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JAVASCRIPT ARRAYS



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ARRAYS

ARRAYS

- An array is a collection of similar data elements stored at contiguous memory locations. It is one of the simplest data structures. Each data element can be accessed directly by using an index.
- Arrays in JS are by default dynamic arrays, which means they can change their size

ARRAYS BROKEN DOWN

- Let's say you have a collection of heights you want to compare
- You could take in one height at a time and look at it then compare it against the last (like the pseudo code loop we converted). This could work maybe once but if you need to look at the same data and do something else this would be painful.
- Another thing you could do is store each height in a variable which we will look at on the next page.



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ARRAYS; ARRAYS BROKEN DOWN



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ARRAYS BROKEN DOWN

- If we store each height in a variable, we end up with this:

```
1  let height1 = 55;  
2  let height2 = 100;  
3  let height3 = 101;  
4  let height4 = 98;  
5  let height5 = 44;  
6  let height6 = 120;
```



ARRAYS BROKEN DOWN

- Array indexes start from 0 and increment by 1

0 1 2 3 4 5
↓ ↓ ↓ ↓ ↓ ↓

```
1  const heights = [55,100,101,98,44,120]  
2  console.log(heights[2])
```

This is like strings, which are just arrays of characters.



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ARRAYS BROKEN DOWN

- You can think of arrays as a collection of variable data but stored in a single variable. We access each individual variable by using the subscript operator “[]” and a number called an index.

```
1  const heights = [55,100,101,98,44,120]
2  console.log(heights[2])
```

Index

Subscript Operator



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ARRAYS BROKEN DOWN

- On line one we initialize the variable heights using a subscript operator. We can initialize our array with our data or add data to an array.

```
1  const heights = [55,100,101,98,44,120]
2  console.log(heights[2])
```



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ARRAYS BROKEN DOWN

- To initialize an empty array, we can use an empty subscript operator

```
1  const myArray = [];
```



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ARRAYS BROKEN DOWN

In class Exercise 1:

Make an array of five numbers, add all the numbers together. (no loops just the indexed array)

Input = 5, 1, 22, 4, 3

Output = 35



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ARRAYS AND LOOPS



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ARRAYS AND LOOPS

- For loops and arrays are best friend
- Why do you think this is?



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ARRAYS AND LOOPS

- For loops and arrays are best friend because when we loop over an array, we can use the counter in our for loops to track the index of the array. This is why for loops in JavaScript auto populate “index”:

```
1  for (let index = 0; index < array.length; index++) {  
2    |  const element = array[index];  
3  }
```



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ARRAY LENGTH PROPERTY

You will notice that JavaScript for loops come with `array.length`. This gives us a numerical value we can use in our loops condition.

```
1  for (let index = 0; index < array.length; index++) {  
2    |  const element = array[index];  
3  }
```

ARRAYS AND LOOPS

In Class Exercise 1:

Create an array of 10 unique numbers from 0 - 20, count how many odd numbers, even numbers (that aren't zero) and zeros there are in the array.

Input = 1, 5, 8, 0, 19, 4, 6, 15, 10, 13

Output = "There are 5 odd, 4 even and 1 zero"



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RANDOM NUMBER GENERATOR

RANDOM NUMBER GENERATOR

Random number generators are in almost all programming languages. Random number generators are not truly random but pseudo random. This means that even though a number appears random it has a mathematical formula that can be broken down to accurately predict the number being generated. We will talk about how this is done later in the course.



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RANDOM NUMBER GENERATOR

- The way we get a random number in JavaScript is by using the Below Code.

```
1  let randomNumber = Math.floor(Math.random() * 101);
```



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RANDOM NUMBER GENERATOR

- On its own the Math.random() returns a real number that looks like this:
 - 0.5269496394076698

```
1 let randomNumber = Math.random()
```




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RANDOM NUMBER GENERATOR

- When we multiply it we get something like this
 - 53.22191358017465

```
1 let randomNumber = Math.random() * 101
```



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RANDOM NUMBER GENERATOR

- I chose to multiply by 101 because it will output random numbers from 0-100 when we use the `Math.floor()`.

```
1 let randomNumber = Math.floor(Math.random() * 101);
```



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RANDOM NUMBER GENERATOR

- Math.floor() rounds the number down. Most programming languages come with a floor and ceiling function to round numbers up or down
- The final result we get with our number is:
 - 53

```
1 let randomNumber = Math.floor(Math.random() * 101);
```



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RANDOM NUMBER GENERATOR

In Class Exercise 1:

Create an array of 100 random numbers, then calculate how many odd numbers, even numbers and zeros there are in the array.

