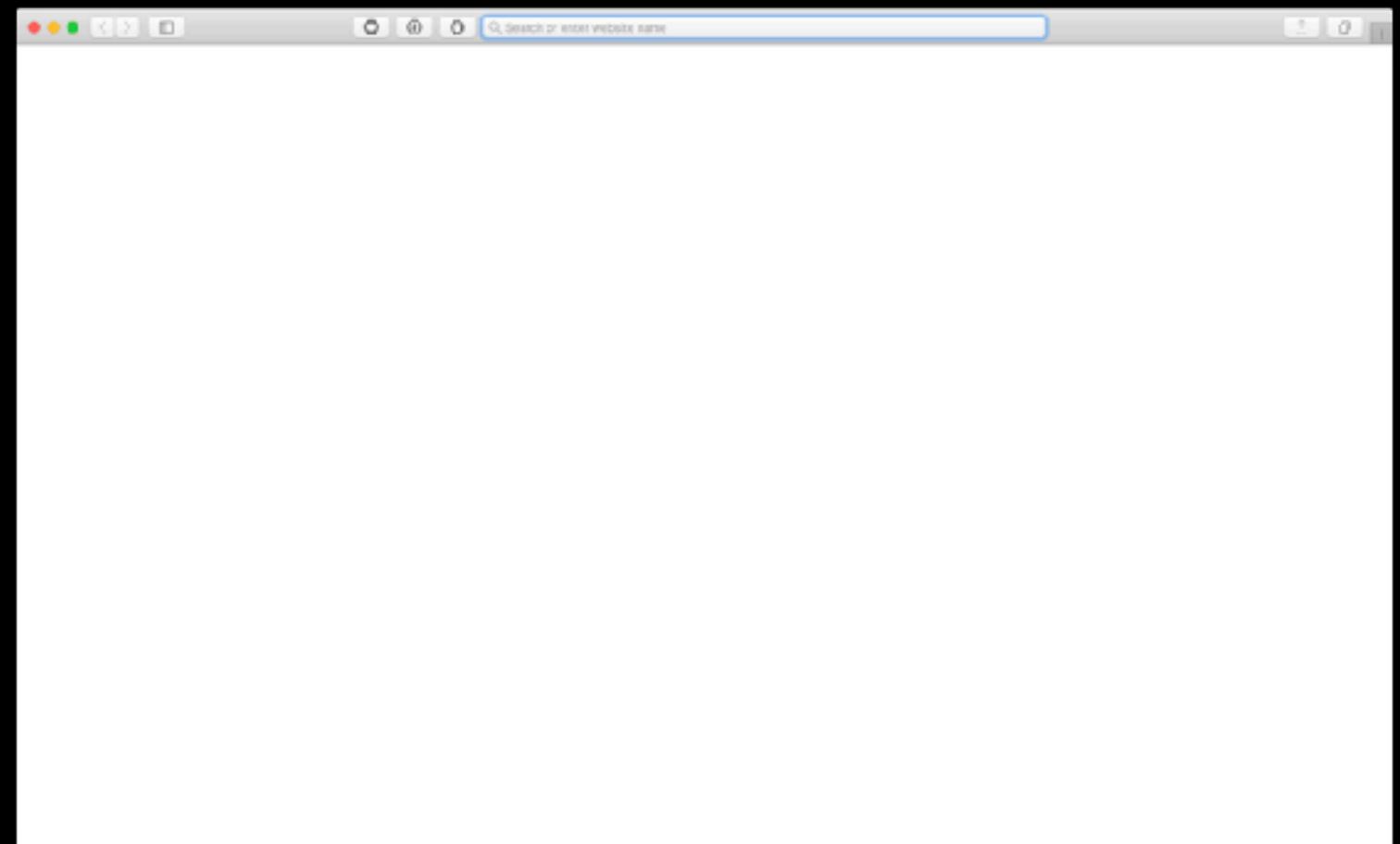
Backend vs. Frontend





Request





Request



Backend

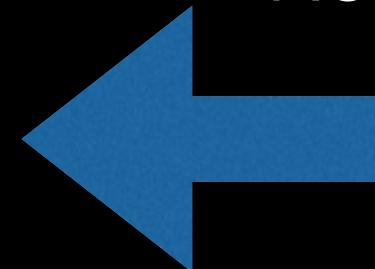
A screenshot of a web browser displaying the Harvard Business School website. The header includes the HBS logo, navigation links for About, MBA, HBK, Doctoral, Executive Education, Alumni, Faculty & Research, and various resources like Baker Library, Campus, Harvard Business Review, Initiatives, News, and Events. A large orange banner features the text "Black Business Leaders Series: John Rogers and the Importance of Hiring Minority-Owned Services Firms". Below this, a "COLD CALL" section highlights an interview with Steven Rogers about his CEO's criticism of Fortune 500 companies for diversity. Other news items listed include "Harvard Business School Auditorium Seats Get New Life" and "Amazoned: Is Any Industry Safe?".

Response



A screenshot of a web browser displaying the Harvard Business School website. The page features a large orange header with the HBS logo and navigation links for About, MBA, HBX, Doctoral, Executive Education, Alumni, Faculty & Research, Baker Library, Campus, Harvard Business Review, Initiatives, News, and Events. Below the header, a red banner highlights a "Black Business Leaders Series: John Rogers and the Importance of Hiring Minority-Owned Services Firms". The main content area shows an article by Steven Rogers titled "AMANDA — The African American CEO of a money management firm publicly criticizes the Fortune 500 for paying lip service to diversity. His board urges him to stop. What should happen? HBS Professor Steven Rogers and protégé John Rogers discuss a new case study about the risks of speaking up, and the importance of black empowerment in the investment sector. Go to Story." A blue "HBS COLD CALL" graphic is visible. At the bottom, there are two news snippets: "07 FEB 2018 UP CLOSE Harvard Business School Auditorium Seats Get New Life" and "19 FEB 2018 HBS WORKING KNOWLEDGE Amazoned: Is Any Industry Safe?".

