

Full Stack Web and Mobile Development

Bootcamp Topics (4 Months)

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SQL

• Concepts Covered:

- o Introduction to Databases and Database Management Systems
- o Types of Databases: Relational vs NoSQL
- o Creating and Modifying Tables (CREATE, ALTER, DROP)
- o Data Manipulation Language (DML):
 - Inserting Data (INSERT)
 - Updating Data (UPDATE)
 - Deleting Data (DELETE)
- o Basic Queries and Data Retrieval (SELECT, WHERE, ORDER BY, GROUP BY, HAVING)
- o Joining Tables (INNER JOIN, LEFT JOIN, RIGHT JOIN, FULL JOIN)
- o Working with Constraints (PRIMARY KEY, FOREIGN KEY, UNIQUE, NOT NULL)
- o Indexes and Performance Optimization

2

C#

• Introduction to C#:

- o Understanding Program Structure
- o Writing the First C# Program
- o Data Types (int, double, string, char, bool, etc.)
- o Variables and Constants
- o Conditional Statements:
 - If-Else Statements
 - Switch Case Statements
- o Loops:
 - For Loop
 - While Loop
 - Do-While Loop
- o Arrays and Lists:
 - Single-Dimensional and Multi-Dimensional Arrays
 - Working with Lists and Collections

• Advanced Concepts:

- o Functions:
 - Defining and Calling Functions
 - Parameters and Return Values
- o Exception Handling:
 - Try-Catch-Finally Blocks
 - Custom Exceptions

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OBJECT ORIENTED PROGRAMMING (OOP) IN C

- **Core Concepts:**
 - o Classes and Objects
 - o Inheritance
 - o Polymorphism
 - o Encapsulation and Abstraction
- **Advanced OOP:**
 - o Interfaces and Abstract Classes
 - o Method Overloading and Overriding
 - o Access Modifiers (public, private, protected, internal)
 - o Using Static Members and Methods
 - o Understanding Constructors and Destructors

4

HTML/CSS JAVASCRIPT + BOOTSTRAP

- **HTML5:**
 - o Page Structure and Document Declaration
 - o Elements and Attributes
 - o Headings, Paragraphs, and Text Formatting Tags (h1–h6, p, b, i, u)
 - o Links, Images, and Multimedia (a, img, audio, video)
 - o Lists (Ordered and Unordered)
 - o Tables (table, th, tr, td)
 - o Forms Handling:
 - Input Types (text, email, password, checkbox, radio, etc.)
 - Form Elements (input, textarea, select, button)
 - Form Attributes (action, method, enctype)
 - o Semantic Elements (header, footer, article, section, aside, nav)
- **CSS3:**
 - o Selectors and Combinators
 - o Box Model (margin, border, padding, content)
 - o Layout & Positioning:
 - Static, Relative, Absolute, and Fixed Positioning
 - Display Property (block, inline, inline-block)
 - Float and Clear
 - o Text and Color Styling:
 - Font Properties (font-family, font-size, font-weight)
 - Text Alignment and Decoration
 - Background Properties (background-color, background-image, background-position)
 - o Media Queries for Responsive Design
 - o CSS Grid:
 - Defining Rows and Columns
 - Grid Gap and Alignment
 - Nested Grids
 - o Flexbox:
 - Main Axis and Cross Axis
 - Flex Container Properties (justify-content, align-items)
 - Flex Item Properties (order, flex-grow, flex-shrink)

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• JavaScript:

o Language Basics:

- Variables (var, let, const)
- Data Types (Primitive and Reference Types)
- Operators and Expressions
- Conditional Statements (if-else, switch)
- Loops (for, while, do-while)

o Functions:

- Function Declaration and Expression
- Arrow Functions
- Callback Functions

o DOM Manipulation:

- Selecting Elements (getElementById, querySelector)
- Modifying Elements (innerHTML, style, classList)
- Adding and Removing Elements

o Event Handling:

- Event Listeners (addEventListener)
- Mouse and Keyboard Events

o AJAX and Fetch API:

- Making HTTP Requests

Handling Responses

• Bootstrap:

o Grid System and Breakpoints

o Responsive Design Principles

o Prebuilt Components:

- Navbar, Buttons, Cards, Alerts, Modals, Forms
- Customizing Themes and Colors
- Using Utilities for Spacing, Alignment, and Sizing

• Introduction to Entity Framework Core:

- o Understanding ORM (Object-Relational Mapping)
- o Setting Up Entity Framework Core in a .NET Project
- o Creating and Configuring DbContext
- o Defining Models and Relationships:
 - One-to-One
 - One-to-Many
 - Many-to-Many
- o Performing CRUD Operations with EF Core
- o Using LINQ Queries for Data Retrieval
- o Managing Database Migrations:
 - Creating Migrations
 - Applying and Rolling Back Migrations
- o Advanced Features:
 - Eager Loading, Lazy Loading, and Explicit Loading
 - Tracking vs No-Tracking Queries
 - Handling Concurrency

