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:

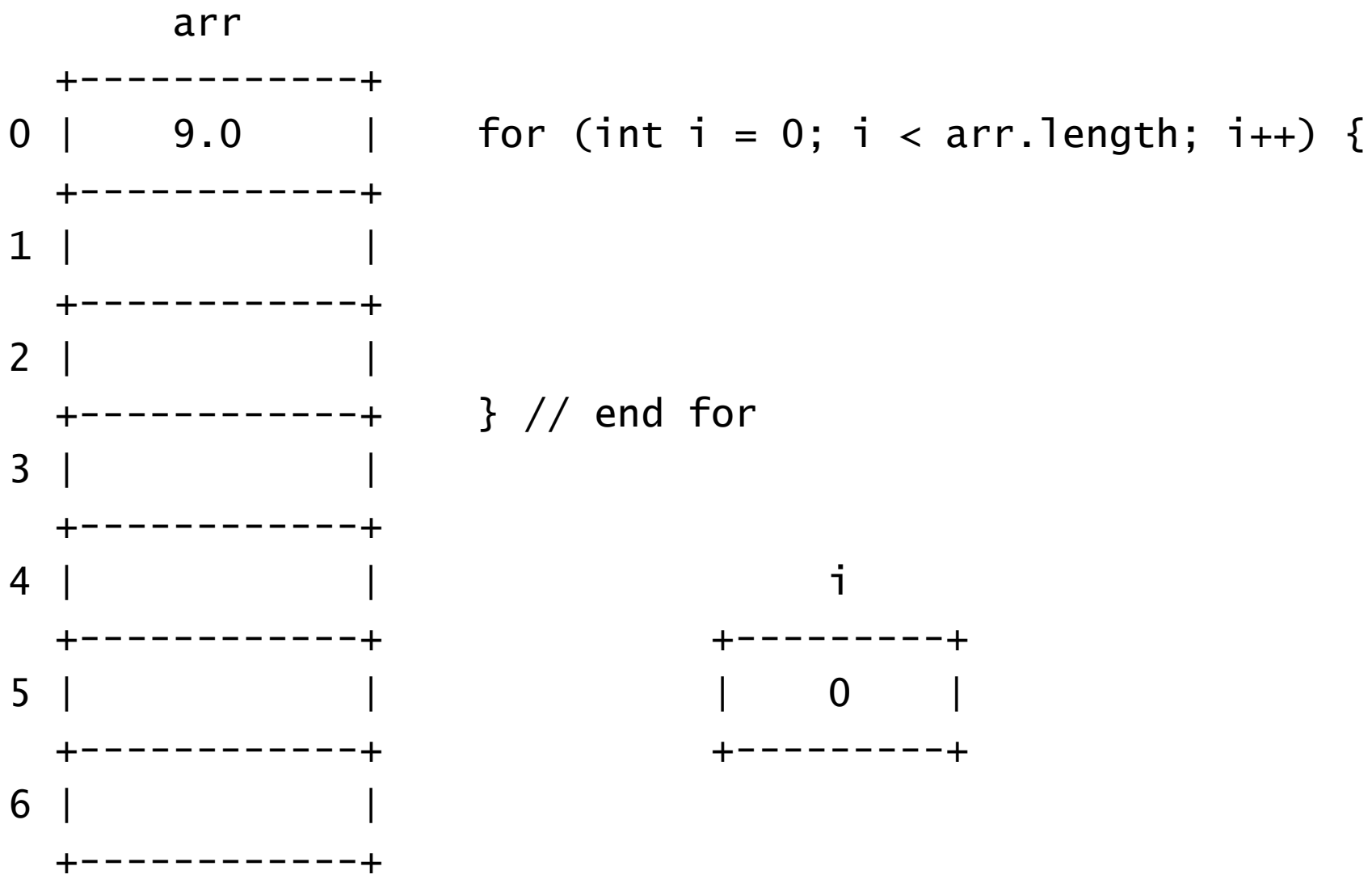
Before the loop begins, what should be the initial value of the variable you are using to keep track of the statistic?