Frontend



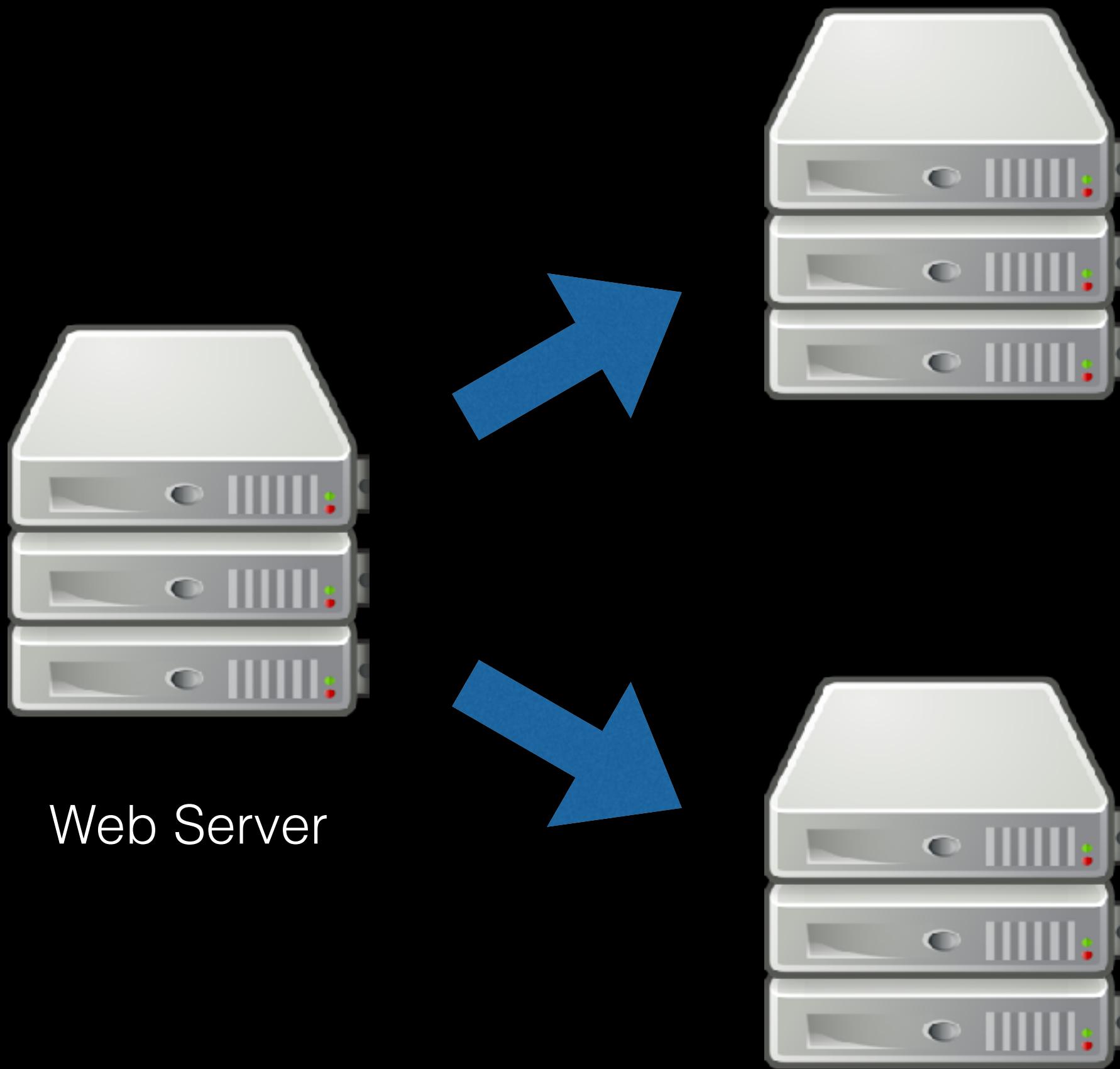
Response

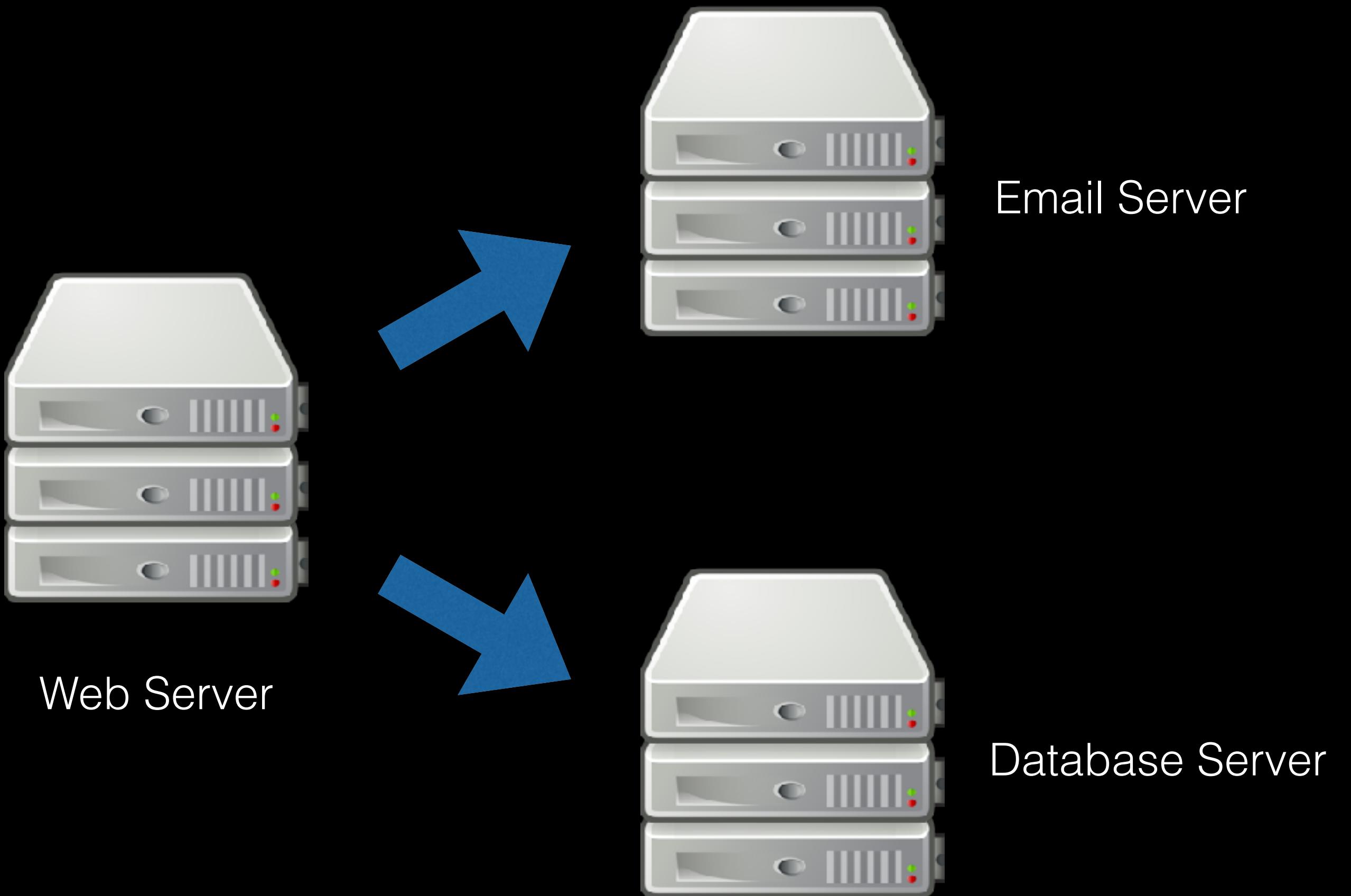






Web Server





Frontend Languages

