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!

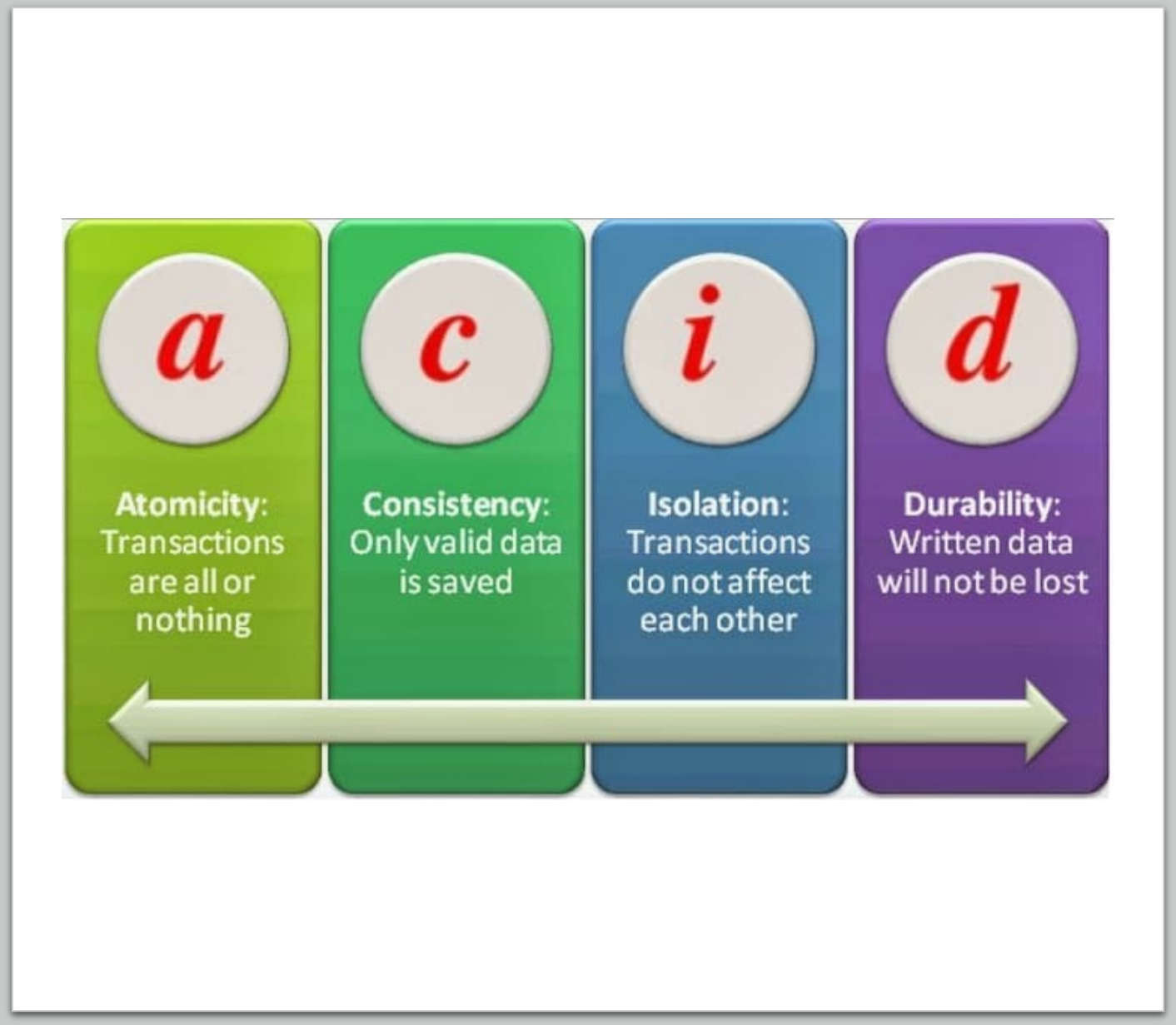
```
node –inspect-brk index.js
```

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.

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

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.

```sql
-- Drop the people table if it exists.
-- We are just doing this to reset the DB each time.
drop table if exists people;

create table if not exists people (
    id varchar(30) primary key,
    name varchar(30),
    age integer
);

insert into
    people(id, name, age)
values
    ('1', 'Artemis', 19),
    ('2', 'Parzival', 17),
    ('3', 'John', 30),
    ('4', 'Mia', 22);

```