Double sum = 0.0;

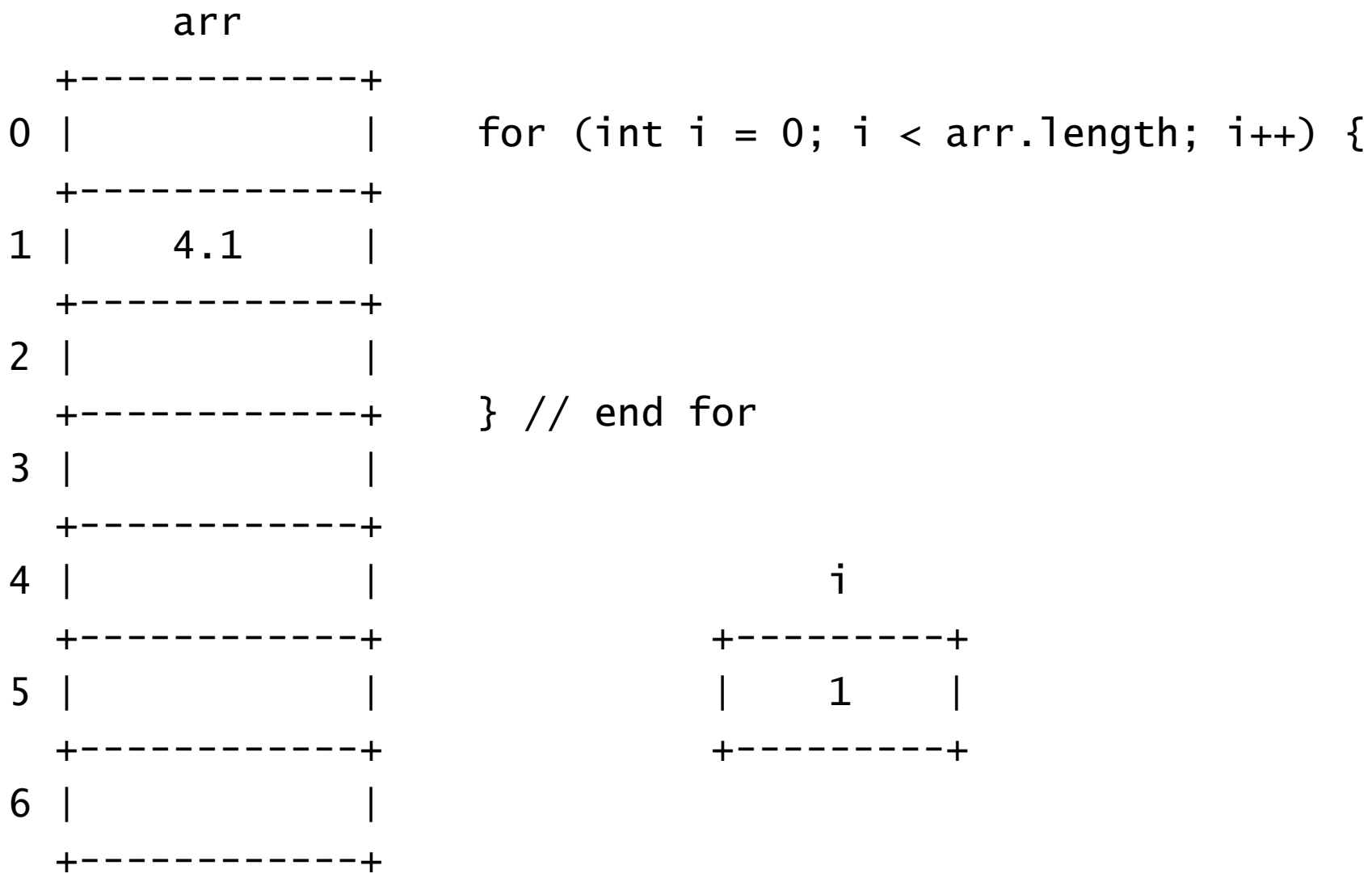
Double min = Double.MAX_VALUE;

