

COMPSCI 326

Web Programming

17 – Heroku and SQL

<https://bityl.co/BkX5>



Some slight changes to class material...

- It is always important to reflect on organization
- The MAP provided good input in how the course is organized
- I have also noticed some things myself, ways to improve
- There is no better time than now to take action:
 - Moving course material to GitHub
 - Trying to move as much as possible to GitHub Classroom
 - Trying to make code and material more accessible and more easily updated

Today

- Debugging a Node Application
- Relational Databases
- ACID
- Creating a Heroku App
- Adding PostgreSQL Database to a Heroku App
- Writing SQL Queries

Debugging a Node Application

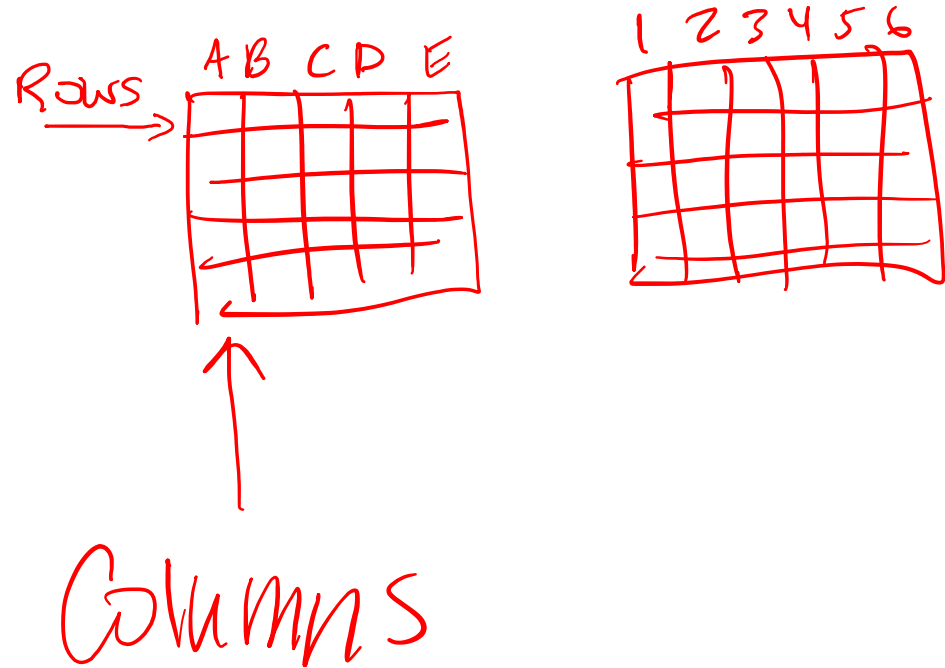
- We know how to debug JavaScript in the browser.
- Wouldn't it be nice to debug JavaScript on the server in the browser?
- We can!

```
node -inspect-brk index.js
```

Relational Databases

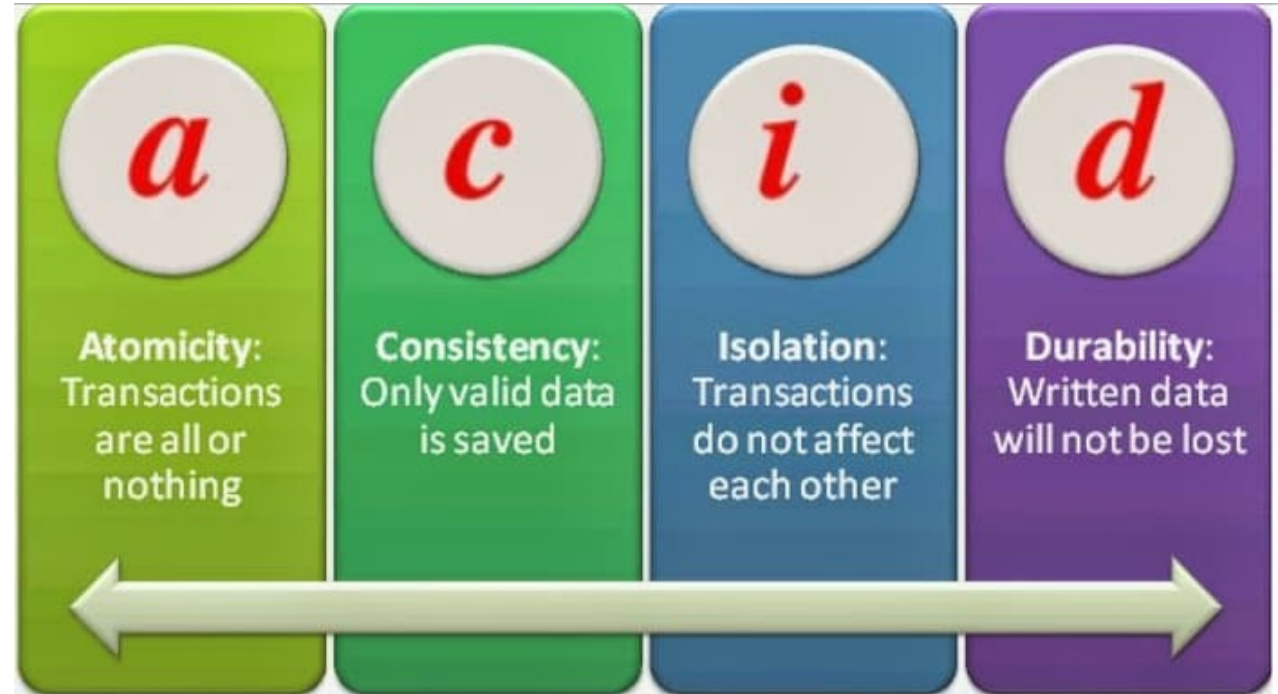
- We know how to persist data on the filesystem.
- This self-managed way of doing things can get messy.
- Relational databases will manage this for us.
- Relational databases are made up of rows and columns.
- We use SQL to access them.

Relational Alg. } SQL
Relational Calc. }



ACID

- **Atomic** - all operations are "all or nothing"
- **Consistent** - we move from one "good" state to another
- **Isolated** - only one thing is happening at a time (but we can have multiple web browsers accessing the same server...)
- **Durable** - state survives a reboot or other failure because it's written to disk



Creating a Heroku App

- It has been fun running apps on our laptops, but...
- Wouldn't it be fun to run them on the web somewhere?
- We will be using Heroku to host our applications for free.

Activity: Spend the next 5-10 minutes creating an account on Heroku <https://www.heroku.com>



HEROKU

Adding a PostgreSQL Database to a Heroku App

- Now that we have a Heroku App...
- We want to provision the app with a database
- This can easily be done through the dashboard of the app you just created

Activity: Spend the next 5-10 minutes provisioning a PostgreSQL database for the App you just created.



Structured Query Language (SQL)

- How do we get data into a relational database?
- How do we get data out of a relational database?

SQL was designed to be independent of internal data structures and storage.

We can use SQL to implement basic CRUD operations.

```
1  -- Drop the people table if it exists.
2  -- We are just doing this to reset the DB each time.
3  drop table if exists people;
4
5  create table if not exists people (
6      id varchar(30) primary key,
7      name varchar(30),
8      age integer
9  );
10
11 insert into
12     people(id, name, age)
13 values
14     ('1', 'Artemis', 19),
15     ('2', 'Parzival', 17),
16     ('3', 'John', 30),
17     ('4', 'Mia', 22);
18
```