**TypeScript**

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Typescript is a typed superset of javacript that compiles to plain javascript.

It will always compile a typescript code into a javascript, even a invalid one.

Objects can be declared by using “Interface”.

**Why we should use typescript?**

TypeScript is a superset of JavaScript which primarily provides optional static typing, classes and interfaces. One of the big benefits is to enable IDEs to provide a richer environment for spotting common errors as you type the code and Intellisense also. It provides more object oriented programming environment. It gives compile time error.

To get an idea of what I mean, watch Microsoft's introductory video on the language.

For a large JavaScript project, adopting TypeScript might result in more robust software, while still being deployable where a regular JavaScript application would run.

**DATA TYPES:**

**Tuples:**

Tuple types allow you to express an array where the type of a fixed number of elements is known, but need not be the same. For example, you may want to represent a value as a pair of a string and a number.

**let** x: [string, number]; //

Initialize it x = ["hello", 10]; // OK

**ENUM**

**ANY  
  
… (spread operator)**

**Union operator**

**Null and Undefined**

By default null and undefined are subtypes of all other types. That means you can assign null and undefined to something like number.

However, when using the --strictNullChecks flag, null and undefined are only assignable to void and their respective types. This helps avoid many common errors.

As a note: we encourage the use of --strictNullChecks when possible, but for the purposes of this handbook, we will assume it is turned off.

**Fat arrow function**

<https://www.youtube.com/watch?v=Fu0HKDNl0rI>

Each optional property denoted by a  “?”

**Rest functions**

The compiler will build an array of the arguments passed in with the name given after the ellipsis (...), allowing you to use it in your function.

Void 0 and undefined is same.

**Interface**

One of TypeScript’s core principles is that type-checking focuses on the shape that values have. This is sometimes called “duck typing” or “structural subtyping”.

**CLASS:**

What is Class?

A class is an entity that determines how an object will behave and what the object will contain. In other words, it is a blueprint or a set of instruction to build a specific type of object.

**FEATURES OF CLASS:**

**I**NHERIATNCE:

class Animal {

move(distanceInMeters: number = 0) {

console.log(`Animal moved ${distanceInMeters}m.`);

}

}

class Dog extends Animal {

bark() {

console.log('Woof! Woof!');

}

}

const dog = new Dog();

dog.bark();

dog.move(10);

dog.bark();

-------------------------------------------------

class Animal {

name: string;

constructor(theName: string) { this.name = theName; }

move(distanceInMeters: number = 0) {

console.log(`${this.name} moved ${distanceInMeters}m.`);

}

}

class Snake extends Animal {

constructor(name: string) { super(name); }

move(distanceInMeters = 5) {

console.log("Slithering...");

super.move(distanceInMeters);

}

}

class Horse extends Animal {

constructor(name: string) { super(name); }

move(distanceInMeters = 45) {

console.log("Galloping...");

super.move(distanceInMeters);

}

}

let sam = new Snake("Sammy the Python");

let tom: Animal = new Horse("Tommy the Palomino");

sam.move();

tom.move(34);

Each derived class that contains a constructor function must call super()which will execute the constructor of the base class. The example also shows how to override methods in the base class with methods that are specialized for the subclass

**What are the Benefits of TypeScript?**

Ans. TypeScript has following benefits:

* It helps in code structuring
* Use class based object oriented programming
* Impose coding guidelines
* Offers type checking
* Compile time error checking
* Intellisense
* Cross-browser support
* Strict type checking
* Static typing

### Does TypeScript Support All Object Oriented Principles?

**Ans.** The answer is **YES**. There are 4 main principles to Object Oriented Programming: Encapsulation, Inheritance, Abstraction, and Polymorphism. TypeScript can implement all four of them with its smaller and cleaner syntax. Read [Write Object-Oriented JavaScript with TypeScript](http://rachelappel.com/write-object-oriented-javascript-with-typescript).

**Encapsulation**: It describes the idea of bundling data and methods that work on that data within one unit, e.g., a class in Java.

**Polymorphism**: Polymorphism means to process objects differently based on their data type. In other words it means, one method with multiple implementation, for a certain class of action. And which implementation to be used is decided at runtime depending upon the situation (i.e., data type of the object)

* Overloading in simple words means more than one method having the same method name that behaves differently based on the arguments passed while calling the method. This called static because, which method to be invoked is decided at the time of compilation
* Overriding means a derived class is implementing a method of its super class. The call to overriden method is resolved at runtime, thus called runtime polymorphism

**Abstraction**: Its main goal is to handle complexity by hiding unnecessary details from the user.

**What are the Disadvantages of TypeScript?**

Ans. Well, TypeScript is great but there are some disadvantages as well.

* TypeScript is just another way to write JavaScript. It doesn’t fix the problems of JavaScript. It just creates an illusion that it does.
* One more tool to learn.
* TypeScript has dependency on type definition files, if you wish to use any existing JavaScript libraries.
* Quality of type definition files is a concern as how can you be sure the definitions are correct?
* Frequent releases of new versions JavaScript library is also a pain area. Because if their type definition files are not updated then you can’t use them instantly.
* In order to run the application in the browser, a compile step is required to transform TypeScript into JavaScript.
* To use any third party library, definition file is you need. And not all the third party library have definition file available.