Frontend Languages

Frontend Technologies

- HTML
- CSS
- Javascript

- **HTML**
- CSS
- Javascript

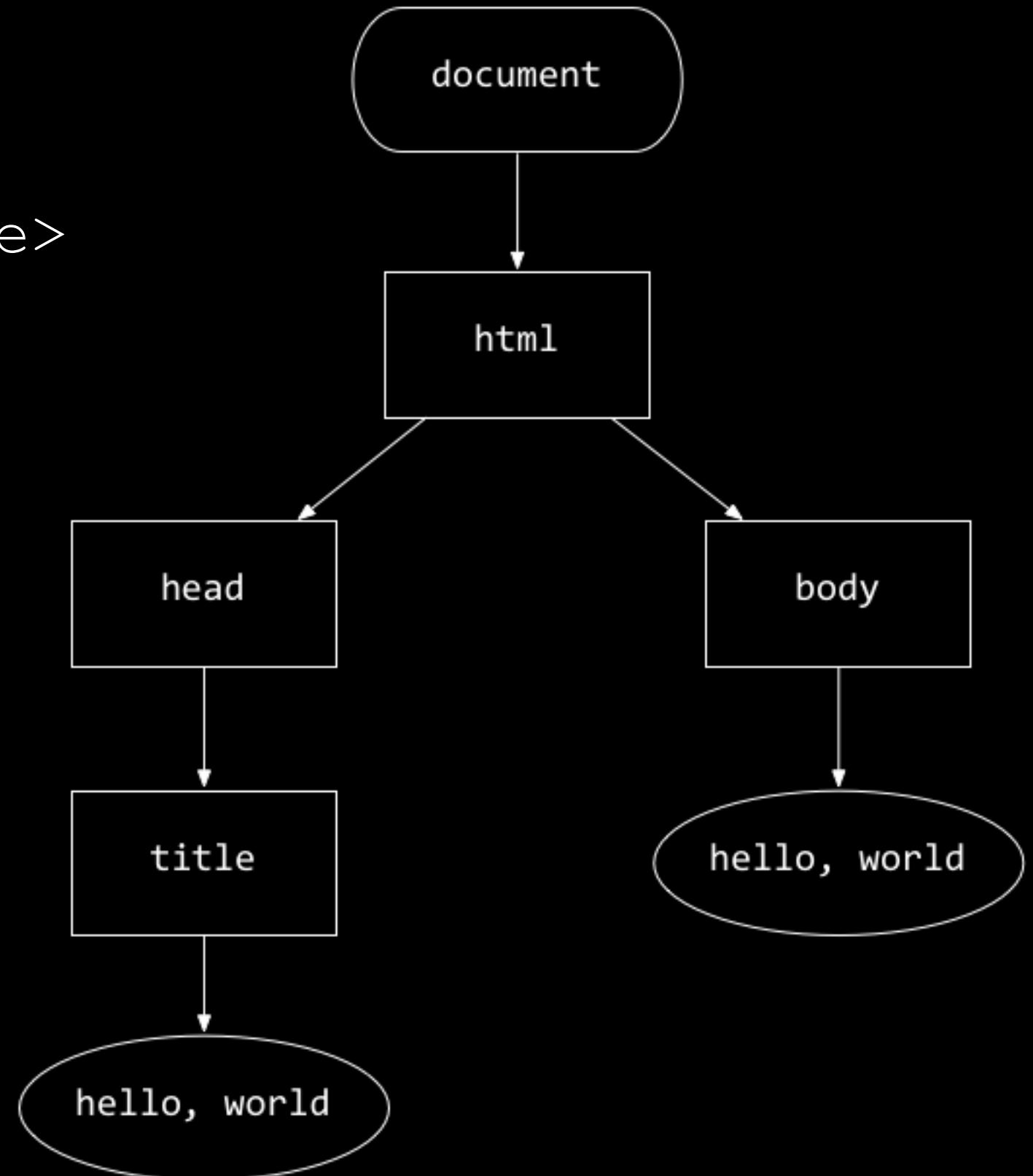
```
<!DOCTYPE html>
<html>
  <head>
    <title>hello, world</title>
  </head>
  <body>
    hello, world
  </body>
</html>
```

