**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)