

## COMPREHENSIVE ANGULAR 7 PROGRAMMING (WA2777)

(5 DAYS)

Get up and running with basic Angular development and advanced usage of HttpClient and observables.

### How You Will Benefit

The Comprehensive Angular 7 Programming Training course covers all the essential topics found in the introductory course as well as additional topics typically encountered while developing real-world applications.

The Angular JavaScript framework supports the creation of single-page browser applications as well as responsive web sites and hybrid mobile applications.

This course covers all the basics, including: Typescript, components, directives, services, pipes, form development, HttpClient and observables. In addition, it covers advanced usage of HttpClient, observables and routing. Added to that are topics on consuming WebSockets data, Testing and Debugging of Angular applications.

The included labs provide students with hands-on experience programming and troubleshooting Angular code.

### Objectives

In this training, attendees will learn how to:

- Develop single page Angular applications using Typescript
- Set up a complete Angular development environment
- Create Components, Directives, Services, Pipes, Forms and Custom Validators
- Handle advanced network data retrieval tasks using Observables
- Consume data from REST web services using the Angular HTTP Client
- Handle push-data connections using the WebSockets protocol
- Work with Angular Pipes to format data
- Use advanced Angular Component Router features

- Test and debug Angular applications using built in tools
- Work with Angular CLI

### Pre-requisite

Web development experience using HTML, CSS and JavaScript is required to get the most out of this Angular course. Knowledge of the browser DOM is also useful. Prior Angular experience, with AngularJS or the current version of Angular, is not required.

### Course Outline

#### Chapter 1. Introducing Angular

- What is Angular?
- Central Features of the Angular Framework
- Why Angular?
- Building Blocks of an Angular Application
- Basic Architecture of an Angular Application
- Installing and Using Angular
- A Basic Angular Application
- Anatomy of a Basic Application
- The Main Component File
- The Application Module File
- The index.html File
- The Bootstrap File
- Running the Application
- Building the Application
- Summary

#### Chapter 2. Development Setup of Angular

- Angular Development Lifecycle
- Angular is Modular
- What is Node.js?

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- Installing Node.js and NPM
- Node Package Manager (NPM)
- Package Descriptor File - package.json
- Semantic Version Numbering
- Package Version Numbering Syntax
- Updating Packages
- Uninstalling Packages
- Installing Angular Packages
- Angular CLI
- Creating a New Project
- Angular
- Development
- Dependencies
- TypeScript Typings
- Testing Tools
- Development Web Server
- Configuring the Web Server
- The Build System
- Configuring the Build
- Summary

### Chapter 3. Introduction to TypeScript and ES6

- Programming Languages for Use with Angular
- TypeScript Syntax
- Programming Editors
- The Type System – Defining Variables
- The Type System – Defining Arrays
- Type in Functions
- Type Inference
- The Type System – Classes & Objects
- Class Constructors
- Class Constructors – Alternate Form
- Interfaces
- Working with ES6 Modules
- Visibility Control
- var, let and const - defined
- var, let and const - usage
- Arrow Functions
- Arrow Function Compact Syntax
- Arrow Function and Caller Context
- Template Strings
- Template Strings – Variables and Expressions
- Template Strings – Multiline

- Generics - Class
- Generics - Methods
- Generics - Restricting Types
- Generics - Restricting Types: Example
- TypeScript Transpilation
- Summary

### Chapter 4. Components in Angular

- What is a Component?
- An Example Component
- The Component Class
- Adding a Component to Its Module
- Creating a Component Using Angular CLI
- Developing a Simple Login Component
- Component Template
- Login Component: Add HTML
- The HTML Component Template
- The templateUrl property
- Login Component: Add CSS Styling
- Login Component: Hook Up Input Fields and Button
- Login Component: Fields & Button in the Component Class
- Component Decorator Properties
- Component Hierarchy
- The Application Root Component
- Using a Regular Component
- The Build System
- Component Lifecycle Hooks
- Using a Lifecycle Hook:
- OnInit
- Summary

### Chapter 5. Data and Event Binding

- Binding Syntax
- One-Way Output Binding
- Binding Displayed Output Values
- Setting Component Properties
- More About Setting Properties
- Setting DOM Element Properties
- Event Binding
- Binding Events Examples
- Firing Event from a Component

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- @Output() Example - Child Component
- @Output() Example - Parent Component
- Two-Way Binding of Input Fields
- Input Binding Examples
- Two Way Binding in a Component
- Use Two Way Binding
- Breaking Down ngModel
- Summary