DOM

DOM

Document Object Model

```
<!DOCTYPE html>
<html>
  <head>
    <title>hello, world</title>
  </head>
  <body>
    hello, world
  </body>
</html>
```



Harvard Business School Guest

https://www.hbs.edu/Pages/default.aspx

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15 FEB 2018 COLD CALL

Black Business Leaders Series: John Rogers and the Importance of Hiring Minority-Owned Services Firms

Re: Steven Rogers



AUDIO — The African American CEO of a money management firm publicly criticizes the Fortune 500 for paying lip service to diversity. His board urges him to stop. What should he do? HBS Professor Steven Rogers and protagonist John Rogers discuss a new case study about the risks of

Elements Console Sources Network Performance Memory Application Security Audits

`<div class="desktop-visible"></div>
 <div id="strip0" class="orange-bg">
 <div class="desktop-visible">
 <div class="container container mobile-container tablet-container" id="background1" style="background-image: url('/HomepageImages/BackgroundImages/arrows_four.png');">
 <div class="site-header">
 <div class="shim35"></div>
 <div class="hr"></div>
 <table class="navbar">
 <tbody>
 <tr>
 <td class="first" width="9%">
 About == $0
 </td>
 <td></td>
 <td width="9%"></td>
 </tr>
 </tbody>
 </table>
 </div>
 </div>
 </div>`

Styles Computed Event Listeners >

Filter element.style { }

.component-framework framework.css:1346

table.navbar td:first a { padding-left: 0; }

.component-framework framework.css:1342

table.navbar a { color: #181818; padding-left: 1em; padding-right: 1em; }

table.navbar td a { font-size: 17px; }

hbs2.css:49

Harvard Business School Guest

https://www.hbs.edu/Pages/default.aspx

 HARVARD | BUSINESS | SCHOOL

HBX DOCTORAL EXECUTIVE EDUCATION ALUMNI FACULTY & RESEARCH

BAKER LIBRARY CAMPAIGN HARVARD BUSINESS REVIEW INITIATIVES NEWS RECRUIT

**Business Leaders Series: John Rogers
Importance of Hiring Minority-Owned Firms**

AUDIO — The African American CEO of a money management firm publicly criticizes the Fortune 500 for paying lip service to diversity. His board urges him to stop. What should he do? HBS Professor Steven Rogers and protagonist John Rogers discuss a new case study about the risks of speaking up, and the importance of black empowerment in the investment sector. Go to Story.

