

# Processing Arrays

Finding the Sum, Average, Minimum  
and Maximum value in a Numeric  
Array

# Key Idea:

In order to find the sum, average, minimum or maximum value of all elements in an array, we need to remember . . .

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In order to find the sum, average, minimum or maximum value of all elements in an array, we need to remember . . .

we can only examine, test and/or process ONE  
ARRAY POSITION AT A TIME!

Using a loop, we process all elements from first to last, one at a time.

# Example: Fill an Array with Values

```
Double[] arr;
```

```
arr = new Double[7];
```

```
for (int i=0; i<arr.length; i++) {  
    arr[i] = (i-3)*(i-3) + i/10.0;  
}
```

# First Step:

Before the loop begins, what should be the initial value of the variable you are using to keep track of the statistic?

Double sum = ?????;

Double min = ?????;

Double max = ?????;

# First Step:

Before the loop begins, what should be the initial value of the variable you are using to keep track of the statistic?

```
Double sum = 0.0;
```

```
Double min = Double.MAX_VALUE;
```

```
Double max = Double.MIN_VALUE;
```

# Find sum or min or max of array:

```
arr
+-----+
0 | 9.0 | for (int i = 0; i < arr.length; i++) {
+-----+
1 | |
+-----+
2 | |
+-----+
3 | | } // end for
+-----+
4 | |
+-----+
5 | |
+-----+
6 | |
+-----+
```

```

i
+-----+
| 0 |
+-----+
```

# Find sum or min or max of array:

```
arr
+-----+
0 |           | for (int i = 0; i < arr.length; i++) {
+-----+
1 |    4.1    |
+-----+
2 |           |
+-----+
3 |           | } // end for
+-----+
4 |           |
+-----+
5 |           |
+-----+
6 |           |
+-----+
```

```

+-----+
|    1    |
+-----+
```



# Find sum or min or max of array:

```
arr
+-----+
0 |           | for (int i = 0; i < arr.length; i++) {
+-----+
1 |           |
+-----+
2 |    1.2    | } // end for
+-----+
3 |           |
+-----+
4 |           |
+-----+
5 |           |
+-----+
6 |           |
+-----+
```

```

+-----+
|    2    |
+-----+
```

# Find sum or min or max of array:

```
arr
+-----+
0 |           | for (int i = 0; i < arr.length; i++) {
+-----+
1 |           |
+-----+
2 |           |
+-----+
3 |    0.3    | } // end for
+-----+
4 |           |
+-----+
5 |           |
+-----+
6 |           |
+-----+
```

```

+-----+
|    3    |
+-----+
```

# Find sum or min or max of array:

```
arr
+-----+
0 |           | for (int i = 0; i < arr.length; i++) {
+-----+
1 |           |
+-----+
2 |           |
+-----+
3 |           | } // end for
+-----+
4 |    1.4    |
+-----+
5 |           |
+-----+
6 |           |
+-----+
```

```

              i
+-----+
|    4    |
+-----+
```

# Find sum or min or max of array:

```
arr
+-----+
0 |           | for (int i = 0; i < arr.length; i++) {
+-----+
1 |           |
+-----+
2 |           |
+-----+
3 |           | } // end for
+-----+
4 |           |
+-----+
5 |     4.5    |
+-----+
6 |           |
+-----+
```

```

                    i
                    +-----+
                    |     5     |
                    +-----+
```

# Find sum or min or max of array:

```
arr
0 | | for (int i = 0; i < arr.length; i++) {
1 | |
2 | |
3 | | } // end for
4 | |
5 | |
6 | 9.6 |
  | |
```

```

      i
    +-----+
    | 6      |
    +-----+
```

# Find sum or min or max of array: (before start of loop)

arr				
	+-----+	for (int i = 0; i < arr.length; i++) {		
0		sum = sum + arr[i];		
	+-----+	if (arr[i] < min) {		
1		min = arr[i];		
	+-----+	}		
2		if (arr[i] > max) {		
	+-----+	max = arr[i];		
3		}		
	+-----+	} // end for		
4				
	+-----+			
5		sum	min	max
	+-----+	+-----+	+-----+	+-----+
	+-----+	0.0	999.9	-999.9
6		+-----+	+-----+	+-----+
	+-----+			

