Database-Backed Websites

No screens

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COMS 4170
21 February 2018

Say your name
Goal 1
Build websites that suit the needs and abilities of users

The main goal of many websites is to display information users need.
This website has no database

User Interface Design
COMS 4170 · Spring 2018

Part 1 Build websites that suit the needs and abilities of users.
Part 2 When the needs and abilities of users are uncertain, design systems by learning from iteration and experimentation.
But all the other ones do
Amazon: Database of books
Windows 95 Video Guide with Matthew Perry & Jennifer Aniston

216,782 views

Watch all about the show Friends in a single playlist - https://www.youtube.com/playlist?list=... Subscribe and watch scenes from all seasons of Friends on my channel - https://www.youtube.com/channel/UCABV...
GMail: Database of emails
Facebook: Database of posts
GCalendar: Database of events
Google Maps: A database of locations
Trump in Shutdown Talks With Schumer

White House Invites Democratic Leader to Negotiate a Deal

The government will shut down at 12:00 a.m. Saturday if lawmakers fail to get an agreement on some kind of spending bill.

With Democrats balking, President Trump canceled plans to travel to his Florida resort and contacted Senator Chuck Schumer, the Democratic leader.

Timeline: How Congress Got to the Brink of a Shutdown

- Right and Left React to Prospect of Shutdown

How the Debate in Congress Breaks Down

Lawmakers have until Friday at midnight to pass a short-term spending bill to avoid a government shutdown.

Senate to Vote With Shutdown at Stake

Senate Democrats appear ready to block legislation to keep the government funded past midnight, gambling that Mr. Trump will offer concessions on Immigration and other issues.

The Chaos President vs. His Iron-Fisted Chief of Staff

VIDEO INTERVIEW

The New York Times: Database of news articles
Gorgeous new 6ft. tall throne chair - $1199 (Brooklyn)

Gorgeous new 6ft. tall throne chair for $1199obo. I will deliver it to you!

- do NOT contact me with unsolicited services or offers
What’s the difference?
Database-backed Websites
This class is not about backend development

But front-ends and back-ends are tightly coupled. So you need to know something about back-end databases To create awesome websites
Interacting with Databases

CRUD: Create, Read, Update Delete
Gmail is a database of emails
What are the key bits of information stored for each **email**?

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Subject</th>
<th>Body</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baldwin</td>
<td>Jeffrey</td>
<td>Blogloving’</td>
<td>Not that I know of...</td>
<td>158904993585835</td>
</tr>
<tr>
<td>Ann Feldman</td>
<td>Jeffrey</td>
<td>Fwd: Classroom visit?</td>
<td>Ann Feldman District Technology</td>
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...
Remember: Multiple users’ data stored in one database

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</tr>
<tr>
<td>Lydia Chilton</td>
<td>Lee Bollinger</td>
<td>Bowling tuesday</td>
<td>Hey dude! Donnie and I were thinking of going bowling...</td>
<td>158904993443772</td>
</tr>
</tbody>
</table>
Most websites allow users to: **Create, Read, Update, and Delete Data**

<table>
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</table>
CREATE: How do users create data in GMail?

INSERT INTO emails (To, From, Subject, Body, time)
VALUES ("Baldwin", "Jeffrey", "Bloglovin’", "not that I know of", NOW)
READ: How do users read data in GMail?

How do they see different portions of the database?

Select * FROM emails
WHERE (to = “Jeffrey”) OR from = “Jeffrey”
ORDER BY time DESCENDING
LIMIT 30

WHY NOT THIS?
Select FROM emails WHERE (to = “Jeffrey”) OR from = “Jeffrey”
**READ: How do users read data in GMail?**

How do they see different portions of the database?

<table>
<thead>
<tr>
<th>ID</th>
<th>From</th>
<th>To</th>
<th>Subject</th>
<th>Body</th>
<th>Response to</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Baldwin</td>
<td>Jeffrey</td>
<td>Blogloving’</td>
<td>Not that I know of...</td>
<td></td>
<td>158904993585</td>
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<td>Ann Feldman</td>
<td>Jeffrey</td>
<td>Fwd: Classroom visit?</td>
<td>Ann Feldman District Technology</td>
<td></td>
<td>158904993585</td>
</tr>
<tr>
<td>3</td>
<td>Jeffrey</td>
<td>Lambert</td>
<td>8th Period</td>
<td>Hey Lambert, ...</td>
<td>0</td>
<td>158904993589</td>
</tr>
<tr>
<td>4</td>
<td>Lambert</td>
<td>Jeff</td>
<td></td>
<td>Hey Jeff,</td>
<td>3</td>
<td>158904993599</td>
</tr>
</tbody>
</table>

My_emails_id = Select * FROM emails WHERE (to = "Jeffrey")

Select * FROM emails WHERE (responseTo IN My_email_ids)
UPDATE: How do users update data in GMail?

