UNIVERSITY OF SAN FRANCISCO
CHANGE THE WORLD FROM HERE

Principles of Software Development

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Welcome to CS 601!

- **Learn to think like a software developer**
  - Modular design
  - Reusable code
  - Problem solving
- **Foundations**
  - Concurrency
  - Networking
  - Web and HTTP
  - Distributed topics

A practical approach

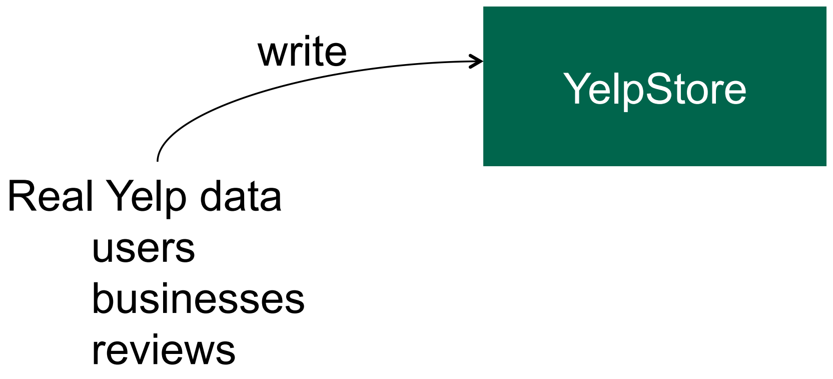
- **Learn by doing – build a user review web application!**
- **Labs – practice fundamentals**
- **Project – get creative!**

