

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

```

                                i
                                +-----+
                                |    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 | | | |
| 4 | | | |
| 5 | 4.5 | | |
| 6 | | } // end for | |
| | | | |
| | | | 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    |
+-----+
```

```

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

Find sum or min or max of array:

| arr | | | | | |
|-----|-----|--|-----|-----|-----|
| 0 | 9.0 | for (int i = 0; i < arr.length; i++) { | | | |
| 1 | | sum = sum + arr[i]; | | | |
| 2 | | if (arr[i] < min) { | | | |
| 3 | | min = arr[i]; | | | |
| 4 | | } | | | |
| 5 | | if (arr[i] > max) { | | | |
| 6 | | max = arr[i]; | | | |
| | | } | | | |
| | | } // 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]; | | | |
| | | } | | | |
| | | if (arr[i] > max) { | | | |
| 2 | | max = arr[i]; | | | |
| | | } | | | |
| | | } // end for | | | |
| 3 | | | | | |
| | | | | | |
| 4 | | | | | |
| | | | | | |
| | | | | | |
| 5 | | i | sum | min | max |
| | | +-----+ | +-----+ | +-----+ | +-----+ |
| | | 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++) { | | | |
| | | sum = sum + arr[i]; | | | |
| | | if (arr[i] < min) { | | | |
| 1 | | min = arr[i]; | | | |
| | | } | | | |
| | | if (arr[i] > max) { | | | |
| 2 | 1.2 | 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]; | | | |
| | | if (arr[i] < min) { | | | |
| 1 | | min = arr[i]; | | | |
| | | } | | | |
| | | if (arr[i] > max) { | | | |
| 2 | | max = arr[i]; | | | |
| | | } | | | |
| 3 | 0.3 | } | | | |
| | | } // end for | | | |
| 4 | | | | | |
| | | | | | |
| | | | | | |
| 5 | | i | sum | min | max |
| | | +-----+ | +-----+ | +-----+ | +-----+ |
| | | 3 | 14.6 | 0.3 | 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 | | min = arr[i]; | | | |
| | | } | | | |
| | | if (arr[i] > max) { | | | |
| 2 | | max = arr[i]; | | | |
| | | } | | | |
| 3 | | } | | | |
| | | } // end for | | | |
| 4 | 1.4 | | | | |
| | | | | | |
| | | | | | |
| 5 | | i | sum | min | max |
| | | +-----+ | +-----+ | +-----+ | +-----+ |
| | | 4 | 16.0 | 0.3 | 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 | | min = arr[i]; | | | |
| | | } | | | |
| | | if (arr[i] > max) { | | | |
| 2 | | max = arr[i]; | | | |
| | | } | | | |
| 3 | | } | | | |
| | | } // end for | | | |
| 4 | | | | | |
| | | | | | |
| | | | | | |
| 5 | 4.5 | i | sum | min | max |
| | | +-----+ | +-----+ | +-----+ | +-----+ |
| | | 5 | 22.5 | 0.3 | 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 | | 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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