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**ENTITY
 FRAMEWORK
 CORE**

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ASP.NET CORE MVC

- **Introduction to ASP.NET Core MVC:**
 - o Understanding MVC Architecture (Model, View, Controller)
 - o Difference Between Forms and MVC Applications
 - o Creating and Running the First MVC Application
 - o Controllers and Actions
 - o Views and Razor Syntax
- **Working with Data:**
 - o Models and Data Binding
 - o ViewBag, ViewData, and TempData
 - o Partial Views and Layout Views
 - o Strongly Typed Views
- **Database Integration:**
 - o Using Entity Framework Core for Database Operations
 - o Creating and Connecting Tables
 - o Performing CRUD Operations (Create, Read, Update, Delete)
 - o Managing Migrations
- **Form Handling and Validation:**
 - o Using Tag Helpers
 - o Data Annotation for Input Validation
 - o Custom Validation Attributes
- **Authentication and Authorization:**
 - o Implementing Identity in MVC
 - o Role-Based Access Control

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ASP.NET CORE WEB API

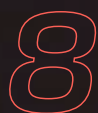
- 1. Introduction to Web API:**
 - o Understanding REST principles (Stateless, Client-Server, Resource-based)
 - o Creating a new ASP.NET Core Web API project
 - o Comparing traditional MVC with Web API
 - o Overview of [ApiController] and its benefits
- 2. Controllers and Routing:**
 - o Creating Controllers and using Routing to define endpoints
 - o Differences between Attribute Routing and Conventional Routing
 - o Best practices for naming routes (RESTful endpoints)
- 3. Working with Data (Models & Entity Framework Core):**
 - o Creating Models and establishing relationships between them
 - o Setting up Entity Framework Core and configuring the database connection
 - o Implementing CRUD operations (Create, Read, Update, Delete)
 - o Managing database migrations and schema updates
- 4. Data Validation and Request Handling:**
 - o Utilizing Data Annotations for Model Validation
 - o Creating Custom Validation Attributes for specialized rules
 - o Handling query parameters and filtering data in requests
 - o Using Action Filters or Middleware to manage request flow and error handling

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5. Documentation and Testing:

- o Generating API documentation using Swagger/OpenAPI
- o Configuring advanced Swagger settings (comments, model documentation)
- o Testing API endpoints with tools like Postman or integrated testing frameworks



CLEAN ARCHITECTURE

- Introduction to Clean Architecture:
 - o Understanding Clean Architecture Principles
 - o Layered Architecture and Dependency Rule
 - o Separation of Concerns and Dependency Injection
- Key Components:
 - o Implementing IService and Repository Patterns:
 - Defining Interfaces for Services and Repositories
 - Dependency Injection of Services and Repositories
 - o Creating and Using DTOs (Data Transfer Objects):
 - Mapping Data Between Layers Using DTOs
 - Avoiding Direct Use of Entities in External Layers
 - o Configuring AutoMapper for Object Mapping:
 - Setting Up AutoMapper Profiles
 - Using AutoMapper to Simplify Data Transformation
- Applying Clean Architecture:
 - o Structuring ASP.NET Core MVC Projects:
 - Creating Separate Layers for Presentation, Application, Domain, and Infrastructure
 - Using Dependency Injection to Manage Dependencies
 - o Structuring ASP.NET Core API Projects:
 - Designing APIs Following Clean Architecture Guidelines
 - Managing Controllers, Services, and Repositories in Different Layers

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FLUTTER

- **Introduction to Flutter:**
 - o Understanding Flutter's Architecture
 - o Setting Up the Development Environment
 - o Creating the First Flutter Application
 - o Working with Widgets:
 - Stateless and Stateful Widgets
 - Layout Widgets (Column, Row, Stack)
 - Input Widgets (TextField, Checkbox, RadioButton)
- **UI Design:**
 - o Styling Widgets
 - o Using Themes
 - o Handling User Input
- **State Management:**
 - o Using Provider Package
 - o GETX for Simple and Reactive State Management
- **API Integration:**
 - o Making HTTP Requests
 - o Parsing JSON Data
 - o Displaying Data in Lists and Grids
 - o Error Handling and Retrying Requests
- **Database Handling:**
 - o Local Database with SQLite
 - o Firebase Integration for Realtime Database and Authentication
- **Deploying the Application:**
 - o Preparing the App for Android and iOS Deployment
 - o Performance Optimization Techniques

FINAL DELIVERABLES

- Building a complete project that includes:
 1. **Web Application** using ASP.NET Core MVC and Entity Framework.
 2. **Mobile Application** using Flutter connected to a database via API.
 3. **Deploying Applications** on the web and app stores.
 4. **E-commerce Project:** A comprehensive web and mobile e-commerce solution with full API integration and database management