# Find sum or min or max of array:

arr					
	+-----+				
0	9.0	for (int i = 0; i < arr.length; i++) {			
	+-----+	sum = sum + arr[i];			
1		if (arr[i] < min) {			
	+-----+	min = arr[i];			
2		}			
	+-----+	if (arr[i] > max) {			
3		max = arr[i];			
	+-----+	}			
4		} // end for			
	+-----+				
		i	sum	min	max
5		+-----+	+-----+	+-----+	+-----+
	+-----+	0	9.0	9.0	9.0
6		+-----+	+-----+	+-----+	+-----+
	+-----+				

# Find sum or min or max of array:

arr					
0		for (int i = 0; i < arr.length; i++) {			
		sum = sum + arr[i];			
		if (arr[i] < min) {			
1	4.1	min = arr[i];			
		}			
2		if (arr[i] > max) {			
		max = arr[i];			
3		}			
		} // end for			
4					
5		i	sum	min	max
		+-----+	+-----+	+-----+	+-----+
		1	13.1	4.1	9.0
6		+-----+	+-----+	+-----+	+-----+



# Find sum or min or max of array:

arr					
	+-----+	for (int i = 0; i < arr.length; i++) {			
0		sum = sum + arr[i];			
	+-----+	if (arr[i] < min) {			
1		min = arr[i];			
	+-----+	}			
2	1.2	if (arr[i] > max) {			
	+-----+	max = arr[i];			
3		}			
	+-----+	} // end for			
4					
	+-----+				
5		i	sum	min	max
	+-----+	+-----+	+-----+	+-----+	+-----+
	+-----+	2	14.3	1.2	9.0
6		+-----+	+-----+	+-----+	+-----+
	+-----+				

# Find sum or min or max of array:

arr					
0		for (int i = 0; i < arr.length; i++) {			
		sum = sum + arr[i];			
1		if (arr[i] < min) {			
		min = arr[i];			
2		}			
		if (arr[i] > max) {			
3	0.3	max = arr[i];			
		}			
4		} // end for			
5		i	sum	min	max
		+-----+	+-----+	+-----+	+-----+
6		3	14.6	0.3	9.0
		+-----+	+-----+	+-----+	+-----+

# Find sum or min or max of array:

arr					
0		for (int i = 0; i < arr.length; i++) {			
		sum = sum + arr[i];			
		if (arr[i] < min) {			
1		min = arr[i];			
		}			
		if (arr[i] > max) {			
2		max = arr[i];			
		}			
		} // end for			
3					
4	1.4				
5					
6					

  

i	sum	min	max
4	16.0	0.3	9.0

# Find sum or min or max of array:

arr					
		i	sum	min	max
0		+-----+	+-----+	+-----+	+-----+
		5	22.5	0.3	9.0
1		+-----+	+-----+	+-----+	+-----+
2					
3					
4					
5	4.5				
6					

```
for (int i = 0; i < arr.length; i++) {  
    sum = sum + arr[i];  
    if (arr[i] < min) {  
        min = arr[i];  
    }  
    if (arr[i] > max) {  
        max = arr[i];  
    }  
} // end for
```

# Find sum or min or max of array:

arr					
	+-----+	for (int i = 0; i < arr.length; i++) {			
0		sum = sum + arr[i];			
	+-----+	if (arr[i] < min) {			
1		min = arr[i];			
	+-----+	}			
2		if (arr[i] > max) {			
	+-----+	max = arr[i];			
3		}			
	+-----+	} // end for			
4					
	+-----+				
5		i	sum	min	max
	+-----+	+-----+	+-----+	+-----+	+-----+
	+-----+	6	30.1	0.3	9.6
6	9.6	+-----+	+-----+	+-----+	+-----+
	+-----+				

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and Maximum value in a Numeric  
Array