

Arrays: Iteration

Working through an array algorithmically.

Example Setup

In VSCode:

1. Start the Development Server
 - View Terminal
 - `npm run pull`
 - `npm start`
2. Open the File Explorer Pane
 - Right click on the src folder
 - Select "New folder"
 - Name it: **x-arrays**
 - Right click on the x-functions folder
 - Select "New file"
 - Name it: **array-loop-app.ts**
3. In `array-loop-app.ts`, write out the code to the right. It has no errors, so review carefully if yours has any.

```
import { print } from "intros";

export let main = async () => {

    let a: number[] = [1, 2, 3];

    print(a);

    a[0] = a[0] * a[0];
    a[1] = a[1] * a[1];
    a[2] = a[2] * a[2];

    print(a);

};

main();
```

Processing an Array Manually

- Suppose you have silly problem:
You want to square each element of a number array with length 3.
- Here's one way to do so:

```
let a: number[] = [1, 2, 3];  
  
print(a);  
  
a[0] = a[0] * a[0];  
a[1] = a[1] * a[1];  
a[2] = a[2] * a[2];  
  
print(a);
```

Notice there's a pattern...

- Each of these lines is exactly the same, *only* the ***index number*** in each of them is changing:
- What if we introduced an *index variable* and incremented it between each line:
- Now each of those lines is *exactly the same* and we're repeating them over and over...

```
a[0] = a[0] * a[0];  
a[1] = a[1] * a[1];  
a[2] = a[2] * a[2];
```

```
let i = 0;  
a[i] = a[i] * a[i];  
i++;  
a[i] = a[i] * a[i];  
i++;  
a[i] = a[i] * a[i];
```

Processing an Array with a Loop

- When you find yourself writing repetitive code, ask yourself: Could I let a loop handle the repetition for me?
- In this case... yes!

```
for (let i = 0; i < a.length; i++) {  
    a[i] = a[i] * a[i];  
}
```

- Notice **by starting i at 0** and repeating while **$i < a.length$** we now have an **algorithm** for squaring an array of numbers of **any length!**