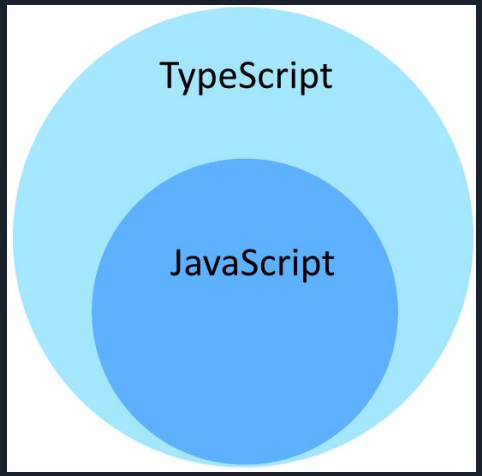
TypeScript Learning

Presented by Umang

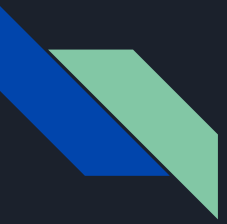
Let us talk about JavaScript first

Oh! Wait. don’t change topic. Its cheating.

JavaScript, TypeScript and Angular



Angular is a javascript framework



Atwood's Law: any application that can be written in JavaScript, will eventually be written in JavaScript.

https://blog.codinghorror.com/the-principle-of-least-power/

And you will hate it

We can't escape JavaScript

JavaScript (JS) is everywhere

- Phones, Tablets, Computer, Mac, Chromebook, all of the devices come equipped with something that can execute JavaScript

JavaScript is not Java

- Java is compiled and interpreted but JavaScript is interpreted.
- Java has class based inheritance but JavaScript is prototype based.

JavaScript easy

- JavaScript has a syntax of that should feel familiar to anyone working on C like language.
- You can create a text file with JS extension and can run it from anywhere. No compilation needed.

Who owns JavaScript?

- European Computer Manufacturers Association (ECMA)
- ECMA creates scripting language standard which every one has to adhere to.
  - Some vendors who create implementation are:
    - Mozilla
    - Microsoft (Chakra execution engine in Microsoft Internet Explorer)
    - Google (V8 execution engine in Google Chrome)
- “ECMAScript 2015” is one such standard (6th edition).
- Then there are ECMAScript 16, ECMAScript 17, ECMAScript 18 and ECMAScript ES.

Enterprise grade development can not be done in JavaScript

Problems with JavaScript

- One syntax error will take down the program.
- It lacks some features like:
  - Static typing
  - Classes
  - Interfaces
  - Generics
  - Modules

Don’t bug us! Let's start with practicals.

Problems with JavaScript

Exercise 1 - How JavaScript does strange comparisons:

This exercise is at 1st day\Exercise 1\1.html

Problems with JavaScript

Exercise 2 - How TypeScript corrects JavaScript’s strange comparisons:

This exercise is at 1st day\Exercise 2\2.html

Run this from studio developer command prompt:

```
tsc myscripts.ts
```

Problems with JavaScript

Exercise 3 - Converting in TypeScript works well:

This exercise is at 1st day\Exercise 3\1.html

Run this from studio developer command prompt:

```
tsc myscripts.ts
```

Problems with JavaScript

Exercise 4 - Strange Addiction in JavaScript:

This exercise is at 1st day\Exercise 4\1.html

Run this from studio developer command prompt:

```
tsc myscripts.ts
```

Problems with JavaScript

Exercise 5 - Block scope do not work well in JavaScript:

This exercise is at 1st day\Exercise 5\1.html

Problems with JavaScript

Exercise 6 - Block Space - throws error in ts:

This exercise is at 1st day\Exercise 6\1.html

The TLS won't stop this from happening, but it will infer that i is of type number or type any when it is redeclared because of its previous use as a number in the for loop. Therefore, should i be assigned or inferred a type other than number or any outside of the for loop, the code as a whole will not compile because the code inside the for loop—specifically, the part where i is treated as a number—is then invalid.

Hello world

Exercise 7 - Hellow world :

This exercise is at 1st day\Exercise 7\1.html

This exercise throws an error. Correct it to say hello world.

Google created “dart” language that got converted to JavaScript.

This made enterprise grade development possible.

Microsoft’s answer to this is TypeScript

TypeScript is open source (Apache 2.0 License)

Some more on TypeScript

- TypeScript is just JavaScript. You only need to know JavaScript to use TypeScript, and all your favorite third-party JavaScript libraries (jQuery, MooTools, Prototype, and so forth) will work fine with it.
- JavaScript is just TypeScript. Any valid .js file can be renamed .ts and be compiled with other TypeScript files.
- The TypeScript compiler is itself a JavaScript file (compiled down from TypeScript). Thus it can be hosted in any browser, on any host, on any operating system if required. There's no dedicated VM and no plan to develop one.

Some more on TypeScript

- Statically identify JavaScript constructs that are likely to be errors
- High compatibility with existing JavaScript code.

Some more on TypeScript

The Microsoft engineers provided the TypeScript compiler with some mechanisms, such as code transformations (converting TypeScript features into plain JavaScript implementations) and type erasure (removing static type notation), to generate clean JavaScript code. Type erasure removes not only the type annotations, but also all the TypeScript-exclusive language features such as interfaces.

the generated code is highly compatible with web browsers as it targets the ECMAScript 3 specification by default, but it also supports ECMAScript 5 and ECMAScript 6. In general, we can use the TypeScript features when compiling to any of the available compilation targets, but sometimes some features will require ECMAScript 5 or a higher version as the compilation target.

Transpiler

A **transpiler** is a type of compiler that takes the source code of a programming language as its input and outputs the source code into another programming language with a similar level of abstraction.

Compiler VS Transpiler

Compilation describes the process of taking source code written in one language and converting it into another language.

Transpilation is a specific kind of compilation and describes the process of taking source code written in one language and transforming it into another language with a similar level of abstraction.

So you might compile a high-level language into an assembly language, but you would transpile TypeScript to JavaScript as they are similarly abstracted.

End of the day
Please send me feedback if any.