CSE 106
Exploratory Computing
(AKA Full Stack Development)

Lecture 1 - Introduction

This is going to be a GREAT class

- You'll learn many useful technologies applicable to your career
- You'll do a project you can add to your portfolio
- My goal is to help each of you:
  - Become a solid software engineer
  - Get a good job after you graduate
  - Become a better you

About me: Dr. Ammon Hepworth

- Grew up in San Diego, lived in UT, CT, TX, AR, Hong Kong
- Married with 3 kids (wife from Merced)
- Developed software since 2007
- BS, MS and PhD from Brigham Young University
- Currently Sr Manager Software Engineering at a Walmart Innovation Lab

TA Intro

- Jianan Chen
  - jchen488@ucmerced.edu
- Yangqing Sun
  - ysun58@ucmerced.edu

About you

- Where are you from?
- What year in school are you?
- What Programming languages do you know?
  - Java, C, C++, Python, C#, Visual Basic, JavaScript, HTML/CSS

Contact Info

- Dr. Ammon Hepworth
- ahepworth@ucmerced.edu
- Office Hours: Immediately after class

What is this class anyway?

- Hasn’t been taught in 15 years before I starting teaching it in Spring ‘22
- Old title: Exploratory Computing
- New title: Full stack development
- A practical, project-based class to learn technologies for building web applications (frontend, backend, and storage)

Technologies you'll learn

- Focus on web technologies and languages including:
  - Python
  - HTML/CSS
  - JavaScript
  - SQL
  - ORM's
  - Web frameworks
  - Visualization libraries

Course Overview

- 1 Lecture and 1 Lab per week
- 8 lab assignments applying what is taught in lecture
  - Lab 8 is a group mini project
- Mid-term exam
  - During class, in a classroom on Nov 16
  - Final project in place of final exam
  - Presentations on Tues, Dec 12, 6:30 – 9:30pm (over Zoom)

Final project

- A substantial web application hosted live on the Web
- Requires a database, server, and front end
- Requires user sign up and login
- Pick a project (or variation) or come up with your own idea
- Examples:
  - A social media web app
  - Collaborative game web app
  - Interactive analytics map app
  - A forum web app

Grading

- Mid-term: 30%
- Final project: 35%
- Lab assignments: 30%
- Lab attendance: 5%
- Grades:
  - 90% at least an A-
  - 80% at least a B-
  - 70% at least a C

Course Content

Don’t be a cheater!

- Examples
  - Communicating information to another student during examination
  - Knowingly allowing another student to copy one’s work
  - Offering another person’s work as one’s own
- **You are a better than that!**

You can do hard things

- Programming is hard
  - Learning multiple languages
  - Learning new concepts
- Keys for success
  - Attend lab and lecture
  - Do the labs
  - Ask a lot of questions
  - Just keep trying