Today

- Introductions
- Expectations
- A bit of history
- Java

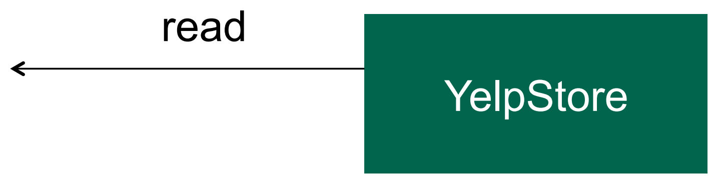
Lab 1

- **Practice with data structures**



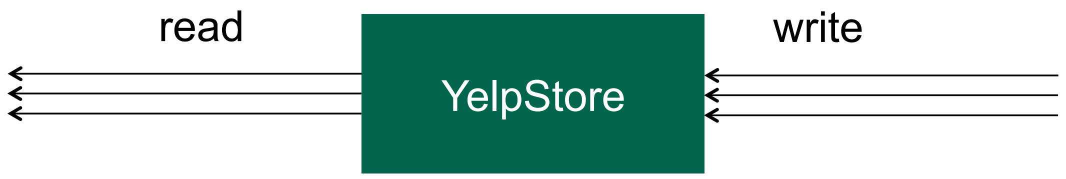
Lab 2

- **More practice with data structures**



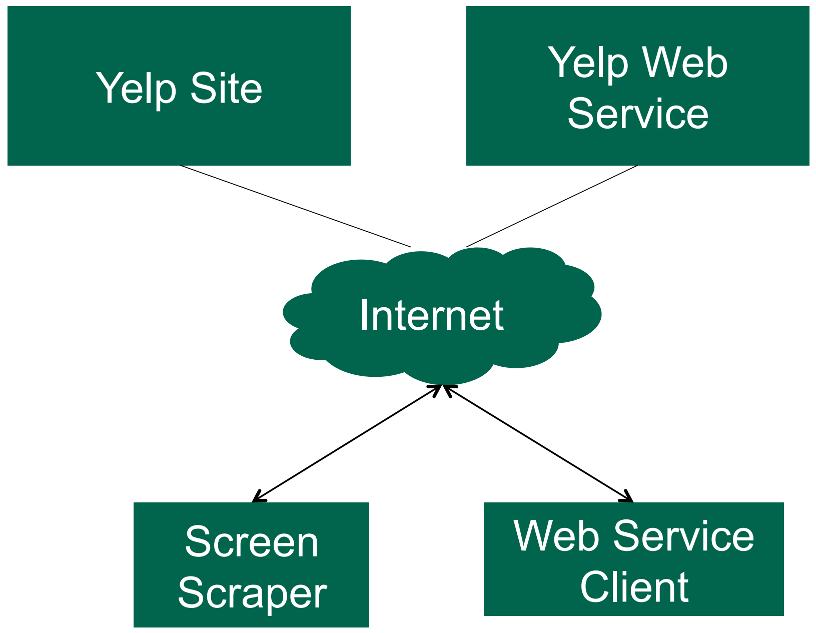
Lab 3

- **Concurrency and multithreaded programming**



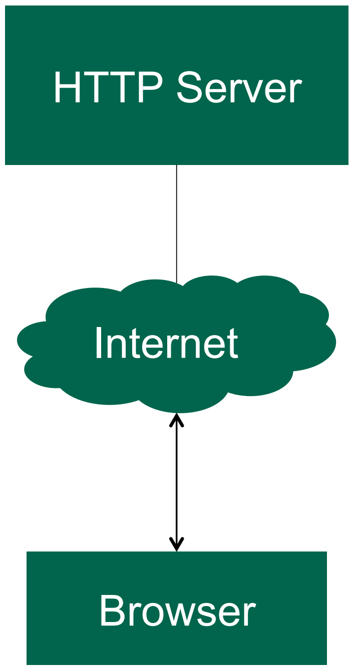
Lab 4

- **Web clients**
  - Screen scraper
  - Web service client



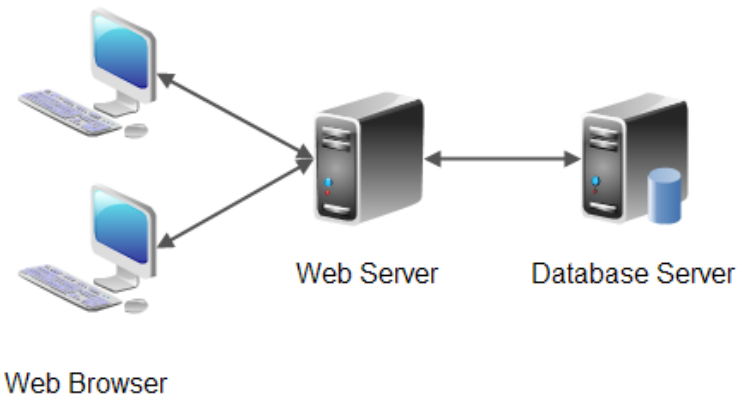
Lab 5

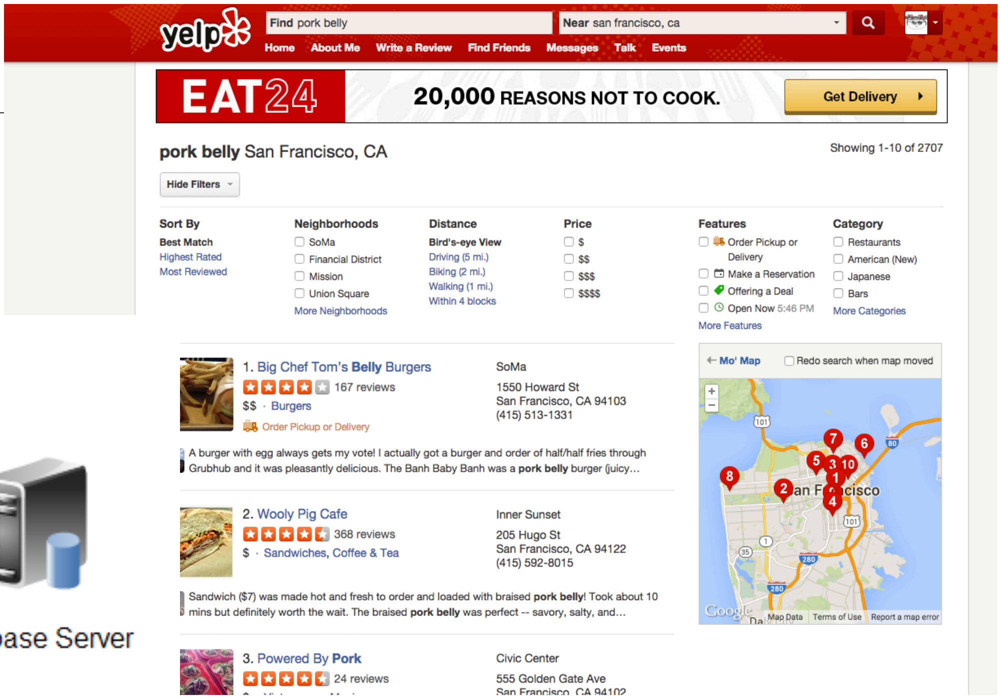
- **HTTP Server**
  - Using raw sockets!