**DECLARE KEYWORD:** If we are using any variable or library which doesn’t belong to typescript

Then we use declare. The declare keyword is used for ambient declarations where you want to define a variable that may not have originated from a TypeScript file.

For example, lets imagine that we have a library called myLibrary that doesn’t have a TypeScript declaration file and have a namespace called myLibrary in the global namespace. If you want to use that library in your TypeScript code, you can use the following code:

**declare var myLibrary;**

**Advantages of Module –**

* Code reuse
* Encapsulation
* Scoping of variables
* Support CommonJs
* Easier for testing

**TypeScript Method Overriding :**

class Animal {

name: string;

constructor(theName: string) { this.name = theName; }

move(distanceInMeters: number = 0) {

console.log(`${this.name} moved ${distanceInMeters}m.`);

}

}

class Snake extends Animal {

constructor(name: string) { super(name); }

move(distanceInMeters = 5) {

console.log("Slithering...");

super.move(distanceInMeters);

}

}

The example also shows how to override methods in the base class with methods that are specialized for the subclass. Here both Snake create a move method that overrides the move from Animal

**Automatic Assignment of Constructor Parameters in TypeScript :**

Declaring a class with constructor arguments in TypeScript –that is called automatic parameter assignment as,

export class Customer {

    constructor(private name: string, age: number, private adrress: string) { }

}

**Module vs. Namespace:**

Module is for external packages and the namespace is for internal packages. Actually, the module keyword has been replaced with the namespace keyword.

Namespaces are simply named JavaScript objects in the global namespace. Modules can contain both code and declarations.

Internal Modules are now replaceable by using Typescript’s namespace.

External Modules —used to specify and load dependencies between multiple external js files. If there is only one js file used, then external modules are not relevant.

**How you can use TS with jQuery, Angularjs and Reactjs?**

A5- Angularjs is already integrated with Typescript.So, if you are using Angularjs CLI you don’t need to do anything special.

For React and jQuery use Typescript’s @types and it will install all the dependencies.

@types/ React

@types / jQuery

**Type Assertions:**

A type assertion is like a type cast in other languages, but performs no special checking or restructuring of data. It has no runtime impact, and is used purely by the compiler.

Type assertions have two forms. One is the “angle-bracket” syntax:

1. **let** someValue: any = "this is a string"; **let** strLength: number = (<**string**>someValue).length;
2. as syntax:

**let** someValue: any = "this is a string"; **let** strLength: number = (someValue as string).length;

**What is Compilation Context?**

The compilation context is basically grouping of the files that TypeScript will parse and analyze to determine what is valid and what isn’t.

**What are all the other access modifiers that TypeScript supports?**

TypeScript supports access modifiers public, private and protected which determine the accessibility of a class member as given below:

* public - All the members of the class, its child classes, and the instance of the class can access.
* protected - All the members of the class and its child classes can access them. But the instance of the class can not access.
* private - Only the members of the class can access them.

**What is Contextual typing?**

TypeScript compiler can figure out the type if you have types on one side of the equation but not the other.

**What is Generic Class?**

A generic class has a similar shape to a generic interface. Generic classes have a generic type parameter list in angle brackets (<>) following the name of the class.

**Why TypeScript is referred as Optionally Statically Typed Language?**

TypeScript is referred as optionally statically typed, which means we can make the compiler to ignore the type of a variable optionally. Using any data type, we can assign any type of value to the variable. TypeScript will not give any error checking during compilation.

**What is TypeScript Definition Manager?**

When using TypeScript, you will need TypeScript definition files to work with external libraries. TypeScript Definition Manager (TSD) is a package manager to search and install TypeScript definition files directly from the community driven DefinitelyTyped repository.

Consider we need typings file for jQuery so that we can use jQuery with TypeScript. This command, tsd query jquery --action install (we need to have tsdinstalled), finds and install the typings file for jQuery. Now we can include the below directive at the top of the file where we want to use jQuery.

**tsconfig.json**

This is a TypeScript configuration file. tsconfig.json defines the compiler settings and the TyepScript files to be included in a TypeScript application. The tsconfig.json file specifies the root files and the compiler options required to compile the project.

{  
   "compilerOptions": {  
      "removeComments": true,  
      "sourceMap": true  
   },  
   "files": [  
      "main.ts",  
      "othermodule.ts"  
    ]  
}

* **To understand Abstraction:** <https://www.guru99.com/java-data-abstraction.html>

**INTERVIEW QUESTION LINKS**

* <https://www.quora.com/What-is-OOPs-1>
* [https://www.onlineinterviewquestions.com/typescript-interview-questions/#.W3I8Ps4zbIU](https://www.onlineinterviewquestions.com/typescript-interview-questions)
* <http://www.talkingdotnet.com/typescript-interview-questions/>
* <https://medium.com/@hellonehha/top-5-typescript-interview-questions-e9260db8b96b>
* <https://howtodoinjava.com/typescript/union-types/>