Double max = Double.MIN_VALUE;

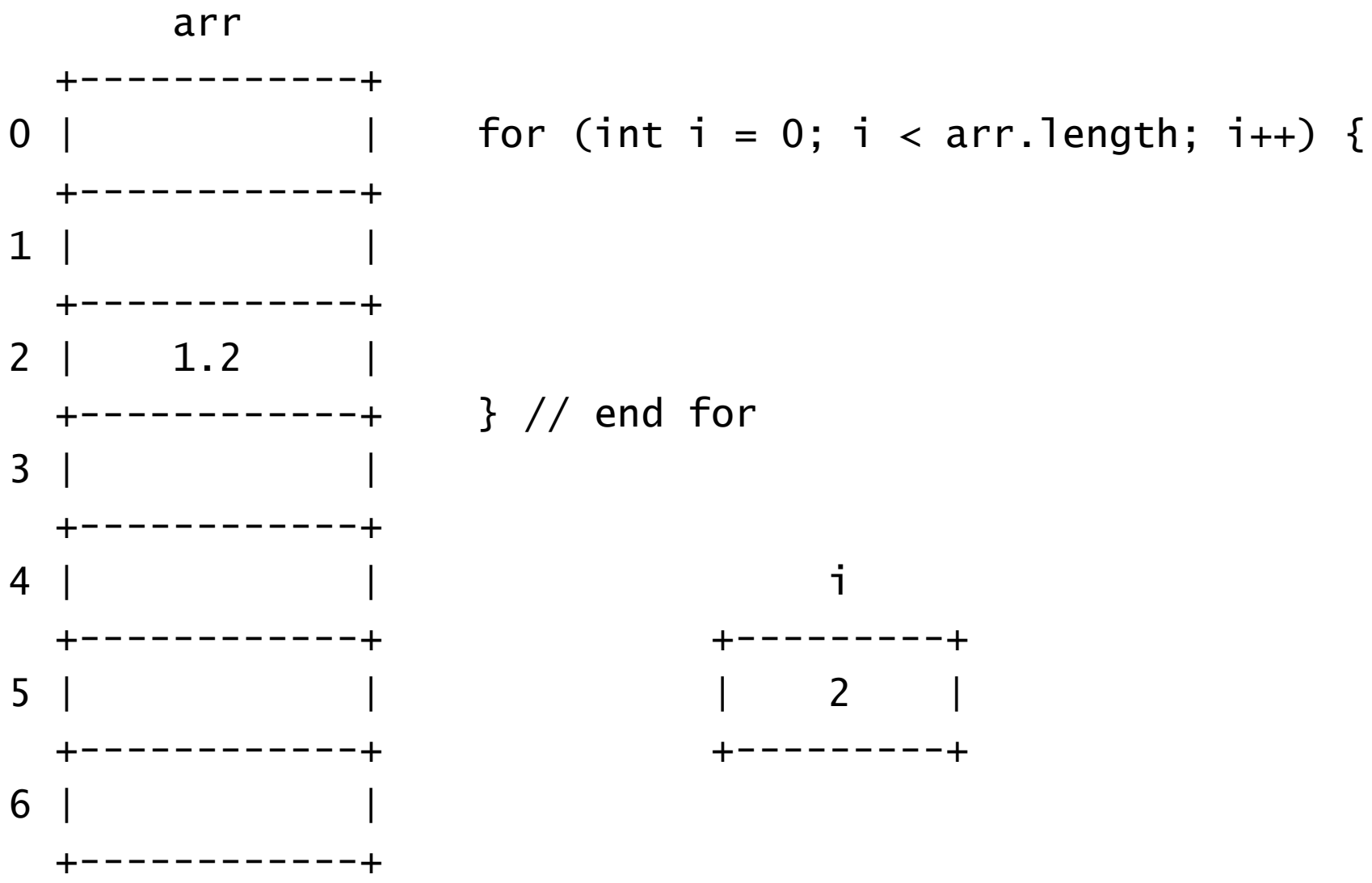
Find sum or min or