

1 C#

- Delegates, anonymous functions, lambda expressions
- Lambda action, function, predicate types
- Extension methods
- Relationship between OO and SQL
- LINQ - Language Integrated Queries
- LINQ syntax choices - query language vs extension methods
- Common LINQ extension methods: Select, Where, FirstOrDefault
- Anonymous types; the **var** type
- Entity Framework - code first
- Generating a database using Entity Framework
- Multithreading in C#
 - The Thread class and ThreadStart delegates
 - The Task class
 - Using Parallel LINQ
- Object serialization; JSON
- APIs in C# - ASP.NET
 - Creating an ASP.NET project with a simple controller
 - Adding controllers and endpoints to an ASP.NET project
 - Capturing HTTP events like GET and POST in ASP.NET
 - Creating custom routes using ASP.NET
 - Combining Entity with ASP.NET

2 SQL

- Analogues among objects, collections, properties and tables, rows, and columns
- Stored procedures
- How Entity Framework generates databases
- Generating database migrations using Entity
- Applying database migrations using Entity
- What changes require a database migration?
- The role of classes, properties, and contexts in Entity Framework
- Table per Type versus Table per Hierarchy
- Creating a data model to represent financial instruments
- Understanding how class inheritance manifests in a database
- Class and property annotations in Entity

3 HTML/CSS/JavaScript

- Understanding the general HTML syntax
- Understanding the general CSS syntax
- Understanding the general JavaScript syntax
- Understanding how HTML, CSS, and JavaScript fit together in a web app
- HTML tags, elements, and the DOM
- HTML tags such as head, body, script, div, and input
- Inline CSS versus CSS referenced in a separate file
- CSS selectors: universal, class, id, and element
- CSS classes
- Applying a CSS class to an HTML element
- Attaching events like hover to CSS classes
- Common CSS properties like display, position, width, color
- Creating a Single Page Application using CSS
- Creating a grid using CSS
- Making a simple control element - like a button - with CSS
- JavaScript syntax
- Using Node to execute JavaScript
- Common JavaScript engines
- General JavaScript code structure
- Variables, data structures, and control flow in JavaScript
- Functions in JavaScript
- Calling API resources using JavaScript
- Deserializing communication using JSON
- Manipulating the DOM using JavaScript
- Attaching events to HTML elements in JavaScript

4 Finance

- Control variate approach to variance reduction
- Delta-based control variate Gamma-based control variate
- Choosing the correct control variate for an unknown variate
- Using simulation for things other than pricing derivatives
- Exotic derivative products; pricing arbitrary payoff functions
- Asian, Digital, Lookback, Barrier, and Range options
- Path dependent versus non-path dependent options