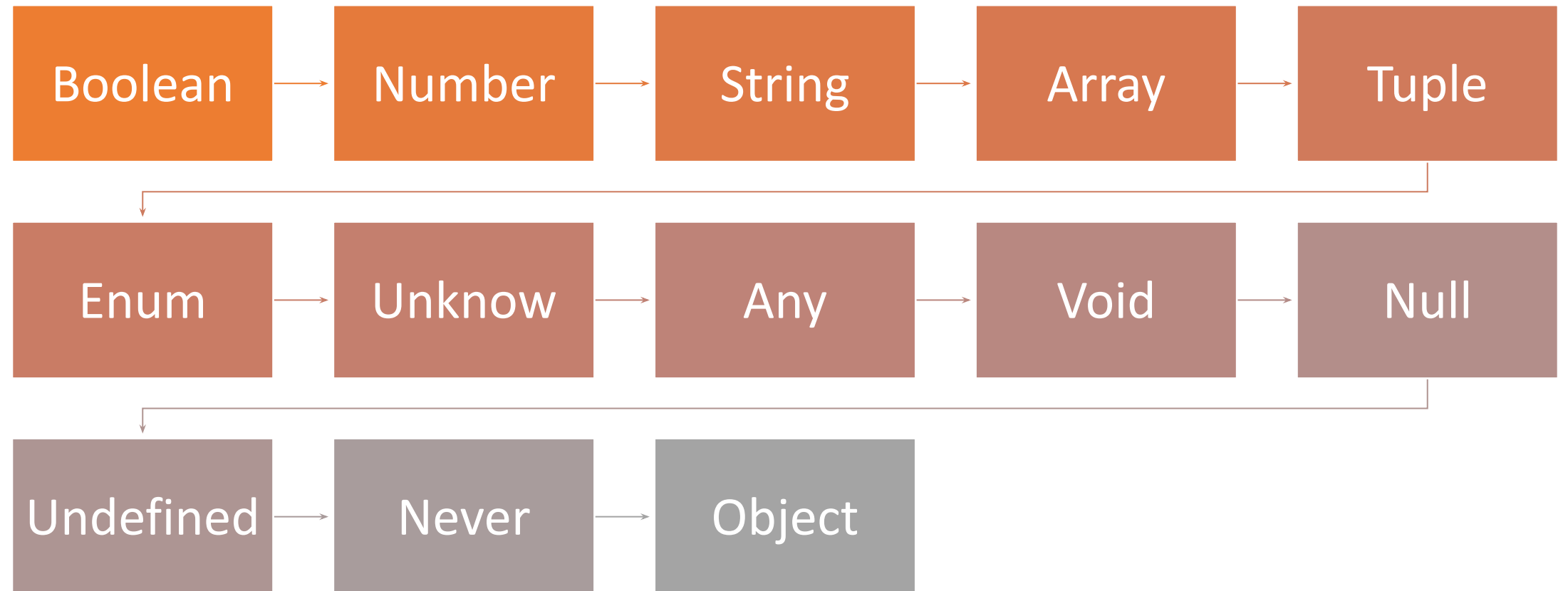


# TypeScript

JavaScript with syntax for types

# Basic types

---





Types

# Types

```
type Point = {  
  x: number;  
  y: number;  
};  
  
// Exactly the same as the earlier example  
function printCoord(pt: Point) {  
  console.log("The coordinate's x value is " + pt.x);  
  console.log("The coordinate's y value is " + pt.y);  
}  
  
printCoord({ x: 100, y: 100 });
```

- Basic type:  
Boolean, string and etc...
- You can create you own type

# Types

---

## Union type

---

```
const a = string |  
number;
```

# Type Assertions



For example, if you're using `document.getElementById`, TypeScript only knows that this will return *some* kind of `HTMLElement`, but you might know that your page will always have an `HTMLCanvasElement` with a given ID.

In this situation, you can use a *type assertion* to specify a more specific type:

```
const myCanvas = document.getElementById("main_canvas") as HTMLCanvasElement;
```

```
interface Point {  
  x: number,  
  y: number,  
  z?: number  
}
```

```
const a = {  
  x: 5,  
  y: 2  
} as Point;
```

# Narrowing or type Guard

```
function padLeft(padding: number | string, input: string) {  
    return " ".repeat(padding) + input;  
}
```

Argument of type 'string | number' is not assignable to parameter of type 'number'.  
Type 'string' is not assignable to type 'number'.

```
}
```

[Try](#)

Fix:

```
function padLeft(padding: number | string, input: string) {  
    if (typeof padding === "number") {  
        return " ".repeat(padding) + input;  
    }  
    return padding + input;  
}
```

[Try](#)

# Interfaces



# Interfaces

---

Interfaces declare type of object

```
interface Point {  
  x: number;  
  y: number;  
}
```

```
function printCoord(pt: Point) {  
  console.log("The coordinate's x value is " + pt.x);  
  console.log("The coordinate's y value is " + pt.y);  
}
```

```
printCoord({ x: 100, y: 100 });
```

# Interface or type ? Different

Type aliases and interfaces are very similar, and in many cases you can choose between them freely. Almost all features of an **interface** are available in **type**, the key distinction is that a type cannot be re-opened to add new properties vs an interface which is always extendable.

### Extending an interface

```
interface Animal {  
  name: string  
}  
  
interface Bear extends Animal {  
  honey: boolean  
}  
  
const bear = getBear()  
bear.name  
bear.honey
```

### Extending a type via intersections

```
type Animal = {  
  name: string  
}  
  
type Bear = Animal & {  
  honey: boolean  
}  
  
const bear = getBear();  
bear.name;  
bear.honey;
```

### Adding new fields to an existing interface

```
interface Window {  
  title: string  
}  
  
interface Window {  
  ts: TypeScriptAPI  
}  
  
const src = 'const a = "Hello World"';  
window.ts.transpileModule(src, {});
```

### A type cannot be changed after being created

```
type Window = {  
  title: string  
}  
  
type Window = {  
  ts: TypeScriptAPI  
}  
  
// Error: Duplicate identifier 'Window'.
```

# Optional = Properties?

```
interface Point {  
  x: number,  
  y: number,  
  z?: number  
}
```

```
const a: Point = {  
  x: 5,  
  y: 2  
}
```

```
function printName(obj: { first: string; last?: string }) {  
  // ...  
}  
// Both OK  
printName({ first: "Bob" });  
printName({ first: "Alice", last: "Alisson" });
```

# Function

- Function Type Expressions
- Generic Functions
- Function Overloads

# Function Type Expressions

```
function greeter(fn: (a: string) => void) {  
    fn("Hello, World");  
}
```

```
function printToConsole(s: string) {  
    console.log(s);  
}
```

```
greeter(printToConsole);
```

# Function Generic

```
function firstElement<Type>(arr: Type[]): Type | undefined {  
    return arr[0];  
}
```

```
// s is of type 'string'  
const s = firstElement(["a", "b", "c"]);  
// n is of type 'number'  
const n = firstElement([1, 2, 3]);  
// u is of type undefined  
const u = firstElement([]);
```

# Function Overload

```
function len(s: string): number;  
function len(arr: any[]): number;  
function len(x: any) {  
    return x.length;  
}
```