Project

- **Fully functional website**





pork belly San Francisco, CA

Showing 1-10 of 2707

Sort By
Best Match
Highest Rated
Most Reviewed

Neighborhoods
SoMa
Financial District
Mission
Union Square
More Neighborhoods

Distance
Bird's-eye View
Driving (5 mi.)
Biking (2 mi.)
Walking (1 mi.)
Within 4 blocks

Price
$
$$
$$$
$$$$

Features
Order Pickup or Delivery
Make a Reservation
Offering a Deal
Open Now 5:46 PM
More Features

Category
Restaurants
American (New)
Japanese
Bars
More Categories

1. Big Chef Tom's **Belly** Burgers
167 reviews
$$ · Burgers
Order Pickup or Delivery
SoMa
1550 Howard St
San Francisco, CA 94103
(415) 513-1331

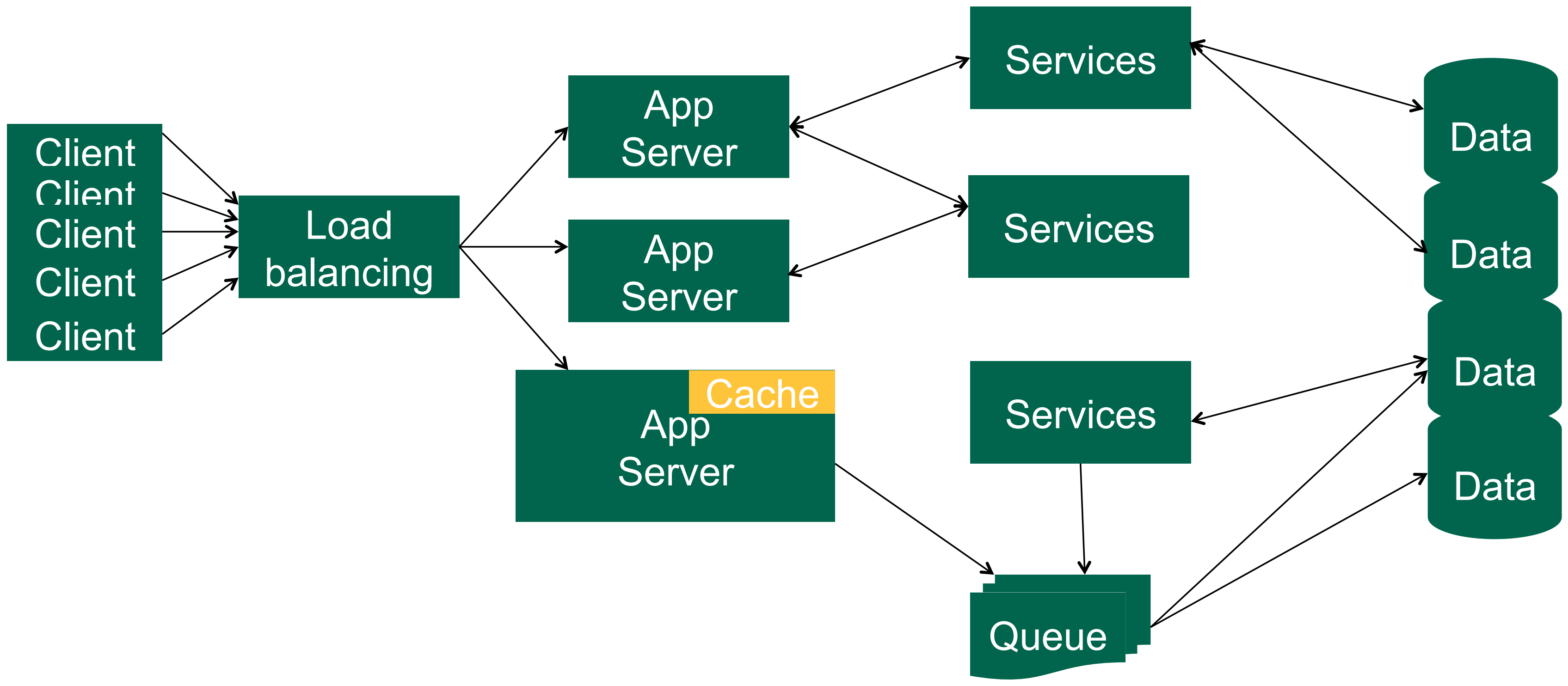
A burger with egg always gets my vote! I actually got a burger and order of half/half fries through Grubhub and it was pleasantly delicious. The Banh Baby Banh was a **pork belly** burger (juicy...

