**256 Final Exam Content (in addition to Content from Exams #1 and #2):**

**- Web Abstractions** - Definitions & Roles

- Client Side / Server Side

- Front End / Back End

- HTML / CSS / JavaScript

- Web Server

- Back End Languages / Applications

- Database

- HTTP / HTTPS

- Web API

- HTML

- Elements / Tags / Content

- Source Code / Rendered Page

- Element nesting

- Document Object Model (DOM)

- Tags:

- html, head, title, body

- p, em, strong, a, img, ul, ol, li, div, span

- CSS

- CSS Rules

- Selector, declaration, property, value

- Selectors (element, class, id)

- JavaScript

- Handling Events (onclick)

- Input elements

- Modifying attributes (value/src)

- Modifying CSS

- Modifying the DOM

- Web APIs

- Restaurant Metaphor

- Request URLS

- Host / Endpoint / Query String

- Query Parameters

- Field / Value

- API Keys

- JavaScript Object Notation (JSON)

- Fields / Objects / Arrays

- Referencing Values

- AJAX

- Be familiar with the code

- Know how it works

- Will not need to write it from scratch

- Databases

- Definitions

- Relational Databases (RDBMS)

- Tables / Entities

- Relations

- Structured Query Language (SQL)

- SELECT, FROM, WHERE, JOIN

- Back End Dynamic Content

- Static Content / Dynamic Content

- Dynamic Content Approaches

- Page Generation

- Server Pages

- API Endpoint Handlers

- API Endpoints with Express

- Be familiar with the code

- Know how it works

- Understand the relationship between:

- Back End API Handler (server.js)

- Front End Code

- AJAX to make the call

- JavaScript to process the result.

- Will not need to write it from scratch.

**- Networking Abstractions:**

**-** Networking and Internet vocabulary

- Postal System metaphor for Internet

- Packet vs Circuit Switching

- Network Layers

- Process oriented view

- Service oriented view

- Responsibilities of layers in Internet

- Encapsulation of information at layers

- Physical Layer

- Serial and Parallel transmission

- Bandwidth and Data Rates

- Encodings

- NRZ / Manchester / Frequency shift

- Need for clock synchronization

- Data Link Layer

- Ethernet Protocol (CSMA/CD)

- MAC Addresses

- Ethernet Frame Contents

- Exponential backoff

- Error Detection and Correction

- Odd/Even Parity bits

- 2D parity

- Network Layer

- IP Addresses and Net Masks

- Subnet addresses

- Routing

- Routing tables

- Hierarchical Routing & default route

- Routing Information Protocol (RIP)

- Message Routing

- through Network & Data Link Layer

- Transport Layer

- Reliable Delivery (if we get to it)

- TCP Protocol (if we get to it)

- Application Layer

- Basics from Lab 10

- HTTP Requests / Responses

- HTTP Protocol (if we get to it)