



End Term Revision

Modern Application Development - I
May - 2023

Agenda of the session



1. Basic walkthrough of the course content
2. Important concepts
3. Take home content for End Term

Week 1 : Basics of web

Content

- Apps in general
- Types of App/Platforms
- Components of an App
- Web Architectures
 - Client-Server
- Design pattern
 - MVC

Things to know

1. [What are Protocols?](#)
2. [HTTP/HTTP verbs](#)
3. Request/Response
4. [What is curl and how to make a curl request?](#)
5. [Performance parameters](#)
 - a. Latency
 - b. Bandwidth

Week 2 : Basics of HTML and CSS



Content

- Information representation
- Efficiency
- Markups and its types: HTML
- Basic DOM
- Styling and Aesthetics: CSS
- Responsive design

Things to know

1. [Basics of numbers systems](#)
 - a. Binary
 - b. Octal
 - c. Decimal
 - d. Hexadecimal
2. [Unicode to UTF-8](#)
3. [HTML tags](#)
4. [CSS: inline-internal-external](#)
5. [Developer tools](#)

Week 3 : Presentation layer: View



Content

- User Interface vs. User Interaction
- Types of view
- User interface design: Aesthetics, Accessibility
- Jakob Nielsen's heuristics

Things to know

1. [Template creation using PyHTML](#)
2. [Template creation using Python string module](#)
3. [Template creation using Jinja2](#)
4. [Template designer documentation](#)
5. [Jinja filters](#)
6. Template Inheritance

Week 4 : Database layer: Model

Content

- Persistent storage
- Mechanisms for persistent storage
- Relational databases (SQL) vs. Unstructured databases (NoSQL)
- Relationships and its types
- Entity-Relationship (ER) Diagrams

Things to know

1. Basic SQL queries
2. Setting up SQLite database
3. ER diagrams
4. [Basic wildcards](#)
5. [ORMs](#)

Week 5 : Business logic layer: Controllers

Content

- MVC design pattern and separation of concern.
- What are controllers?
- Working of requests and response in the context of web applications.
- CRUD operation.
- Routes and Controller

Things to know

1. [Flask basics](#)
 - a. Instantiating a flask app
 - b. Basic routing
 - c. [Decorators in python](#)
 - d. Rendering templates with Jinja
 - e. Redirecting
 - f. Error handling with flask
2. [Flask sqlalchemy](#)
 - a. Instantiating a DB object
 - b. Configure database
 - c. Creating models
 - d. Establishing relationships

Week 6 : APIs and REST

Content

- What are APIs?
- Concept of API design.
- REST architecture and it's constraints.
- REST APIs.
- Introduction to OpenAPI
- OpenAPI specification.
- APIs and it's relation with the CRUD.

Things to know

1. Flask_restful
 - a. [Resourceful routing and endpoint mapping](#)
 - b. [Argument parsing using reqparse](#)
 - c. [Formatting output](#) with output fields and marshal_with decorator
2. Documenting APIs with Swagger UI, Insomnia etc.
3. [Loading and testing API with simple CURL and Postman](#)

Week 7 : Backend



Content

- Memory hierarchy and storage elements.
- Computer organization and cold storage.
- Data search
- Database search
- Validations and Security of web applications.

Things to know

1. [Algorithmic complexities](#)
2. Double data rate
3. [Numerical on Algorithmic complexities](#)

Week 8 : Application frontend



Content

- Introduction to application frontend.
- AJAX and Asynchronous Update.
- WASM
- Security implications

Things to know

1. Concept of DOM and DOM manipulations.
2. Browser/ Client operations
3. Client side computation
4. [Basic JavaScript](#)

Week 9 : Application Security



Content

- Access Control: Discretionary, Mandatory, RBAC, Attribute based etc.
- Web-based Mechanisms: Token based
- HTTPS
- Logs and Analysis: Logging

Things to know

1. [Session management: Session and Cookies,](#)
2. [Flask-Login](#)
 - a. Concept of usermixin
 - b. Secret key
 - c. login_required decorator
3. HTTPS
4. [Logging levels](#)

Week 10 : Testing of Application

Content

- All whs of testing
- Testing types
 - Static and Dynamic
 - White-box, Black-box & Grey-box
 - Regression
 - Functional and Non-functional
- Levels of Testing: unit, integration, system level
- Coverage

Things to know

1. [Test generation](#)
2. [Pytest](#)
 - a. Unit test
 - b. [Fixtures](#)
 - c. Conventions
3. Testing flask app and APIs with [requests library](#)

Week 11: Beyond HTML



Content

- Evolution of Markups
 - SGML
 - XML
 - XHTML
 - HTML 2.0, 4
 - HTML 5
- JavaScript: what and why?
- Web components
- Frameworks
 - Frontend
 - Backend

Week 12 : App Deployment

Content

- [Stages of an app before deployment](#)
- [Stages of an app when deployed](#)
- Scaling
- Service Approaches

Thank You
