**TypeScript**

It is a programming language, which is developed based on JavaScript.

It is a superset of JavaScript, which adds data types, classes, interfaces and other features.

TypeScript = JavaScript + Data Types + Classes + Interfaces + Misc. Concepts (Arrow Functions + Multiline Strings + String Interpolation + Destructing + Modules etc.)

It is built on the top of JavaScript. That means all the code of JavaScript works as-it-is in TypeScript, but in TypeScript, we can additionally use data types, classes, interfaces etc., concepts.

It is developed by Microsoft in 2012.

Browser doesn’t support TypeScript directly; code can’t be executed by browser directly. So TypeScript code should be converted into JavaScript code, and we have to import JavaScript language file into the web page. Browser executes JavaScript. We use TypeScript Compiler (tsc) to compile / transpile “filename.ts” to “filename.js”. We won’t load TypeScript file into the browser, we will load and execute JavaScript file into the browser.

Filename.ts

TypeScript

Compiler (tsc)

Filename.js

Advantages of TypeScript: -

1. Static Typing and Type Safety
   1. **Static Typing**: whenever we can fix a data type for the variable while declaration of variable, and we can’t change its data type throughout the program, then it is said to be “static typing”.
      1. **Ex**: - C, C++, Java, C#.Net, …
   2. **Dynamic Typing**: whenever we can’t fix a data type for the variable while declaration, and the data type will be automatically taken by the runtime, then it is said to be “dynamic typing”.
      1. **Ex**: - JavaScript, python.
   3. **Type Safety**: if we specify data type while declaring the variable and when we assign wrong type of value into a variable, the compiler shows error.
      1. **Note:** - TypeScript supports both static typing and dynamic typing
2. Identification of Errors
3. Classes and Interfaces (OOPS concepts)
4. Intellisense

Steps to write typescript program

1. Install Node JS
2. Install TypeScript
3. Open any editor to write program (VS Code Software)
4. Write program and save with .ts extension
5. Compile the program then execute the program.
   1. For compile :- **tsc <filename.ts>**
   2. Once it is compiled successfully, we will get .js file. That file has to be executed
      1. For execute :- **node “filename.js”**

**What is npm?**

The full of npm is Node Package Manager Installer, it is the world's largest Software Library (Registry), it is also a software Package Manager and Installer. The registry contains over 800,000 code packages.

Open-source developers use npm to share software. Many organizations also use npm to manage private development. Using npm is Free

You can download all npm public software packages without any registration or logon.

**Command Line Client**

npm includes a CLI (Command Line Client) that can be used to download and install software:

**Installing npm**

npm is installed with Node js, this means that you have to install Node js to get npm installed on your computer. Download Node js from the official Node js web site: [**https://nodejs.org**](https://nodejs.org)

**Installing TypeScript:-**  To install typescript, we have to use npm, here for typescript no need download anything, just use following steps and it’s related command

* 1. Goto command prompt then use following command
  2. **npm install typescript -g // for installing typescript**

**Data Types :-**

As per the typescript following types are existed

1. number :- for numeric (integers / float values)
2. string :- for set of characters
3. boolean :- for true / false
4. any :- for any type of value

**Variable Syntax:-**

**var <variable name> : data type = <value>;**