TYPESCRIPT

19CSE100-Problem Solving AND Algorithmic Thinking
PROGRAMMING LANGUAGE Survey Assignment

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WHAT IS TYPESCRIPT

TypeScript is a syntactic superset of JavaScript which adds static typing. This basically means that TypeScript adds syntax on top of JavaScript, allowing developers to add types, it shares the same base syntax as JavaScript, but adds something to it.

Developed by

Anders Hejlsberg (designer of C#) at Microsoft

History of TypeScript

Anders Hejlsberg created TypeScript in 2010 at Microsoft, and its first version was available to the public in 2012, known as TypeScript 0.8.

Even so, TypeScript is supported by many software developers, but its major drawback is the lack of IDEs, so many JavaScript developer’s communities did not wholly adopt it.

As the developer’s community grows, new versions of Typescript with more advanced features are regularly released to make it simpler to start with TypeScript.

Components of TypeScript

LANGUAGE

the syntax, keywords, and type annotations..

THE TYPESCRIPT COMPILER (TSC)

converts the instructions written in TypeScript to its JavaScript equivalent..

THE TYPESCRIPT LANGUAGE SERVICE

an additional layer of editor-like applications, such as statement completion, signature help, code formatting, and colorization, among other things

.

Features of TypeScript

1.**TypeScript is just JavaScript.** TypeScript starts with JavaScript and ends with JavaScript. Typescript adopts the basic building blocks of your program from JavaScript. Hence, you only need to know JavaScript to use TypeScript. All TypeScript code is converted into its JavaScript equivalent for the purpose of execution.

2.**JavaScript is TypeScript.** This means that any valid **.js** file can be renamed to **.ts** and compiled with other TypeScript files.

Features of TypeScript

3.TypeScript supports other JS libraries: Compiled TypeScript can be consumed from any JavaScript code. TypeScript-generated JavaScript can reuse all of the existing JavaScript frameworks, tools, and libraries.

4.TypeScript is portable: TypeScript is portable across browsers, devices, and operating systems. It can run on any environment that JavaScript runs on. Unlike its counterparts, TypeScript doesn’t need a dedicated VM or a specific runtime environment to execute.

What TypeScript Does

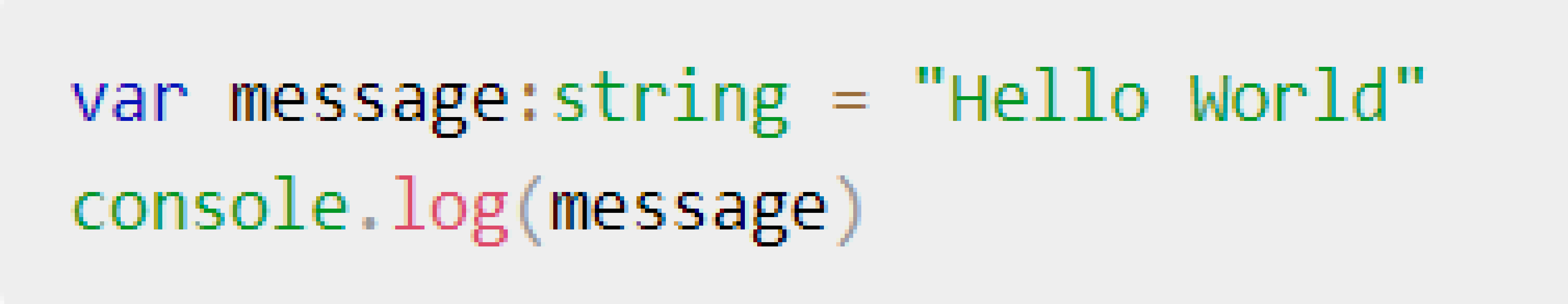
1.Make JavaScript development more efficient

