Unknown: A Better any

In this lesson, you will see the type, `unknown`.

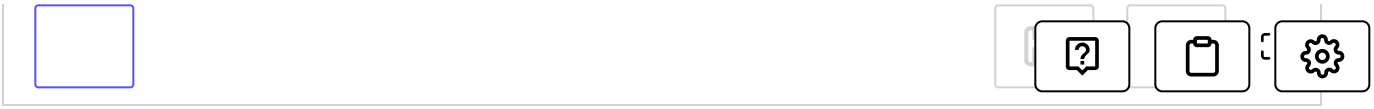
The `unknown` type is half a specific explicit type and half the type `any` which allows everything. Declaring a variable as `unknown` allows us to set a wide variety of types without allowing unwanted access to properties or the value of a type. The following code demonstrates that a variable with type `any` can be assigned a string and then used with a function of the `string` type.

Later, the variable is assigned to a `number` that does not have `substr` function. However, TypeScript does not catch an attempt to invoke a function that does not exist.

```
let variable1: any;
variable1 = "It is a string";
console.log(variable1.substr(0,2)) // Output "it"
variable1 = 1;
console.log(variable1.substr(0,2)) // Crash
```

Changing the type from `any` to `unknown` indicates to TypeScript that the type can receive any value but should be used cautiously. It does not allow the function to be invoked.

```
let variable2: unknown;
variable2 = "It is a string";
console.log(variable2.substr(0,2)) // Does not compile here
variable2 = 1;
console.log(variable2.substr(0,2)) // Does not compile here
```



The only way to access hidden properties or values is to explicitly tell TypeScript a variable's type. This can be done by *casting* or using a *type assertion*. Here is an example that lets an `unknown` variable use the `string` function, `substr`. `variable3` is of `unknown` type but is explicitly cast by asserting its type as `string`.

Forcing a type is not recommended because it can lead to specifying the wrong one. For example, `variable3` may be a `number` asserted to be a `string`. Asserting an `unknown` type is dangerous and should be used with caution.

```
let variable3: unknown;
variable3 = "It is a string";
let variable3String = variable3 as string;
console.log(variable3String.substr(0,2))
```

`unknown` and `null` can both be validated without using `==` or `===` because of JavaScript. Both are *falsy*.

```
let und: string | undefined = undefined;
if(und) {
    console.log(und)
} else {
    console.log("The value is undefined")
}
```

In case you need to display a value in an object that has many `undefined/null` (or optional) fields, several checks are required. The following example shows that only the last object displays the string because

the others are nested with `undefined` values.

```
interface ObjectC {
    m3: string;
}
interface ObjectB {
    m2?: ObjectC;
}
interface ObjectA {
    m1?: ObjectB;
}

function print(o: ObjectA): void {
    if (o.m1) {
        if (o.m1.m2) {
            console.log(o.m1.m2.m3);
        }
    }
}

const obj1: ObjectA = {
    m1: undefined,
};
const obj2: ObjectA = {
    m1: {
        m2: undefined,
    },
};
const obj3: ObjectA = {
    m1: {
        m2: {
            m3: "Yeah!",
        },
    },
};
print(obj1);
print(obj2);
print(obj3);
```

TypeScript versions 3.7 and up allow us to shortcut the conditions of `null` and `undefined` by using *optional chaining*. Optional chaining uses `?.` and returns `undefined` if the chain of `?.` contains a property that is `null` or `undefined`. Otherwise, it returns the value. If you change the previous example to use optional chaining, the code is reduced to:

```
interface ObjectC {
    m3: string;
}
interface ObjectB {
    m2?: ObjectC;
}
interface ObjectA {
    m1?: ObjectB;
}

function print(o: ObjectA): void {
  if(o.m1?.m2){
    console.log(o.m1.m2.m3);
  }
}

const obj1: ObjectA = {
    m1: undefined,
};
const obj2: ObjectA = {
    m1: {
        m2: undefined,
    },
};
const obj3: ObjectA = {
    m1: {
        m2: {
            m3: "Yeah!",
        },
    },
};
print(obj1);
print(obj2);
print(obj3);
```

In the same vein, TypeScript has *nullish coalescing* that allows the code to be reduced before invoking something that can be `null` or `undefined`. If you run the following code several times, once in a while, you will get the value from the function and sometimes the one from the default value.

```
function getValue(): string | undefined{
```

```
  if (Math.random() > 0.5){
    return undefined;

  }
  return "Good";
}

let value = getValue();
if(!value){
  value = "Default"
}
console.log(value);
```

With TypeScript, since version 3.7, it is possible to use `??` to avoid the if statement.

```
function getValue(): string | undefined{
  if (Math.random() > 0.5){
    return undefined;
  }
  return "Good";
}

let value = getValue() ?? "Default";
console.log(value);
```

A few lessons ago, you learned that the constructor of the `Boolean` object uses `unknown`. The constructor could take `any`, but with `unknown`, the type is sure to remain the same inside the boolean's constructor and keep the code inside the constructor to access a limited range of properties. This wraps up our discussion of the unknown type.

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