Web API Development

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Module Aims

- This module equips students with the knowledge and skills to design and build their own web service API.

- Students will learn both the principles behind full-stack development as well as gaining a solid grounding in the tools and techniques, such as versioning and testing, required to build robust solutions.

Intended Learning Outcome

- LO1 - Develop a secure, open-standards-based API to support server-client communication.
- LO2 - Create modern web content involving asynchronous data retrieval, client-side DOM manipulation, standards adherence and user-user interaction
- LO3 - Manage data persistence cross both server and client web-based solutions.
- LO4 - Design and implement an API and client based on given, non-trivial requirements using a range of appropriate developer tools.

What you going to learn?

- Front-end Development
  - HTML5
  - CSS & CSS3
  - Javascript
  - JQuery
  - AJAX
  - Bootstrap
  - Responsive Design

What you going to learn?

- Back-end Development
  - NodeJS
  - API Design
  - Web Services
  - Authentication & Security
  - Persistent Storage

Module Organization

- One hour lecture covers the concepts, some theoretical background, and guide you through the module.
- 2-Two hours labs
  - First Lab Meeting: Front-end Development
  - Second Lab Meeting: Back-end Development

Assignment

- You need to develop a full stack, full restful web application.
- The exact topic you choose is entirely up to you,
- you can decide to create a news website, a Recipe website, a Cinema website, a portfolio website or any other ideas you are interested in.

- Create a persistent data storage (SQL, noSQL, JSON files, text files or any other technology you think suitable for your website) and write one page report about its design
- A backend system in a form of a full Restful public web API using NodeJS, in case you are not comfortable with NodeJS you may only use Python, no other alternatives are permitted. For this part of the assignment the source code should be hosted on a GIT repository
- A web application using combination of modern web UI technologies such as Bootstrap and JQuery. The front-end should communicate with your backend system, the source code should hosted on a GIT repository.
- A link to your live application **or** a video recording of your application.

Lectures Plan

- Found on Moodle under Module Essentials

Labs Plan

- Found on Moodle under Module Essentials

Evaluate Yourself so far?

- Have You created and understood the Resume Task?**....YES**
- Can you extend the Resume and improves it even slightly? **....YES**
- Do you know how to change style on the Resume Page? **....YES**
- Can you add new styles? **....YES**
- Can you run a Hello World in NodeJS? **....YES**
- Can you write simple NodeJS programs? **....YES**

- **If Answer is YES to all then you are in good position so far**

Why Full Stack development

- Highest Employment Rate
- Full Control
- As Web Technologies change so quickly, developers are required to learn more than one technology
- If you working only on the back you will need to understand how the front technologies work and vice-versa

The Role of HTML

- Hyper Text Markup Language
- Describes the content and defines the structure within a webpage
- A front end developer has to understand the relationship of the entire site, and how documents relate to one another
- HTML tags define the role of each piece of content
- HTML defines the DOM, or Document Object Model. The DOM describes the structure of the page

The Role of CSS

- Cascading Style Sheets
- Define rules for the Look and feel of the site
- The language of web designers and User experience (UX)
- It defines how to present a content to the user
- The rules can be as simple as defining colors, sizes and fonts
- CSS files can be shared and applied to multiple HTML pages

Try it yourself

- Remember the resume task
- Delete the CSS file or CSS code and open the page again to see how does it look

The Role of JavaScript

- Web page interactivity
- Managing interaction between the page and the user
- JavaScript interacts with the DOM events, loading and unloading media, and creating, modifying, and deleting elements in a page.
- JavaScript doesn't behave in the same in every browser, and debugging this code can be specially frustrating

Server Logic

- Serve Web Pages
- Handle authentications
- Web site Security
- Connect to database and read/write to it
- Access files system
- Business Logic
- Validate users input
- Route the user

Server Technologies

- PHP
- ASP.NET
- NodeJS
- Java
- Python
- Ruby
- C++

Node.JS

- Run JavaScript outside the browser
- Can create HTTP Server, socket server, Desktop application and more using NodeJS
- Javascript is Asynch language
- Use Non Blocking Calls
- Very Popular, Scalable and Fast

Database Technologies

- SQL databases
  - MySQL
  - SQL Server
  - Oracle
- Non-SQL databases
  - Mongo
  - CouchDB
  - Cassandra
- Files Systems
  - Text
  - XML
  - JSON

What’s Next?

- Some simple NodeJS programs code with comments were added to the moodle, check them out
- For your practice on NodeJS a set of challenges were added
- Try to improve your HTML5 C.V
- **Next Lecture:** What is an API?
- Next Front-end Lab:
  - Improve Your resume by adding JS and jQuery
  - define your Final project Idea
- Next End-development Lab:
  - Learn how to use GIT and Version Control
  - Define System Architecture