- Google `array.push()` to figure out how to add variables to your array

ARRAY

In Class Exercise 1:

Create an array of 100 random numbers, then calculate how many odd numbers, even numbers and zeros there are in the array.



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MULTIDIMENSIONAL ARRAYS



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MULTIDIMENSIONAL ARRAYS

- A multidimensional arrays are arrays in an array.
- A great example of this is an array of strings.



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MULTIDIMENSIONAL ARRAYS

let numbers = ['January', 'February', 'March',
'April', 'May', 'June', 'June', 'July', 'August',
'September', 'October', 'November', 'December']

This is an example of an array of strings



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MULTIDIMENSIONAL ARRAYS

- This array of strings is multidimensional which means we can use two subscript operators to access different parts:

```
5 let year = ['January', 'February', 'March', 'April', 'May', 'June', 'June',  
  'July', 'August', 'September', 'October', 'November', 'December']  
6 console.log(year[2][4])
```

- What will this print out?



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MULTIDIMENSIONAL ARRAYS

Arrays have an index and that starts counting at 0

0 1 2 3 4 5 6

```
9   let year = ["January", "February", "March", "April", "May", "June", "July",  
10  | "August", "September", "October", "November", "December",];  
11  console.log(year[2][4]);
```



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MULTIDIMENSIONAL ARRAYS

Arrays have an index and that starts counting at 0

0 1 2 3 4 5 6

```
9   let year = ["January", "February", "March", "April", "May", "June", "July",  
10  | "August", "September", "October", "November", "December",];  
11  console.log(year[2][4]);
```



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MULTIDIMENSIONAL ARRAYS

If you remember back to strings, they also start counting at 0 till the end of the string. This means strings are also arrays.

0

1

2

- *let* year = ["January", "February", "March", "April", "May", "June", "June", "July", "August", "September", "October", "November", "December"]



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MULTIDIMENSIONAL ARRAYS

0

1

2

- *let* year = ["January", "February", "March", "April", "May", "June", "June", "July", "August", "September", "October", "November", "December"]



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ARRAY METHODS

`year.push("Smarch");`

allows us to add an element at the end of an array

`year.unshift("Smarch");`

allows us to add an element at the beginning of an array.

`Year.pop("Smarch");`

allows us to remove the last element of an array

`Year.shift();`

Allows us to remove the first element of an array

`Year.splice(index,count); Year.splice(2,1);`

This will remove a specific part of an array

ARRAY METHODS(CONTINUED)

```
year.indexOf("April");
```

Allows us to find the index of an element in an array.

```
year.slice(from, to ); year.slice(1, 4 );
```

We can copy a part of an array. This copies from the index number so once again if we say 1 we are copying the second item in the array. This also only selects < the index number. So we are not taking 4 we are only taking 1, 2, 3

```
year.slice(from);
```

This will copy from a specific index all the way to the end.

```
year.slice();
```

This has no parameter. This will copy the whole array.



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ARRAY

Exercise 2:

Use the array from exercise one and find the minimum, maximum, sum of all the numbers and the average of all the numbers in the array. Your program will also print the index that the min and max are at.



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ARRAY

Exercise 3:

Create a program that has an array of names when the user enters a name, the program calculates how many times the name is repeated.

Ex. John is input

The out put will be:

Name John:2 times

If there is only one name you will have to output:

Name John: 1 time



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ARRAY

Exercise 4

Create a function that convert a sentence input by a user into camelCase

“To be or not to be” becomes **“toBeOrNotToBe”**

You will use these functions:

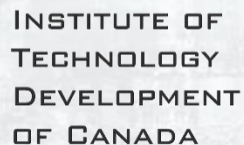
split()

subString(indexA, IndexB)

.toUpperCase()

.toLowerCase()

.join()



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