https://youtu.be/KdxEAt91D7k

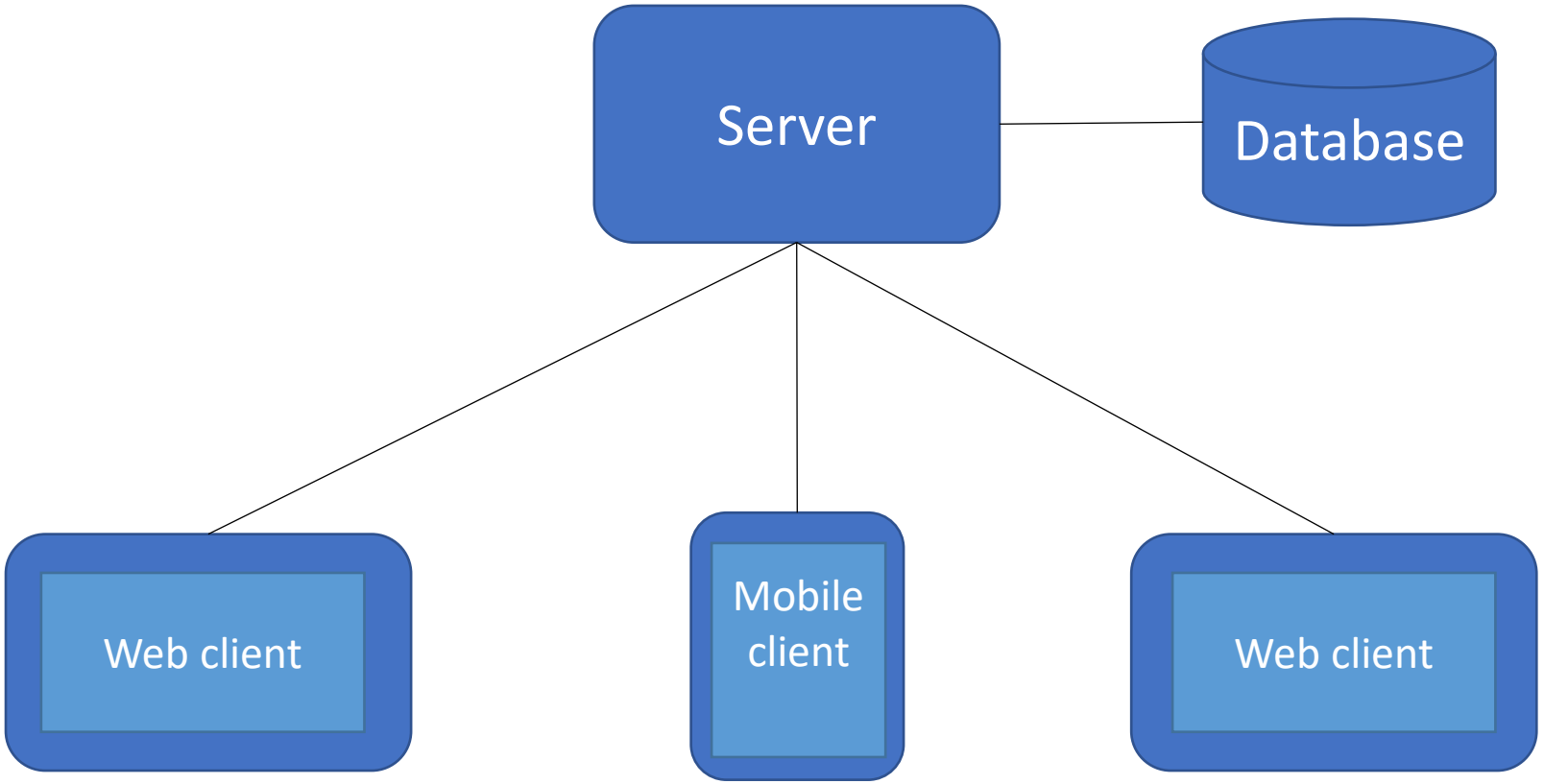
Web Technologies and Data

- The web is a major way for billions of people to consume data every
- Web technologies used today (to name a few):
  - Databases (SQL, MongoDB, etc)
  - HTML, CSS, JavaScript
  - Web frameworks (Flask, Django, Express, etc)
  - Front end frameworks (React, Angular, ect)

Full Stack Web Development

- Full stack refers to the technology to implement both the front end and back end of an application
- Front end
  - Referred to as the client
  - Included the web or mobile app user interface
- Back end
  - Web/app server(s)
  - Database(s)

Basic Client/Server Architecture



Python Language

- A popular, high-level language with simple and easy to read syntax
- Common uses
  - Data processing
  - Backend development
- Characteristics
  - Interpreted
  - Object-oriented
  - Dynamically typed (type is not specified)
  - Garbage collected

Python History

- Created by Guido van Rossum in 1991 as Python 0.9.0
- Python 2.0 was released in 2000
- Python 3.0 was released in 2008
  - Not completely backwards compatible with Python 2
  - Many developers continued with Python 2.x for years
  - Python 2.0 finally discontinued with version 2.7.18 in 2020
  - Python 3.0 is the preferred version

Python Hello World

```
print(“Hello World!")
```

One line. It’s that easy!

Getting started with Python

- Download and install from Python.org for Windows, Linux/Unix or MacOS
- Recommended IDE’s
  - Pycharm
  - Visual Studio Code
- Online options
  - Replit.com
  - PythonAnywhere.com