→ More Cold Call Episodes

UP CLOSE
Business School Auditorium
at New Life

H|B|S WORKING KNOWLEDGE

19 FEB 2018 HBS WORKING KNOWLEDGE
Amazoned: Is Any Industry Safe?

→ More HBS Working Knowledge

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HARVARD BUSINESS REVIEW
INITIATIVES
NEWS
RECRUIT

MAP / DIRECTIONS

- HTML
- CSS
- Javascript

Harvard Business School Guest

Secure | https://www.hbs.edu/Pages/default.aspx

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→ [More Cold Call Episodes](#)

 07 FEB 2018 UP CLOSE
Harvard Business School Auditorium Seats Get New Life

 19 FEB 2018 HBS WORKING KNOWLEDGE
Amazoned: Is Any Industry Safe?

[→ More News](#)

www.hbs.edu/doctoral/Pages/default.aspx

```
.container {  
    background: some-ugly-orange;  
    font-size: 24pt;  
    width: 100%;  
}  
  
#homepage-topnav-about {  
    text-transform: uppercase;  
    text-align: left;  
}
```

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    text-align: left;  
}
```

- HTML
- CSS
- **Javascript**

Google Maps

Secure | https://www.google.com/maps/@37.7755529,-122.3947138,15z

Search Google Maps

CIVIC CENTER

Westfield San Francisco Centre
InterContinental San Francisco

SHN Orpheum Theatre
The Book Of Mormon

Bill Graham Civic Auditorium
Twitter HQ

SOUTH OF MARKET

San Francisco City Hall

S VALLEY

DNA Lounge

Costco Wholesale

Mission Bay Park System

MISSION BAY

South Beach Harbor

AT&T Park

4th & King St

Lot A P

Taylor Francisco Blvd

Map data ©2018 Google United States Terms Send Feedback 1000 ft

Sign in

+

-

Satellite

Elements Console Sources Network Performance Memory Application Security Audits

View: Group by frame Preserve log Disable cache Offline Online

Filter Hide data URLs All XHR JS CSS Img Media Font Doc WS Manifest Other

Name	Status	Type	Initiator	Size	Time	Waterfall	10.08s
pb=Im4!1m3!1i1!2i1311!3i3167!2m3!1e0!2sm!3i41111...22!2i26m1!4b1!...	200	xhr	rs=ACT90oGaTkeF-QsA13sNlruGfTy...	5.1 KB	34 ms		
pb=Im4!1m3!1i1!2i1312!3i3166!2m3!1e0!2sm!3i41111...22!2i26m1!4b1!...	200	xhr	rs=ACT90oGaTkeF-QsA13sNlruGfTy...	6.8 KB	31 ms		
pb=Im4!1m3!1i1!2i1312!3i3166!2m3!1e0!2sm!3i41111...22!2i26m1!4b1!...	200	xhr	rs=ACT90oGaTkeF-QsA13sNlruGfTy...	639 B	29 ms		
pb=Im4!1m3!1i1!2i1312!3i3167!2m3!1e0!2sm!3i41111...22!2i26m1!4b1!...	200	xhr	rs=ACT90oGaTkeF-QsA13sNlruGfTy...	181 B	27 ms		

7 / 16 requests | 49.9 KB / 157 KB transferred



functions



functions



```
window.alert("hello, world");
```

loops



loops



```
while (true)
{
    window.alert("hello, world");
}
```

loops



loops



```
for (var i = 0; i < 10; i++)  
{  
    window.alert("hello, world");  
}
```

variables



variables