2. Wooly Pig Cafe
368 reviews
$ · Sandwiches, Coffee & Tea
Inner Sunset
205 Hugo St
San Francisco, CA 94122
(415) 592-8015

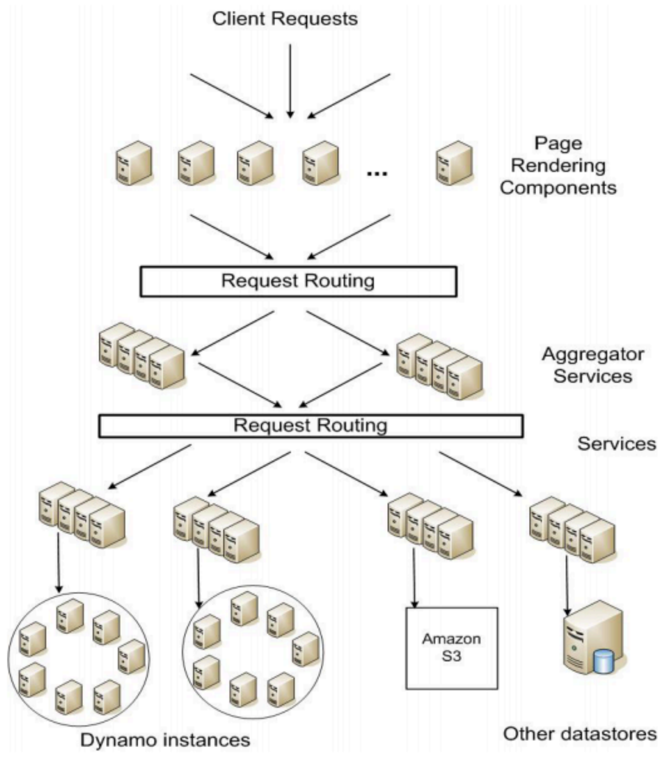
Sandwich ($7) was made hot and fresh to order and loaded with braised **pork belly**! Took about 10 mins but definitely worth the wait. The braised **pork belly** was perfect -- savory, salty, and...

3. Powered By **Pork**
24 reviews
Civic Center
555 Golden Gate Ave

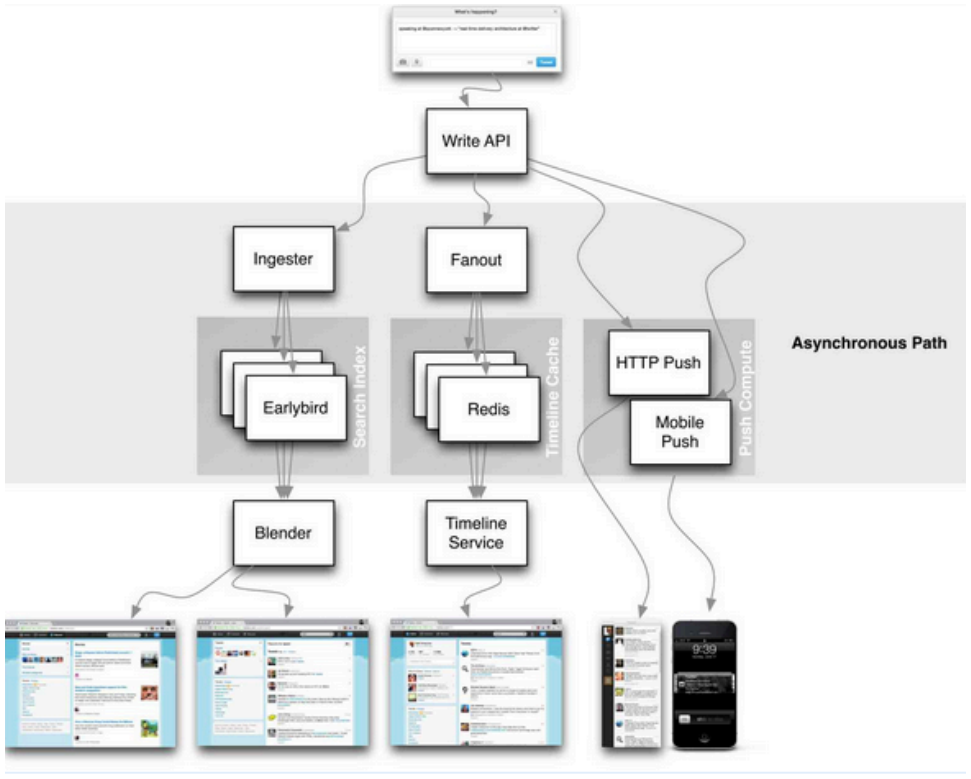
Scaling


Client
Client
Client
Client
Client
Load balancing
App Server
App Server
Cache
App Server
Services
Services
Services
Queue
Data
Data
Data
Data