### Chapter 6. Attribute Directives

- What are Attribute Directives
- Apply Styles by Changing CSS Classes
- Changing Classes – Example
- Applying Styles Directly
- Applying Styles Directly - Example
- Controlling Element Visibility
- Setting Image Source Dynamically
- Setting Hyperlink Source Dynamically
- Writing a Custom Attribute Directive
- Using a Custom Attribute Directive
- Supplying Input to a Directive
- Handling Event from a Custom Directive
- Summary

### Chapter 7. Structured Directives

- Structural Directives
- Adding and Removing Elements Dynamically
- If-Else Syntax of ngIf
- Looping Using ngFor
- ngFor - Basic Example
- Creating Tables with ngFor
- ngFor Local Variables
- Manipulating the Collection
- Example - Deleting an Item
- Swapping Elements with ngSwitch
- ngSwitch - Basic Syntax
- Summary

### Chapter 8. Template Driven Forms

- Template Driven Forms
- Importing Forms Module
- A Basic Angular Form
- Binding Input Fields
- Accessing the NgForm Directive
- Binding the Form Submit Event

- The Submit Function
- Basic HTML5 Validation - "required" Attribute
- HTML5 vs. Angular Validation
- Angular Validators
- The NgModel Directive
- Controlling when validation is applied
- Displaying
  - Form
  - Validation State
  - Displaying
    - Field
    - Validation State
    - Displaying Validation State Using Classes
  - Disabling Submit when Form is Invalid
  - Submitting the Form
  - Binding to Object Variables
  - Binding to Object Variables - Code
  - Additional Input Types
  - Checkboxes
  - Select (Drop Down) Fields
  - Rendering Options for Select (Drop Down)
  - Date fields
  - Radio Buttons
- Summary

### Chapter 9. Reactive Forms

- Reactive Forms Overview
- The Building Blocks
- Import ReactiveFormsModule
- Construct a Form
- Design the Template
- FormControl Constructor
- Getting Form Values
- Setting Form Values
- The Synchronous Nature
- Subscribing to Input Changes
- Validation
  - Built-In Validators
  - Showing Validation Error
  - Custom Validator
  - Using a Custom Validator
- Sub FormGroups - Component Class
- Sub FormGroups - HTML Template
- Why Use Sub FormGroups
- Summary

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## Chapter 10. Advanced Control Structures

- Why Angular Modules?
- But, We Already Had ES6 Module
- Angular Built-in Modules
- The Root Module
- Feature Modules
- Create Feature Module Using CLI
- The Module Class
- @NgModule Properties
- Using One Module From Another
- Importing BrowserModule or CommonModule
- Lazy-Loaded Modules
- How to Organize Modules?
- Third Party Modules
- Summary

## Chapter 11. Services and Dependency Injection

- What is a Service?
- Creating a Basic Service
- What is Dependency Injection?
- What Dependency Injection Looks Like
- Injectors
- Injector Hierarchy
- Register a Service with a Module Injector
- Registering a Service with the Root Injector
- Registering a Service with a Component's Injector
- Where to Register a Service?
- Dependency Injection in Other Artifacts
- Providing an Alternate Implementation
- Dependency Injection and @Host
- Dependency Injection and @Optional
- Summary

## Chapter 12. HTTP Client

- The Angular HTTP Client
- Using The HTTP Client - Overview
- Importing HttpClientModule
- Simple Example
- Service Using HttpClient
- ES6 Import Statements
- Making a GET Request

- What does an Observable Object do?
- Using the Service in a Component
- The PeopleService Client Component
- Error Handling
- Making a POST Request
- Making a PUT Request
- Making a DELETE Request
- Summary

## Chapter 13. Pipes and Data Formatting

- What are Pipes?
- Built-In Pipes
- Using Pipes in HTML Template
- Chaining Pipes
- Using Pipes in Code
- Internationalized Pipes (i18n)
- Loading Locale Data
- Decimal Pipe
- Currency Pipe
- Custom Pipes
- Custom Pipe Example
- Using Custom Pipes
- Using a Pipe with ngFor
- A Filter Pipe
- A Sort Pipe
- Pipe Category: Pure and Impure
- Pure Pipe Example
- Impure Pipe Example
- Summary

## Chapter 14. Introduction to Single Page Applications

- What is a Single Page Application (SPA)
- Traditional Web Application
- SPA Workflow
- Single Page Application Advantages
- HTML5 History API
- SPA Challenges
- Implementing SPA's Using Angular
- Summary

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## Chapter 15. The Angular Component Router

- The Component Router
- View Navigation
- The Angular Router API
- Creating a Router Enabled Application
- Hosting the Routed Component
- Navigation Using Links and Buttons
- Programmatic Navigation
- Passing Route Parameters
- Navigating with Route Parameters
- Obtaining the Route Parameter Values
- Retrieving the Route Parameter Synchronously
- Retrieving a Route Parameter Asynchronously
- Query Parameters
- Supplying Query Parameters
- Retrieving Query Parameters Asynchronously
- Problems with Manual URL entry and Bookmarking
- Summary

