


week 9



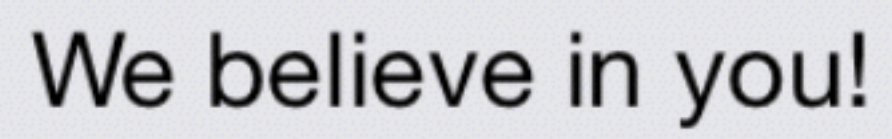
Hi




It's Margot!



You got this, David!



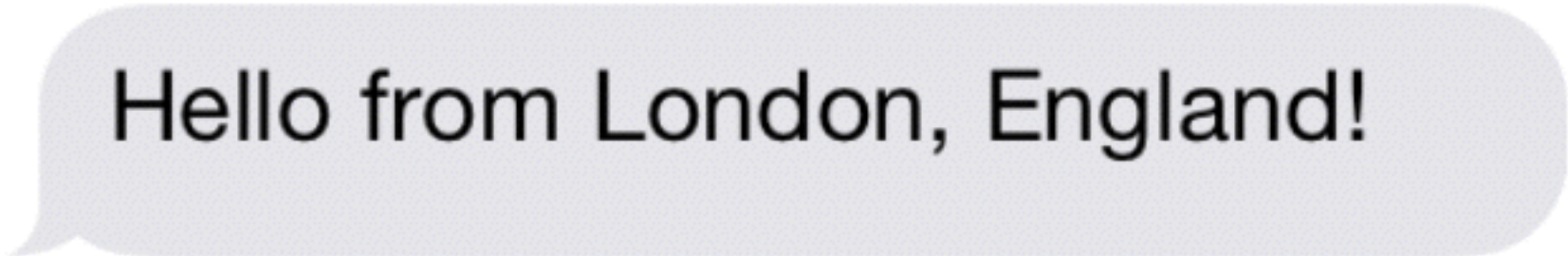
We believe in you!



Nearly there!



you're blowing it!!!!



Hello from London, England!

cs50.harvard.edu/here



lunch this Fri 11/7, 1:15pm

cs50.harvard.edu/rsvp



SEAS Advising Fair

Wed 11/5, 4pm – 5:30pm, Maxwell Dworkin

<http://graph.facebook.com/zuck>

```
{  
  "id": "4",  
  "first_name": "Mark",  
  "gender": "male",  
  "last_name": "Zuckerberg",  
  "link": "https://www.facebook.com/zuck",  
  "locale": "en_US",  
  "name": "Mark Zuckerberg",  
  "username": "zuck"  
}
```

APIs

- CS50 Courses API
- CS50 Food API
- CS50 Maps API
- ...

final project

pre-proposal

proposal

status report

CS50 Hackathon

implementation

CS50 Fair

hardware

Philips hue bulbs

```
PUT /api/newdeveloper/lights/1/state HTTP/1.1
```

```
{"on":true, "bri":128, "transitiontime":0}
```

hardware

Philips hue bulbs

Google Glass

hardware

Philips hue bulbs

Google Glass

Arduino Uno

hardware

Philips hue bulbs

Google Glass

Arduino Uno

Myo Gesture Control Armband

hardware

Philips hue bulbs

Google Glass

Arduino Uno

Myo Gesture Control Armband

Leap Motion Controller

hardware

Philips hue bulbs

Google Glass

Arduino Uno

Myo Gesture Control Armband

Leap Motion Controller

...

cs50.harvard.edu/seminars



I'm terrified of my new TV: Why I'm scared to turn this thing on — and you'd be, too

From facial recognition to personal data collection, this thing is downright scary -- and so are the implications

WWW.SALON.COM



<http://pset7/sell.php?symbol=GOOG>



A massive leak of private Snapchat pics — and an era when even ‘disappearing’ photos can reappear

The Snapchat leak is only the latest to hit today's profoundly insecure internet.