2.Introduce optional types to JavaScript

3.Help catch mistakes earlier

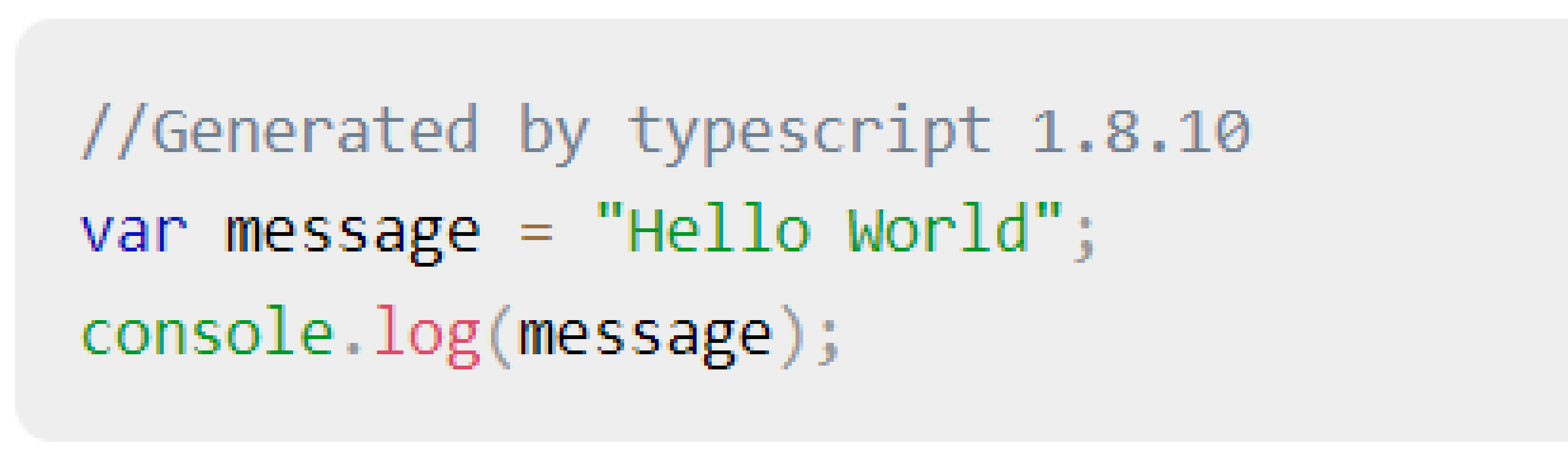
4.Implement planned features of future JavaScript

BASIC SYNTAX OF TYPESCRIPT



```
var message:string = "Hello World"
console.log(message)
```

On compiling, it will generate following JavaScript code.



```
//Generated by typescript 1.8.10
var message = "Hello World";
console.log(message);
```

Why Use TypeScript?

1.Ease of Use:

If you are at least a little familiar with JavaScript, it will require very little effort to get started with TypeScript. This is because all TypeScript code is converted into its JavaScript code equivalent for execution.

Conversely, any JavaScript (.js) file can be renamed to a TypeScript (.ts) file for compilation with other TypeScript files.

2.Portability:

I users can have confidence that TypeScript can run on any environment that JavaScript runs on — browsers, devices, and operating systems.

This starkly contrasts with many TypeScript competitors that require a dedicated VM or specific runtime environments for execution

3.Robust Developer Tooling Support:

Overall, TypeScript aims to improve developers' efficiency and productivity by mitigating errors, aiding problem-solving, and delivering better tooling at scale.

Drawbacks of javascript

1. As JavaScript grows, it is getting **more complicated**, making it difficult for users to keep things tidy as they maintain and reuse the code.

2. By **neglecting** new features like **strong type checking, compile-time error checks, and object orientation**, JavaScript is preventing itself from becoming a fully-fledged server-side technology

3.Separately, JavaScript remains a **loosely typed language**, which can be inhibiting in and of itself. With function parameters and variables offering little to no information, developers are often left fumbling in the dark trying to determine what types of data are being passed where in JavaScript. They either have to waste time looking at the documentation or — in worst cases — simply do their best to guess based on the implementation

How TypeScript Fills in JavaScript’s Gaps

1)Enhanced IDE Support-in many ways, this is largely due to the improved IDE (integrated development environment) support brought by TypeScript, where the TypeScript compiler informs the IDE on rich type information in real-time

2)Strong Static Typing – JavaScript is not strongly typed. TypeScript comes with an optional static typing and type inference system through the TLS (TypeScript Language Service). The type of a variable, declared with no type, may be inferred by the TLS based on its value.

3)TypeScript **supports Object Oriented Programming** concepts like classes, interfaces, inheritance, etc

How TypeScript Fills in JavaScript's Gaps

4) Compilation – JavaScript is an interpreted language. Hence, it needs to be run to test that it is valid. It means you write all the codes just to find no output, in case there is an error. Hence, you have to spend hours trying to find bugs in the code. The TypeScript transpiler provides the error-checking feature. TypeScript will compile the code and generate compilation errors, if it finds some sort of syntax errors. This helps to highlight errors before the script is run.

5) TypeScript **supports type definitions** for existing JavaScript libraries. TypeScript Definition file (with .d.ts extension) provides definition for external JavaScript libraries. Hence, TypeScript code can contain these libraries.

