

# 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 = ?????;

# Find sum or min or max of array:

```
arr
+-----+
0 | 9.0 |
+-----+
1 |
+-----+
2 |
+-----+
3 |
+-----+
4 |           i
+-----+
5 |           | 0 |
+-----+
6 |
+-----+
```

for (int i = 0; i < arr.length; i++) {  
} // end for

# Find sum or min or max of array:

```
arr
+-----+
0 |           |
+-----+
1 |   4.1   |
+-----+
2 |           |
+-----+
3 |           |
+-----+
4 |           |           i
+-----+           +-----+
5 |           |           |   1   |
+-----+           +-----+
6 |           |
+-----+
```

for (int i = 0; i < arr.length; i++) {  
 } // end for

# Find sum or min or max of array:

```
arr
+-----+
0 |           |
+-----+
1 |           |
+-----+
2 |     1.2   |
+-----+     } // end for
3 |           |
+-----+
4 |           |           i
+-----+           +-----+
5 |           |           |   2   |
+-----+           +-----+
6 |           |
+-----+
```

# Find sum or min or max of array:

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

# Find sum or min or max of array:

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

# Find sum or min or max of array:

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

# Find sum or min or max of array:

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

# Find sum or min or max of array:

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

# Find sum or min or max of array:

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

# Find sum or min or max of array:

arr					
		i	sum	min	max
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		+-----+  3  +-----+  14.6  +-----+  0.3  +-----+  9.0			
6		+-----+  3  +-----+  14.6  +-----+  0.3  +-----+  9.0			

# Find sum or min or max of array:

arr					
		i	sum	min	max
0		4	16.0	0.3	9.0
1					
2					
3					
4	1.4				
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
+-----+
0 |           |
+-----+   for (int i = 0; i < arr.length; i++) {
1 |           |       sum = sum + arr[i];
+-----+       if (arr[i] < min) {
2 |           |           min = arr[i];
+-----+       }
3 |           |       if (arr[i] > max) {
+-----+           max = arr[i];
3 |           |
+-----+   } // end for
4 |           |
+-----+       i           sum         min         max
5 |   9.6    |   +---+   +---+   +---+   +---+
+-----+   |   5   |   | 25.6 |   | 0.3  |   | 9.6  |
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		max = arr[i];			
		}			
4		} // end for			
		i	sum	min	max
5		+----+   +----+   +----+   +----+			
		6     30.1     0.3     9.6			
6	4.5	+----+   +----+   +----+   +----+			
		+----+   +----+   +----+   +----+			

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