```
var counter = 0;  
while (true)  
{  
    window.alert(counter);  
    counter++;  
}
```

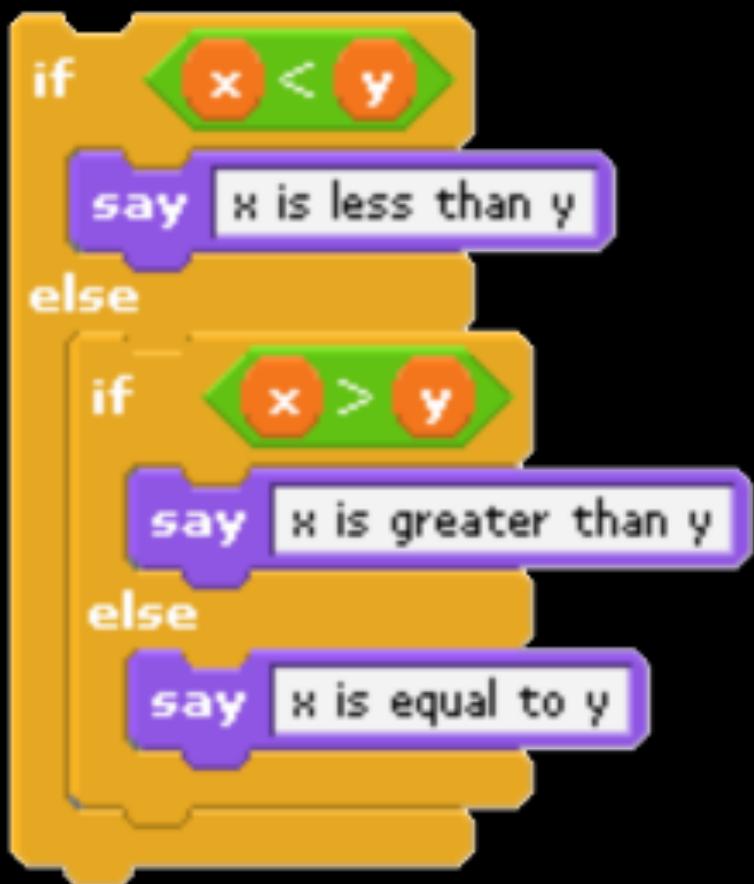
Boolean expressions



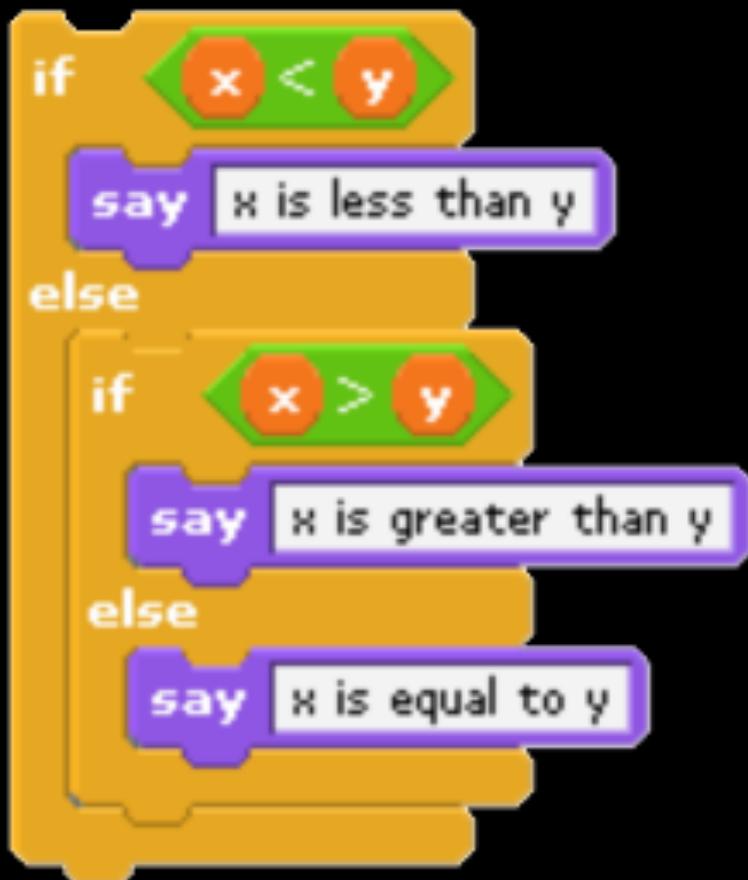
Boolean expressions


$$(x < y) \\ ((x < y) \& \& (y < z))$$

conditions



conditions



```
if (x < y)
{
    window.alert("x is less than y");
}
else if (x > y)
{
    window.alert("x is greater than y");
}
else
{
    window.alert("x is equal to y");
}
```

Events

- onclick
- onmouseover
- onkeypress
- ...

DOM Examples

Form Examples

Geolocation Examples

API

Application Programming Interface

<http://nifty.stanford.edu/2011/parlante-image-puzzle/>

getRed(x, y)

getGreen(x, y)

getBlue(x, y)

setRed(x, y, value)

setGreen(x, y, value)

setBlue(x, y, value)

<https://developers.google.com/maps/documentation/javascript/tutorial>

AlzaSyAmk7cP6WPlqLXgIP4mlQKg7RTDVxhKm50

<http://bit.ly/mba-key>

Next Time

Mobile Strategies

- hybrid apps, native apps, web apps

CS50 for MBAs

Web Programming