Amazon – Original SOA



Twitter – Service Oriented Architecture (SOA)



Software Engineering

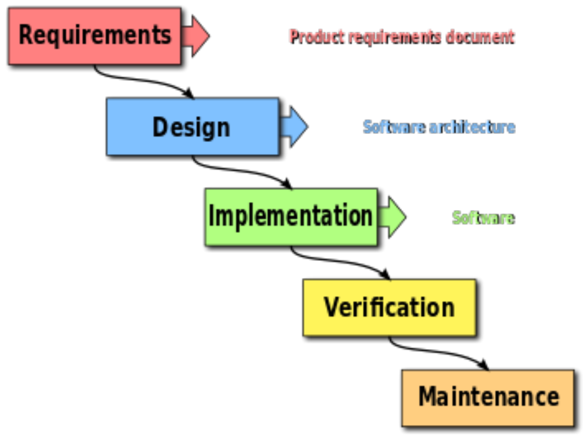
- **There are many examples of failed software projects**
  - Affordable care act website
  - Therac-25 radiation therapy machine killed patients because of a bug

- **Software Engineering**
  - Term coined in 1969. Discover more structured methods for building software.

- **Also see “Engineering Software as a Service: An Agile Approach Using Cloud Computing” by Fox and Patterson**

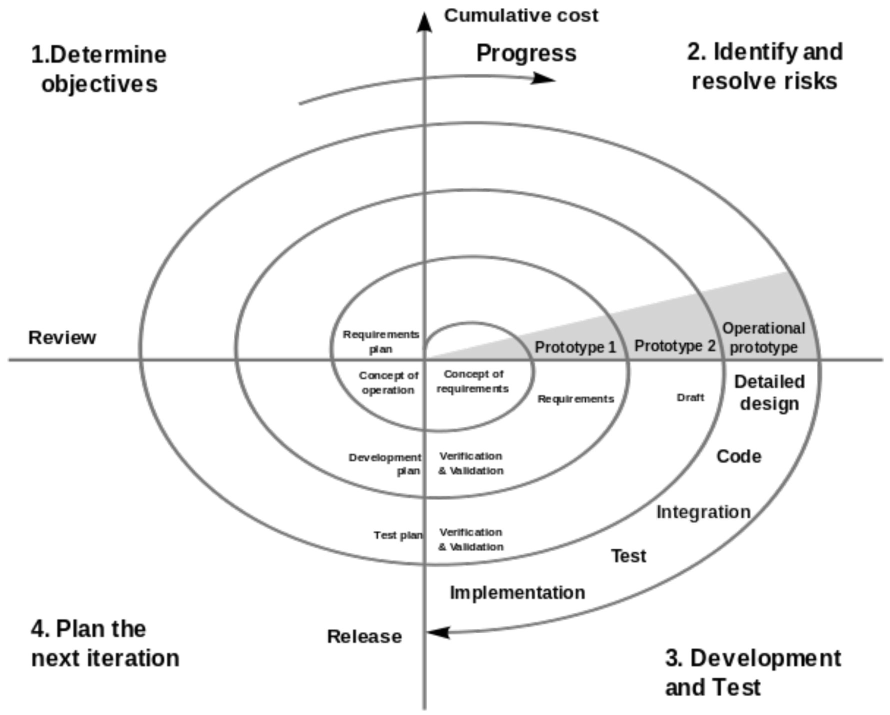
Waterfall – 1970s

- **Each phase happens once**
- **Good for projects that require a lot of planning**
  - NASA applications
- *“Plan to throw one [implementation] away; you will, anyhow.”* -Fred Brooks, Jr.
- **Need user/client in the loop**
  - Early prototypes



Spiral – 1980s

- Develop prototypes
- Consult client
- Iterate
- Iterations 6-24 months long



Rational Unified Process – 2003

- **Four phases**
  - Inception
  - Elaboration
  - Construction
  - Transition

- **Each phase may have multiple iterations**

The Agile Manifesto – 2001

- Individuals and interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan

WE'RE GOING TO TRY SOMETHING CALLED AGILE PROGRAMMING.
THAT MEANS NO MORE PLANNING AND NO MORE DOCUMENTATION. JUST START WRITING CODE AND COMPLAINING.
I'M GLAD IT HAS A NAME.
THAT WAS YOUR TRAINING.
www.dilbert.com scottadams@aol.com
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Exercise

- Identify the ten applications you think are most important.
- For each, do you think agile would be an appropriate software development methodology?