Typescript Development

“Superset of JavaScript that compiles into JS”

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About Me

Hi, I’m Shailendra Chauhan

- Author
- Architect,
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- Microsoft MVP
- Founder and CEO of Dot Net Tricks

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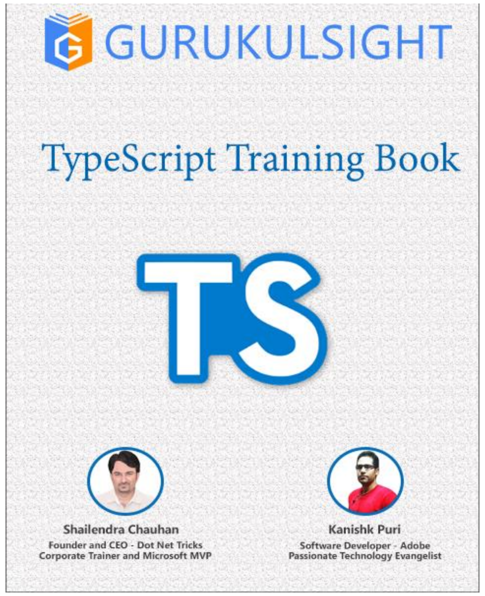
Author of Most Popular Free e-Books


GURUKULSIGHT

TypeScript Training Book

TS

Shailendra Chauhan
Founder and CEO - Dot Net Tricks
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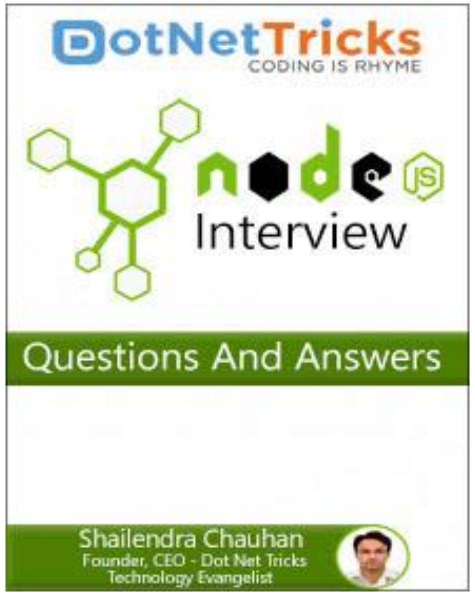
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node JS Interview

Questions And Answers

Shailendra Chauhan
Founder, CEO - Dot Net Tricks
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ANGULARJS 1.x Interview

Questions And Answers

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ASP.NET MVC Interview

Questions And Answers

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LINQ Interview

Questions And Answers

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Agenda

- Introduction to TypeScript
- Issues with Plain JavaScript
- Advantages of TypeScript
- Getting Started with TypeScript
- Data Types
- Functions
- Classes
- Access Modifiers
- Inheritance

Agenda

- Method Overloading
- Interfaces
- Generics
- Modules
- Namespaces

Introduction to TypeScript

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Introduction to TypeScript

- Super set of JavaScript that compiles into JavaScript
- Developed by Microsoft and released 1.0 version in 2012
- Free and open source programming language
- Supports type-safety, data types, classes, interfaces, inheritance, modules and much more..
- Supports latest standard and evolving features of JS including ES5 and ES6

Issues with Plain JavaScript

Issues with Plain JavaScript

- Dynamic Typing
- Lack of Type Safety
- Lack of OOPs concept like classes, Interfaces
- Lack of modularity

Advantages of TypeScript

Advantages of TypeScript

- Simplify code which is easier to read and debug
- Provides Type Safety at compile time
- It’s compiled, rather than interpreted
- Unlike JavaScript, it uses both interfaces & classes
- Supports access modifiers and modularity
- Easy to adopt for object oriented developers (like java & C#)
- Open source

Getting Started with TypeScript

Getting Started with TypeScript

- Development IDEs : Sublime Text, WebStrom, Eclipse, Visual Studio, Visual Studio Code etc.
- Supports Any browser, Any host and Any OS

Visual Studio 2017	Sublime Text	Emacs
Visual Studio 2015	Atom	WebStorm
Visual Studio Code	Eclipse	Vim

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Data Types

Data Types

- Any
- Built-In

  number, string, boolean, void, null, undefined
- User Defined

  class, interface, enum, array, function

Functions

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TS

Functions

- Named Function
- Anonymous Function/ Function Expression
- Arrow Function

Functions

function.ts

```
//named function with number as parameters type and return type
function add(x: number, y: number): number {
    return x + y;
}
//anonymous function with number as parameters type and return type
let sum = function (x: number, y: number): number {
    return x + y;
};
```

arrowfunction.ts

```
//arrow function with typed parameters
let add = (x: number, y: number)=> {
    return x + y;
};

let result = add(2, 3); //5
```

Classes

Classes

- Instance members/methods
- Constructor – Default, Parameterized
- Default/optional Parameters
- ES6 class syntax
- Static members/methods
- Inheritance
- Implements interfaces

Classes

class.ts

```
class Student {
    private rollNo: number;
    private name: string;

    constructor(_rollNo: number, _name: string) {
        this.rollNo = _rollNo;
        this.name = _name;
    }
    showDetails() { //public : by default
        console.log(this.rollNo + " : " +
this.name);
    }
}

let s1 = new Student(1, "Shailendra Chauhan");
s1.showDetails(); //1 : Shailendra Chauhan

let s2 = new Student(2, "kanishk Puri");
s2.showDetails(); //2 : kanishk Puri
```

class.js

```
var Student = (function () {
    function Student(_rollNo, _name) {
        this.rollNo = _rollNo;
        this.name = _name;
    }
    Student.prototype.showDetails = function () {
        console.log(this.rollNo + " : " + this.name);
    };
    return Student;
}());
var s1 = new Student(1, "Shailendra Chauhan");
s1.showDetails();

var s2 = new Student(2, "kanishk Puri");
s2.showDetails();
```