What do they update? And how do they do it in the interface?

UPDATE email_table
SET starred = True
WHERE email_id="123456"
DELETE: How do users delete data in GMail?

First, what objects can be deleted in GMail?

DELETE FROM email_drafts_table WHERE id="123456"

UPDATE email_table
SET mark_as_deleted = True
WHERE email_id="123456"
Facebook is a database of posts.
What fields are in the Facebook posts database?

<table>
<thead>
<tr>
<th>creator</th>
<th>text</th>
<th>Likes</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charles Morton</td>
<td>Charles Age 41: Personal..</td>
<td>210</td>
<td>15890499358</td>
</tr>
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CREATE: How do users create data in Facebook?

```
INSERT INTO
posts (creator, text, likes, time)
VALUES
("Charles Morton",
  "Charles: Age 41: Personal Space None <img src=""/>",
  0,
  NOW())
```
READ: How do users read data in Facebook?

How do they see different portions of the database?

my_friends = 
Select * FROM Friends WHERE friend1="Lydia Chilton"

Select * FROM posts WHERE (creator in my_friends )
UPDATE: How do users update data in Facebook?

UPDATE posts
INCREMENT likes
WHERE post_id = "123345"
DELETE: How do users delete data in Facebook?

DELETE FROM posts
WHERE post_id = "123456"
What fields are in the Calendar events database?
**CREATE:** How do users create data in Calendar?

<table>
<thead>
<tr>
<th>Creator</th>
<th>Start date</th>
<th>End Date</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chilton</td>
<td>Feb 28, 7pm</td>
<td>Feb 28, 8pm</td>
<td>Dinner with Lee</td>
</tr>
<tr>
<td>Chilton</td>
<td>Feb 14, 4pm</td>
<td>Feb 17, 12pm</td>
<td>National Academy of Sciences event</td>
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READ: How do users read data in Calendar?

How do they see different portions of the database?

- "Day" view
- "Week" view
- "Month" view

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UPDATE: How do users update data in Calendar?

Drag and drop

Select an event and edit a form
DELETE: How do users delete data in Calendar?

Selecting an event and clicking delete
CRUD: Operations for interacting with a database

Create

Read

Update

Delete
Dynamically Generated Webpages
On IMDB, are there 100,000 static HTML pages sitting around?
IMDb uses a template and a database

<table>
<thead>
<tr>
<th>Title</th>
<th>Plot summary</th>
<th>poster</th>
<th>year</th>
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<tbody>
<tr>
<td>The Big Lebowski</td>
<td>“The dude” Lebowski, mistaken...</td>
<td>Lebowski.jpg</td>
<td>1998</td>
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<tr>
<td>The Big Short</td>
<td>In 2006-7 a group of investors...</td>
<td>Big_short.jpg</td>
<td>2015</td>
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<tr>
<td>The Big Chill</td>
<td>A group of 7 former roommates</td>
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IMDB uses a template and a database And fills in the data dynamically on pageload
What goes in the template?
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What goes in the template?
IMDB uses a template and dynamically fills the template from a database query.
Anyone remember the other categories?
Anyone remember the other categories?
Anyone remember the other categories?
IMDB Template
Templates are standardizations. What can go wrong?
Templates are standardizations. What can go wrong?
Expect to **iterate** on your templates.
What is statically generated on the Craigslist homepage?
What is dynamically generated on the Craigslist homepage?
What is statically generated on the Craigslist homepage?
AJAX: Updating portions of the page from the database
These pages do not update once loaded
These pages DO update once loaded
What portions of this page update?
What portions of this page update?
What portions of this page DO NOT update?
What portions of this page DO NOT update?
What portions of this page update?
What portions of this page DO NOT update?
From a back-end perspective Facebook, Gmail are very similar. What’s different?
The data is different,
And the information needs they serve are different.
You can drive a lot of human behavior with one database update.
Summary
Sites with lots of data have a database in the backend

Front-ends and back-ends are tightly coupled.
So you need to know something about back-end databases
To create awesome websites
CRUD: Operations for interacting with a database

Create

Read

Update

Delete
Use templates to dynamically generate pages from data in the database.

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Some sites reload portions of the page

Does not reload

Reloads
From a back-end perspective, database-backed websites are very similar. But they serve different data and different information needs.