## Chapter 16. Advanced HTTP Client

- Request Options
- Returning an HttpResponse Object
- Setting Request Headers
- Creating New Observables
- Creating a Simple Observable
- The Observable.create() Method
- Observable Operators
- More About map
- Piping Operators
- The flatMap() Operator
- The tap() Operator
- The zip() Operator
- Caching HTTP Response
- Making Sequential HTTP Calls
- Making Parallel Calls
- Customizing Error Object with catchError()
- Error in Pipeline
- Error Recovery
- Summary

## Chapter 17. Consuming WebSockets Data in Angular

- Web Sockets Overview
- Web Sockets Use Cases
- Web Socket URLs
- Web Sockets Servers
- Web Socket Client
- The socket.io-client library
- Using socket.io-client in JavaScript
- Setting up socket.io-client in Angular Projects
- Using socket.io-client in an Angular service
- Angular websocket.service Notes:
- The Angular Web Socket Client Sample App
- Angular websocket.component.ts
- The Full websocket.component.ts code
- Implementation Modifications
- Summary

## Chapter 18 – Advanced Routing

- Routing Overview
- Routing Enabled Project
- Routing Enabled Feature Module
- Using the Feature Module
- Lazy Loading the Feature Module
- Creating Links for the Feature Module Components
- More About Lazy Loading
- routerLinkActive binding
- Default Route
- Wildcard Route Path
- redirectTo
- Child Routes
- Defining Child Routes
- <router-outlet> for Child Routes
- Links for Child Routes
- Navigation Guards
- Creating Guard Implementations
- Using Guards in a Route
- Route Animations
- Summary

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## Chapter 19 – Introduction to Testing Angular Applications

- Unit Testing Angular Artifacts
- Testing Tools
- Testing Setup
- Typical Testing Steps
- Test Results
- Jasmine Test Suites
- Jasmine Specs (Unit Tests)
- Expectations (Assertions)
- Matchers
- Examples of Using Matchers
- Using the not Property
- Setup and Teardown in Unit Test Suites
- Example of beforeEach and afterEach Functions
- Angular Test Module
- Example Angular Test Module
- Testing a Service
- Injecting a Service Instance
- Test a Synchronous Method
- Test an Asynchronous Method
- Using Mock HTTP Client
- Supplying Canned Response
- Testing a Component
- Component Test Module
- Creating a Component Instance
- The ComponentFixture Class
- Basic Component Tests
- The DebugElement Class
- Simulating User Interaction
- Summary

## Chapter 20. Debugging

- Overview of Angular Debugging
- Viewing TypeScript Code in Debugger
- Using the debugger Keyword
- Inspecting Components
- Saving ng.probe Component References
- Modifying Values using Component References
- Debug Logging
- What is Augury?
- Installing Augury
- Opening Augury
- Augury - Component Tree

- Augury - Router Tree.
- Augury - NgModules Tab
- Common Exceptions
- Common Exceptions: 'No such file: package.json'
- Common Exceptions: 'Cant bind to ngModel'
- Common Exceptions: 'router-outlet not a known element'
- Common Exceptions: 'No provider for Router!'
- Summary

## Lab Exercises

- Lab 1. Introduction to Angular*
- Lab 2. Introduction to TypeScript*
- Lab 3. Introduction to Components*
- Lab 4. Create the Subscription Form Component*
- Lab 5. Understanding Data Binding*
- Lab 6. One Way Data Binding in a Custom Component*
- Lab 7. Using Basic Angular Directives*
- Lab 8. Using Structural Directives*
- Lab 9. Custom Attribute Directive*
- Lab 10. Template Driven Form*
- Lab 11. Validation of a Template Driven Form*
- Lab 12. Reactive Forms*
- Lab 13. Service and Dependency Injection*
- Lab 14. HTTP Client Development*
- Lab 15. Using Pipes*
- Lab 16. Basic Single Page Application Using Router*
- Lab 17. Angular Communication with REST Services*
- Lab 18. HTTP Error Handling and Recovery*
- Lab 19. Using Angular Bootstrap*
- Lab 20. Consuming Data from Web Sockets*
- Lab 21. Lazy Module Loading*
- Lab 22. Advanced Routing*
- Lab 23. Introduction to Unit Testing*
- Lab 24. Debugging Angular Applications*

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## How to Register

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**Time:** 9:00 a.m. to 5:00 p.m.



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**Course cancellations** must be received in writing within ten (10) business days prior to the course start date for a full refund to be applied. Participant substitutions are acceptable.

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