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# Closures (In JavaScript and Beyond)

A closure is a function that accesses a variable "outside" itself. For example:

```
const message = 'The British are coming.';

function sayMessage(){
  alert(message); // Here we have access to message,
  // even though it's declared outside this function!
}
```

JavaScript

We'd say that `message` is "closed over" by `sayMessage()`.

One useful thing to do with a closure is to create something like an "instance variable" that can change over time and can affect the behavior of a function.

```
// Function for getting the id of a dom element,  
// giving it a new, unique id if it doesn't have an id yet  
const getUniqueId = (() => {  
  let nextGeneratedId = 0;  
  return element => {  
    if (!element.id) {  
      element.id = `generated-uid-${nextGeneratedId}`;  
      nextGeneratedId++;  
    }  
    return element.id;  
  };  
})();
```

**Why did we put `nextGeneratedId` in an immediately-executed anonymous function?** It makes `nextGeneratedId` private, which prevents accidental changes from the outside world:

```
// Function for getting the id of a dom element,  
// giving it a new, unique id if it doesn't have an id yet  
let nextGeneratedId = 0;  
const getUniqueId = element => {  
  if (!element.id) {  
    element.id = `generated-uid-${nextGeneratedId}`;  
    nextGeneratedId++;  
  }  
  return element.id;  
};  
  
// ...  
// Somewhere else in the codebase...  
// ...  
  
// WHOOPS--FORGOT I WAS ALREADY USING THIS FOR SOMETHING  
nextGeneratedId = 0;
```

Next up: Mutable vs Immutable Objects ➡ (/concept/mutable?course=fc1&section=general-programming)

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