WWW.WASHINGTONPOST.COM

[http://kennywithers.com/featured-online-marketing-articles/
the-snapping-snapchat-accounts-hacked/](http://kennywithers.com/featured-online-marketing-articles/the-snapping-snapchat-accounts-hacked/)

SQL

storage engines

- InnoDB
- MyISAM
- Archive
- Memory
- ...



atomicity

```
INSERT INTO table (id, symbol, shares) VALUES(6, 'FREE', 10)  
ON DUPLICATE KEY UPDATE shares = shares + VALUES(shares)
```

transactions

```
START TRANSACTION;  
UPDATE account SET balance = balance - 100 WHERE account = 2;  
UPDATE account SET balance = balance + 100 WHERE account = 1;  
COMMIT;
```

SQL injection attack



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PINSYSTEM

[FAQ](#) | [HELP](#) | [PRIVACY](#) | [LOGOUT](#)

Select a Login type: [What is a login type?](#)

☒ Harvard University ID (HUID)

☐ XID Login

Login ID:

[What is a login ID?](#)

PIN / Password:

[What is a PIN / Password?](#)

Login

[New user? Forgot your PIN / Password?](#)

Login

[New user? Forgot your PIN / Password?](#)

```
$username = $_POST["username"];  
$password = $_POST["password"];  
query("SELECT * FROM users WHERE username='{ $username }' AND password='{ $password }'");
```



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PINSYSTEM

[FAQ](#) | [HELP](#) | [PRIVACY](#) | [LOGOUT](#)

Select a Login type: [What is a login type?](#)

- ☒ Harvard University ID (HUID)
☐ XID Login

Login ID:

skroob

[What is a login ID?](#)

PIN / Password:

12345' OR '1' = '1

[What is a PIN / Password?](#)

Login

[New user? Forgot your PIN / Password?](#)

Login

[New user? Forgot your PIN / Password?](#)


```
$username = $_POST["username"];  
$password = $_POST["password"];  
query("SELECT * FROM users WHERE username='{ $username }' AND password='{ $password }'");
```

```
$username = $_POST["username"];  
$password = $_POST["password"];  
query("SELECT * FROM users WHERE username='skroob' AND password='12345' OR '1' = '1'");
```

```
$username = $_POST["username"];  
$password = $_POST["password"];  
query("SELECT * FROM users WHERE username=? AND password=?", $username, $password);
```

```
$username = $_POST["username"];  
$password = $_POST["password"];  
query("SELECT * FROM users WHERE username='skroob' AND password='12345\' OR \'1\' = \'1\'");
```

HI, THIS IS
YOUR SON'S SCHOOL.
WE'RE HAVING SOME
COMPUTER TROUBLE.



OH, DEAR - DID HE
BREAK SOMETHING?

IN A WAY -



DID YOU REALLY
NAME YOUR SON
Robert'); DROP
TABLE Students; -- ?



OH, YES. LITTLE
BOBBY TABLES,
WE CALL HIM.

WELL, WE'VE LOST THIS
YEAR'S STUDENT RECORDS.
I HOPE YOU'RE HAPPY.



AND I HOPE
YOU'VE LEARNED
TO SANITIZE YOUR
DATABASE INPUTS.

V IIII

V IIII

V

WE CALL HIM.

V

DATABASE INPUTS.

JavaScript

<https://developer.mozilla.org/en-US/docs/Web/JavaScript/Guide>

functions

~~main~~

conditions

```
if (condition)
{
    // do this
}
else if (condition)
{
    // do that
}
else
{
    // do this other thing
}
```


Boolean expressions

```
if (condition || condition)
{
    // do this
}
```

Boolean expressions

```
if (condition && condition)
{
    // do this
}
```

switches

```
switch (expression)
{
    case i:
        // do this
        break;

    case j:
        // do that
        break;

    default:
        // do this other thing
        break;
}
```

loops

```
for (initializations; condition; updates)
{
    // do this again and again
}
```

loops

```
while (condition)
{
    // do this again and again
}
```

loops

```
do  
{  
    // do this again and again  
}  
while (condition);
```

arrays

```
var numbers = [4, 8, 15, 16, 23, 42];
```

variables

```
var s = "hello, world";
```


objects

```
var quote = {symbol: "FB", price: 79.53};
```

event handlers

onblur
onchange
onclick
onfocus
onkeydown
onkeyup
onload
onmousedown
onmouseup
onmouseout
onmouseover
onmouseup
onresize
onselect
onsubmit
...

to be continued...