Custom Mapped Type

This lesson explains how to create your own mapped type.

WE'LL COVER THE FOLLOWING

- Creating a “NonNullable” type
- Adding a property conditionally

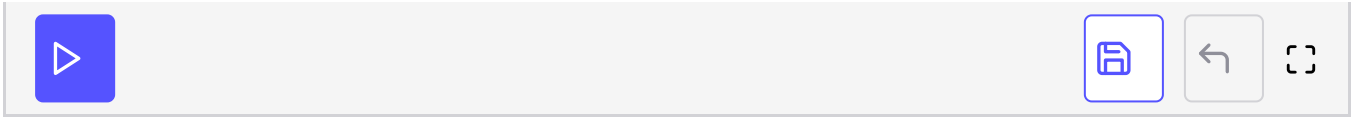
Creating a “NonNullable” type

The first custom type shows how to use `never` to tell TypeScript to not compile if a custom map is not respected. The code map is a generic variable to not be `undefined` or `null.` In the case that the value is either one, TypeScript does not compile.

```
type NoNullValue<T> = T extends null | undefined
  ? never
  : T;

function print<T>(p: NoNullValue<T>): void {
    console.log(p);
}

print("Test"); // Compile
// print(null); // Does not compile
```



Creating a custom mapping requires to use the keyword `extends` which acts like an `if` statement. The `T` is checked against what is written after the `extends`. If true, it does after the `?`. In that example, the value is `never` at **line 2**. TypeScript returning `never` knows that it should never be in that state and stops compilation. Otherwise, it selects the value after the `:` which is the type `T` itself.

Adding a property conditionally

Imagine the scenario where if an object has a `dateCreated` property, and you want to add a `modifiedDate` property automatically.

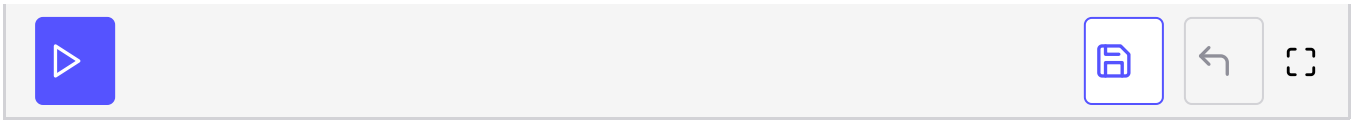
```
interface Person {
    name: string;
    dateCreated: Date;
}
interface Animal {
    name: string;
}

// Create a generic Type that add modifiedDate only if dateCreated is present
type Modified<T> = T extends { dateCreated: Date } ? T & { modifiedDate: Date } : never;

const p: Person = { name: "Pat", dateCreated: new Date() };
const a: Animal = { name: "Jack" };

// ModifiedDate present because "Person" has dateCreated
const p2: Modified<Person> = { ...p, modifiedDate: new Date() };
console.log(p2.modifiedDate)

// Following line do not transpile because Animal does not have dateCreated
// const a2: Modified<Animal> = { ...p, modifiedDate: new Date() };
// console.log(a2.modifiedDate)
```



In the example above, the code compiles as long as the `T` type has `dateCreated`. **Line 10** creates a type that accepts a generic type. The generic type is enhanced by a `modifiedDate` **only** if the generic type has `dateCreated`. Otherwise, the type is `never` causing TypeScript to not compile.

The commented code at **line 19** and **line 20** tried to use the `ModifiedType` but does not have `dateCreated` hence it does not compile.

An alternative could have been to return the generic type instead of `never`. In that case, TypeScript would have compile if a check is done to ensure that `modifiedDate` is present before using the field.