**What is TypeScript:**

1. **TypeScript** - Built by Microsoft and the open-source community to help improve the development experience. Typescript is *statically typed*, which requires all variables to have a data type at compile time. It includes a compiler that converts TypeScript into JavaScript, which can be executed in the browser.
   1. [Typescriptlang.org](https://www.typescriptlang.org/): TypeScript homepage.
   2. [Typescript Playground](https://www.typescriptlang.org/play?#code/PTAEHUFMBsGMHsC2lQBd5oBYoCoE8AHSAZVgCcBLA1UABWgEM8BzM+AVwDsATAGiwoBnUENANQAd0gAjQRVSQAUCEmYKsTKGYUAbpGF4OY0BoadYKdJMoL+gzAzIoz3UNEiPOofEVKVqAHSKymAAmkYI7NCuqGqcANag8ABmIjQUXrFOKBJMggBcISGgoAC0oACCbvCwDKgU8JkY7p7ehCTkVDQS2E6gnPCxGcwmZqDSTgzxxWWVoASMFmgYkAAeRJTInN3ymj4d-jSCeNsMq-wuoPaOltigAKoASgAywhK7SbGQZIIz5VWCFzSeCrZagNYbChbHaxUDcCjJZLfSDbExIAgUdxkUBIursJzCFJtXydajBFQITiCGhmACiqwYiAWkAAao4KAxpO5QABeUAAIgAEjBoBhwPAyNF+cVKYJ4O4AqLmAAKOkMpnuNmUTnuACU5LAOGaHjIXkQEucwPYNC+bjMzHYDGYkH4sGg6kSnPgehEXn59MZzME-KS2P54AcqAA5MIAHKQCT8oIqADyXzI70ELq0kCOqEcClc0jwoCc5p0wyw+hQCEQ0OEl1tEgl0REBg42IWTFYHB4QUU7nS20gzrIAEZ8v12IhpN9eaAAAwAbmCg99ClHACZ55uVwPc1dp-OMhvvmPQABqdcj767-dD09kADM86fe7XJ5vZAALCuP8PRwAVmPADb0va9R1-RQSiAA): Online IDE
   3. [Getting Started](https://www.typescriptlang.org/docs/): Typescript Docs
2. [**Statically v. dynamically v. strongly v. weakly typed languages**](https://www.educative.io/answers/statically-v-dynamically-v-strongly-v-weakly-typed-languages)
   1. **Strongly Typed Language** (TypeScript, Java, C#)- Do not allow implicit conversions between unrelated types.
   2. **Statically Typed Language** (TypeScript, Java, C#) - Verify and enforce type value constraints at compile-time.
   3. **Weakly Typed Language** (JavaScript, PHP, Perl) - Allow implicit conversions between unrelated types.
   4. **Dynamically Typed Language** (JavaScript, PHP, Pearl) - Types are interpreted at runtime.
      1. [Interpreting Mixed Data Type Operations](https://www.digitalocean.com/community/tutorials/understanding-data-types-in-javascript#working-with-multiple-data-types): When using operators that work across data types, JavaScript must interpret how to implement the operation on the values, which may lead to unintended errors.
3. **Local Typescript Setup:**
   1. **Install Node**
      1. [[Prefered] use nvm to install node](https://www.taniarascia.com/setting-up-a-brand-new-mac-for-development/#nodejs)
      2. [node.js.org](https://nodejs.org/en/)
   2. **Installing Typescript Globally:**
      1. npm install -g typescript
   3. **Install lite-server:**
      1. npm install --save-dev lite-server
      2. Add lite-server to start script in package.json:
         1. "start": "lite-server"
   4. **Create Typescript file:**
      1. index.ts
   5. **Options:**
      1. **Compile One file:**
         1. Compile your code with the Typescript compiler, add “-w” to start watch mode:
            1. tsc app.ts –w
      2. **Allow typescript to manage all files:** Initialize the project once as a typescript project. All files and subfolders in the project will be managed by typescript. Creates typescript config file.
         * 1. tsc –-int
         1. Compile and watch for changes in the project
            1. tsc –w
         2. After compilation manually add .js files to index.html (Add all file dependencies first):
            1. <script src="app.js" defer></script>
      3. **Compile all TS files, Enable ES6 Module Imports and Exports in tsconfig.json:**
         1. Initialize the project once as a typescript project. All files and subfolders in the project will be managed by typescript. Creates typescript config (tsconfig) file.
            1. tsc –-int
         2. Enable Imports and Exports in tsconfig.json:
            1. "target": "es2016",
         3. Enable es2015 modules:
            1. "module": "es2015",
         4. Add module type to index.html script tag:
            1. <script type="module" src="app.js" defer></script>
         5. Compile and watch for changes in the project root
            1. tsc –w
         6. After compilation manually add .js files to index.html (Add all file dependencies first):
            1. <script src="app.js" defer></script>
   6. **Run Code:**
      1. npm start

**Helpful Info:**

1. **Understanding TypeScript GitHub Repo:**
   1. [Github Repo](https://github.com/tlockhart/udemy-understanding-typescript)
   2. [OneDrive folder](https://pearsoneducationinc-my.sharepoint.com/:f:/g/personal/tony_lockhart_pearson_com/Eu1VEx97bqVOnx3iwTHpDQwBGg9KOyEw9itNFR0O6xnqzw)
2. **Free Tutorials:**
   1. [Typescript Crash Course](https://www.youtube.com/watch?v=gp5H0Vw39yw): Free Code Camp
   2. [Learning TypeScript Course](https://www.codecademy.com/learn/learn-typescript): CodeCademy
3. **Premium Tutorials:**
   1. [Understanding Typescript](https://www.udemy.com/course/understanding-typescript): Udemy
   2. [Typescript 4: Getting Started](https://www.codecademy.com/learn/learn-typescript): PluralSights
4. **Practice:** 
   1. [CodeWars](https://www.codewars.com/):An online community that allows learners to practice coding challenges, in an online IDE, in a variety of programming languages.
5. **TypeScript Supported Frameworks:**
   1. [React](https://create-react-app.dev/docs/adding-typescript/) – How to setup typescript in React projects.
   2. [Fresh](https://deno.land/x/fresh@1.1.2) – Built with [Preact](https://preactjs.com/) (Lightweight, faster React alternative)
      1. Preact uses [Island Architecture](https://jasonformat.com/islands-architecture/)
   3. [NestJs](https://nestjs.com/)
6. [TSDocs](https://tsdoc.org/): How to document Typescript
7. [Type Declaration Files](https://www.typescriptlang.org/docs/handbook/declaration-files/introduction.html): How to write Typescript Declaration Files.
8. Find Existing TypeScript Declaration Files via Definitely Typed:
   1. [Definitely Typed](https://github.com/DefinitelyTyped/DefinitelyTyped)
   2. [TypeScript Definitely Typed Declaration File Search](https://www.typescriptlang.org/dt/search?search=)