Literal Type, Narrowing, and Const

WE'LL COVER THE FOLLOWING

Literal type

A literal type sets a single value to a variable's type. Initially, TypeScript supported only a string. Nowadays, a literal type can be a Boolean, a number, or an enum.

```
let x : "test";
let y : 123;
let z : true;
```

The concept of having a value that controls the data type flow can be extended beyond type checking in order to narrow down to a single type within a union. A return type can borrow the concept of narrowing by depending on the value's discriminant field. The result is a specific return type.

Imagine the scenario where a method can return a member from the `Cat` or the `Dog` interface. At **line 11** the function takes one parameter that can be `Cat` or `Dog`. The function will return a `name` if the discriminant is a `cat`, see **line 13**. Otherwise, the function returns the `nickname` value, see **line 15**. A discriminant is powerful since the consumer can compare the return value and narrow it to a single type automatically. The narrowing affects the scope of the condition. The **line 12** narrow `p` only between the curly bracket at **line 12** and **line 14**.

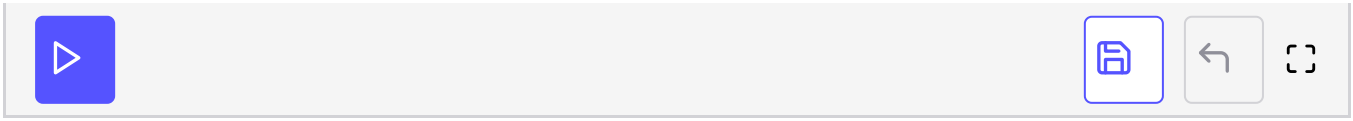
```
interface Cat {
  kind: "cat", // Discriminant because shared with Dog
  name: string
}

interface Dog {
  kind: "dog", // Discriminant because shared with Dog
  nickname: string
}

function callMeBy(p: Cat | Dog): string {
  if (p.kind === "cat") { // In the IF, p is Cat
    return p.name;
  } else if (p.kind === "dog") { // In the IF, p is Dog
    return p.nickname
  }
  return "unknown";
}

const c: Cat = { kind: "cat", name: "Hello Kitty" }
const d: Dog = { kind: "dog", nickname: "Snoopy" }

console.log(callMeBy(c));
console.log(callMeBy(d));
```



A second example

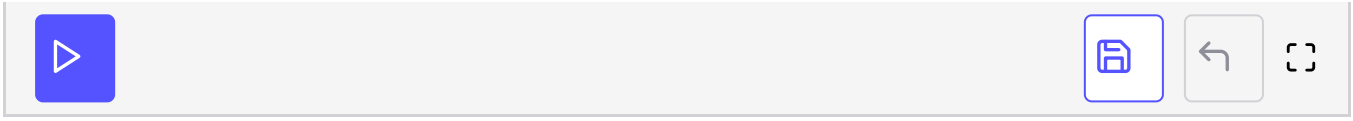
Another example could be a response from an Ajax call which returns a success or a failure. In the case of a failure, the returned interface can have HTTP status, and error, and, when it is successful, the payload. Instead of having a single type that contains all these fields, you can return a type that unites a successful request and a failed request.

The consumer can then check the discriminant and leverage the automatic narrowed type to fulfill both scenarios. This will only contain the fields required, depending on the response.

```
interface Success {
    success: true;
    httpCode: string;
    payload: string;
}
interface Failure {
    success: false;
    errorMessage: string;
}

function ajax(url: string): Success | Failure {
    return { success: false, errorMessage: "Error!" }; // Hardcoded failure
}
```

```
function ajaxCall(): string {
    const ajaxResult = ajax("http://blablac.com");
    if (ajaxResult.success === true) {
        return ajaxResult.payload; // Access to all Success  interface members
    } else {
        return ajaxResult.errorMessage; // Access to all Failure
    }
}
const result = ajaxCall();
```



Literal type with `const`

A literal type declared as a constant without specifying a type is automatically set to the type of the associated string. An implicit declaration of a literal type will make the constant's type to the same as the value.

However, setting a string to a `let` variable instead of `const` doesn't set the type to the string value, but to the type of string. The explicit value is the only valid path with `let` to set a literal type. Another interesting characteristic is that if you create a `let` variable and you associate a constant literal type, the `let` variable will be a string and not the literal.

It opens the definition to a broader scope since `let` allows you to redefine the value at any time. Here are examples that illustrate the difference between `const` and `let` with literal type.

```
const literalType1 = "c";    // Type is not string, but "c"
const literalType2: "c" = "c";  // Same as above
let literalType3 = "c";    // Type is string
let literalType4: "c" = "c";    // Type is not string, but "c"
```