Access Modifiers

Access Modifiers

- Public (by default)
- Private
- Protected

Classes

class.ts

```
class Student {
    private rollNo: number;
    private name: string;

    constructor(_rollNo: number, _name: string) {
        this.rollNo = _rollNo;
        this.name = _name;
    }
    showDetails() { //public : by default
        console.log(this.rollNo + " : " +
this.name);
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}

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```

class.js

```
var Student = (function () {
    function Student(_rollNo, _name) {
        this.rollNo = _rollNo;
        this.name = _name;
    }
    Student.prototype.showDetails = function () {
        console.log(this.rollNo + " : " + this.name);
    };
    return Student;
}());
var s1 = new Student(1, "Shailendra Chauhan");
s1.showDetails();

var s2 = new Student(2, "kanishk Puri");
s2.showDetails();
```

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Constructors

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Constructors

- Supports two types of constructors - default and parameterized
- Supports Constructor Overloading
- Unlike C#, In the constructor, you can make public or private instance members of a class

constructor.ts

```
class Customer {
 //instance members with access modifiers
 constructor(private id:number, public name:string, protected address:string) { }
    showDetails() {
        console.log(this.id + " : " + this.name + " : " + this.address);
    }
}
let c1 = new Customer(1, "Shailendra Chauhan", "Noida");
c1.showDetails(); //1 : Shailendra Chauhan : Noida
```

Inheritance

Inheritance

- Single Level
- Multi Level

inheritance.ts

```
class Person {
    private firstName: string;
    private lastName: string;
    constructor(_firstName: string, _lastName: string) {
        this.firstName = _firstName;
        this.lastName = _lastName;
    }
    fullName(): string {
        return this.firstName + " " + this.lastName;
    }
}
class Employee extends Person {
    id: number;
    constructor(_id: number, _firstName: string, _lastName: string) {
        //calling parent class constructor
        super(_firstName, _lastName);
        this.id = _id;
    }
    showDetails(): void {
        console.log(this.id + " : " + this.fullName()); //calling parent class method
    }
}
let e1 = new Employee(1, "Shailendra", "Chauhan");
e1.showDetails(); //1 : Shailendra Chauhan
```

Function Overloading

FunctionOverloading

- Based on numbers of parameters only

functionoverloads.ts

```
function add(x: string, y: string, z: string): string;
function add(x: number, y: number, z: number): number;

// implementation signature
function add(x: any, y: any, z: any): any {
    let result: any;
    if (typeof x == "number" && typeof y == "number" && typeof z == "number") {
        result = x + y + z;
    }
    else {
        result = x + y + " " + z;
    }
    return result;
}

let result1 = add(4, 3, 8); // 15
let result2 = add("Gurukul", "sight", "website"); //Gurukulsight website
```

Interfaces

Interfaces

- Acts as a contract between itself and any class which implements it
- A class that implement an interface is bound to implement all its members
- Interface cannot be instantiated but it can be referenced by the class object which implements it.
- Interfaces can be used to represent any non-primitive JavaScript object.

Interfaces

interface.ts

```
interface IHuman {
    firstName: string;
    lastName: string;
}
class Employee implements IHuman {
    constructor(public firstName: string, public lastName: string) {

    }
}
```

Generics

Generics

- Enforce type safety without compromising performance, or productivity
- A type parameter is supplied between the open (<) and close (>) brackets which makes it to allow similar types of objects
- TypeScript supports generic functions, generic interfaces and generic classes

Generics

genericfunction.ts

```
function doReverse<T>(list: T[]): T[] {
    let revList: T[] = [];
    for (let i = (list.length - 1); i >= 0; i--) {
        revList.push(list[i]);
    }
    return revList;
}
let letters = ['a', 'b', 'c', 'd', 'e'];
let reversedLetters = doReverse<string>(letters); // e, d, c, b, a

let numbers = [1, 2, 3, 4, 5];
let reversedNumbers = doReverse<number>(numbers); // 5, 4, 3, 2, 1
```

Generics

genericclass.ts

```
class ItemList<T>
{
    private itemArray: Array<T>;
    constructor() {
        this.itemArray = [];
    }
    Add(item: T) : void  {
        this.itemArray.push(item);
    }
    GetAll(): Array<T> {
        return this.itemArray;
    }
}
let fruits = new ItemList<string>();
fruits.Add("Apple");
fruits.Add("Mango");
fruits.Add("Orange");

let listOfFruits = fruits.GetAll();
for (let i = 0; i < listOfFruits.length; i++) {
    console.log(listOfFruits[i]);
}
```

Modules

Modules

- Acts as a container to a group of related variables, functions, classes, and interfaces etc.
- Use export keyword to access Variables, functions, classes, and interfaces etc. declared in a module outside the module
- Use import keyword to consume the members of a module

Modules

myModule.ts

```
//exporting Employee type
export class Employee {
    constructor(private firstName: string, private lastName:
string) { }
    showDetails() {
        return this.firstName + ", " + this.lastName;
    }
}

//exporting Student type
export class Student {
    constructor(private rollNo: number, private name:
string) { }
    showDetails() {
        return this.rollNo + ", " + this.name;
    }
}
```

app.ts

```
//importing the exporting types Student and
Employee from myModule file
import { Student, Employee } from "./myModule";

let st = new Student(1, "Mohan");
let result1 = st.showDetails();
console.log("Student Details :" + result1);

let emp = new Employee("Shailendra", "Chauhan");
let result2 = emp.showDetails();
console.log("Employee Details :" + result2);
```