Final Exam

Instructions

Please write your name and university-issued email address below in the space provided.

Name: _____

Email Address: _____

You will have 60 minutes to answer the questions contained herein. You may submit the exam at any time within this period. Once you begin the exam, please do not leave the room until you have submitted it.

Do not consult with any other source of information during the exam period (except for one sheet of printed notes). This includes no communication, no phones, no chat, etc.

To maintain a distraction-free environment, please avoid talking during the exam period. If you have a question about the exam material, raise your hand at any time, and wait for an opportunity to ask an instructor for clarification.

When you are ready, you may begin. Good luck!

Evaluation

The weight of each question is detailed below. Many questions have multiple parts, which need to be addressed for full credit. Partial credit may be awarded, and there is no penalty for guessing. The exam will be graded on a curve, so don't worry if you aren't able to get some of the questions. Just do your best and answer as many as you can.

Question	Weight
1 - Software	6%
2 - User Experience	6%
3 - Analytics	12%
4 - APIs	10%
5 - Internet Technologies	12%
6 - Client Server Model	8%

Question	Weight
7 - HTML Elements	14%
8 - HTML List	6%
9 - Web Forms	10%
10 - Version Control	8%
11 - Application Security	8%

Part I: Information Systems within a Business Context

1. What is the role, or purpose, of **software** within the context of a computer-based information system?

2. For a business which produces customer-facing web application software, why does the customer's **user experience** matter? In other words, how does a business benefit from providing a good experience to its customers? Ideally focus on benefits which can be measured in quantifiable (i.e. numerically measurable) terms, which can affect the business' bottom line.

3. **Google Analytics:**

    a. What is Google Analytics? For a business that has a customer-facing website, what kinds of information does it help the business see? Provide at least three specific examples of the kind of information they could see.

    b. How could using a tool like Google Analytics benefit the business? Ideally focus on benefits which can be measured in quantifiable (i.e. numerically measurable) terms, which can affect the business' bottom line.

    c. How does one actually go about implementing Google Analytics on a website? What are the steps involved?

4. **Application Programming Interfaces (APIs)**:

    a. What are APIs, in practical terms? What is their role, or purpose?

    b. What are the benefits of APIs for the people who use them (i.e. the API consumer)? Ideally focus on benefits which can be measured in quantifiable (i.e. numerically measurable) terms.

    c. What are the benefits of APIs for the businesses and organizations who produce them (i.e. the API provider)? For a business that produces customer-facing web application software, why would providing an API be helpful for the business? Ideally focus on benefits which can be measured in quantifiable (i.e. numerically measurable) terms, which can affect the business' bottom line.

Part II: Internet Technologies

5. What is the role, or purpose, of each of the following **technologies** within a web-based system? For each, provide a few specific examples of how that technology controls what the user might be able to see and do in the browser:

    a. *HTML*

    b. *CSS*

    c. JavaScript

6. **Client-Server Model**:

    a. What is the client-server model? Describe the roles and responsibilities of the client, as well as the server.

    b. When a business produces its own web based applications, which of these two (client or server) would the business be more likely to need to budget ongoing expenses to pay for? Explain your answer.

Part III: Websites

7. What is the role, or purpose, of each of the following **HTML elements**? For each, what does it look like, or what does it help us do? Two of these elements require additional attributes to work properly. For each of these two elements, also specify the name of its required attribute.

    a. `<p>`

    b. `<a>`

    c. `<h1>`

    d. `<img>`

    e. `<div>`

8. Write HTML in the gray box below that would display a **numbered list** of ice cream flavors, like: "1. Vanilla", "2. Chocolate", and "3. Strawberry", each on its own line. HINT: you should not need to use any numbers in your solution.

9. Given the **web form** below:

```
<form action="https://api.mytrade.com/orders" method="POST">

    <label>Stock Symbol:</label>
    <input type="text" name="symbol" placeholder="NFLX">

    <label>Num Shares:</label>
    <input type="number" name="n_shares" min="1" placeholder="1">

    <label>Risk Tolerance:</label>
    <select name="risk_level">
        <option value="high">High</option>
        <option value="medium">Medium</option>
        <option value="low">Low</option>
    </select>

    <button>Trade!</button>
</form>
```

   a. Describe what this form would look like on the page, and how a user would go about filling it out. In other words, what are the different kinds of inputs they will need to provide? What kind of form validations or other mechanisms are in place to prevent or restrict the kind of data a user could provide?

   b. After the user fills out the form, what will happen when they click the button? What kind of HTTP request will be made, and why is this kind of request appropriate? What data will be sent with the request? Where will the request data be sent?

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Part IV: Development Tools and Practices

10. For a business that produces web applications (whether they be consumer-facing or internally-facing), what are the advantages and disadvantages of checking in their application's source code using **version control**?

11. **Application Security**:

    a. When a web application needs to reference secret credentials like passwords and API keys, why is it important to avoid hard-coding these values in the app's source code?

    b. What security measures can developers take instead, to prevent these credentials from being compromised when the source code is shared publicly? For a Python-based server side application, mention the names of two specific files involved in the process, and describe the role of each.