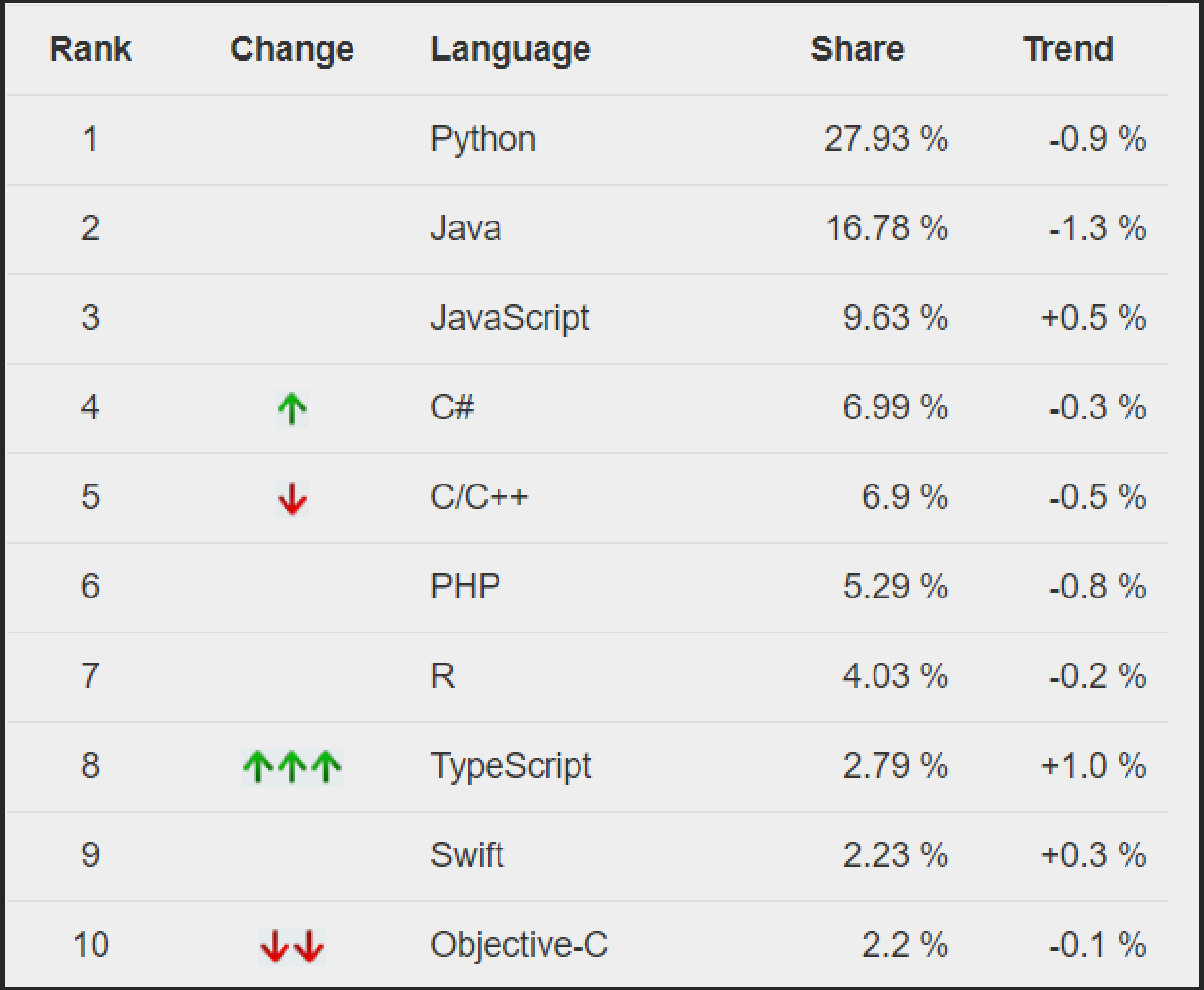
Difference between TypeScript and JavaScript:

- TypeScript is known as an Object-oriented programming language whereas JavaScript is a prototype based language.
- TypeScript has a featureknown as Static typing but JavaScript does not support this feature.
- TypeScript supports Interfaces but JavaScript does not.

Disadvantages of using TypeScript over JavaScript

- Generally, TypeScript takes time to compile the code

PYPL PopularitY of Programming Language



Rank	Change	Language	Share	Trend
1		Python	27.93 %	-0.9 %
2		Java	16.78 %	-1.3 %
3		JavaScript	9.63 %	+0.5 %
4	↑	C#	6.99 %	-0.3 %
5	↓	C/C++	6.9 %	-0.5 %
6		PHP	5.29 %	-0.8 %
7		R	4.03 %	-0.2 %
8	↑↑↑	TypeScript	2.79 %	+1.0 %
9		Swift	2.23 %	+0.3 %
10	↓↓	Objective-C	2.2 %	-0.1 %

THANK YOU

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