max of array:



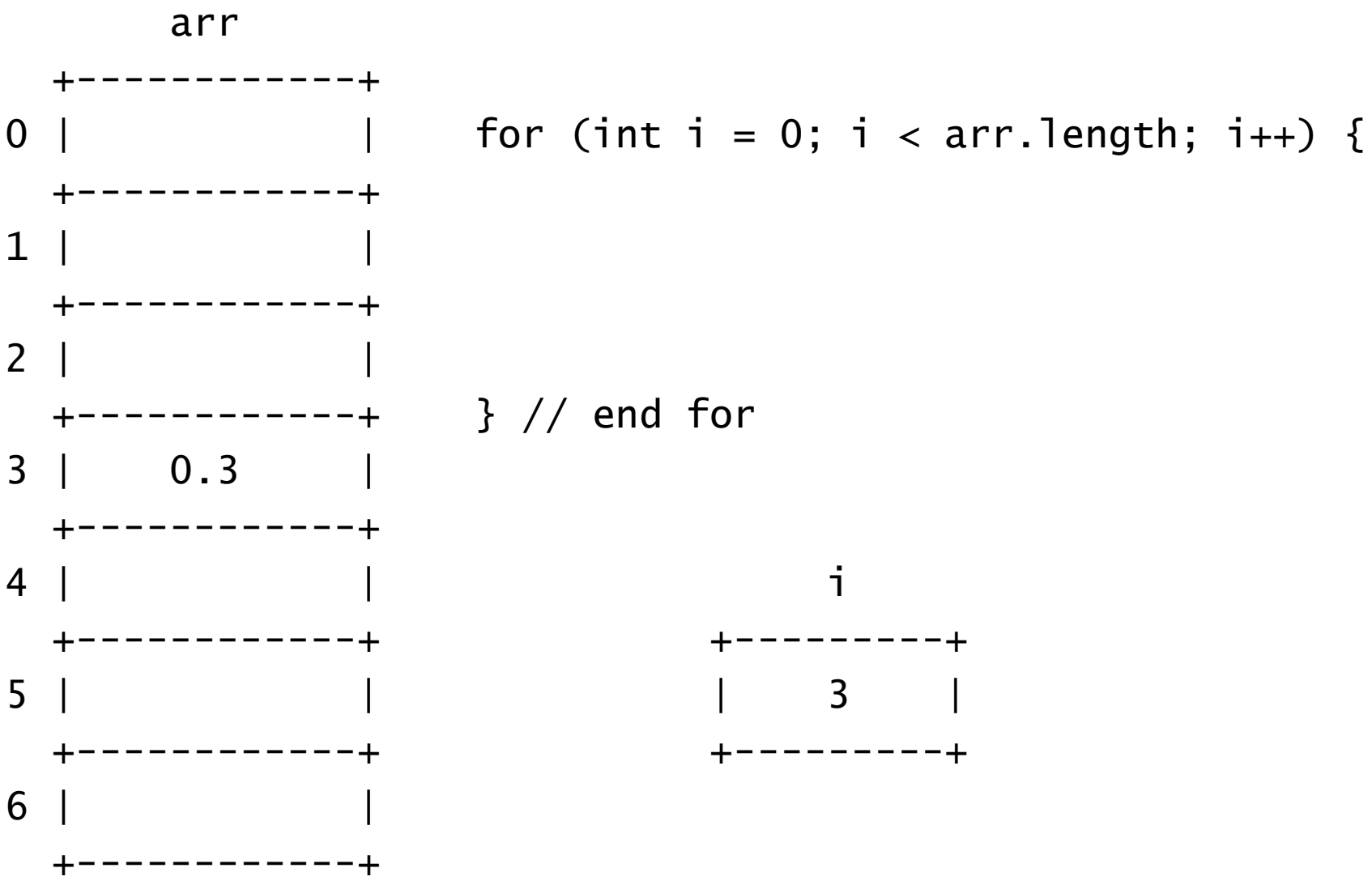
Find sum or min or max of array:



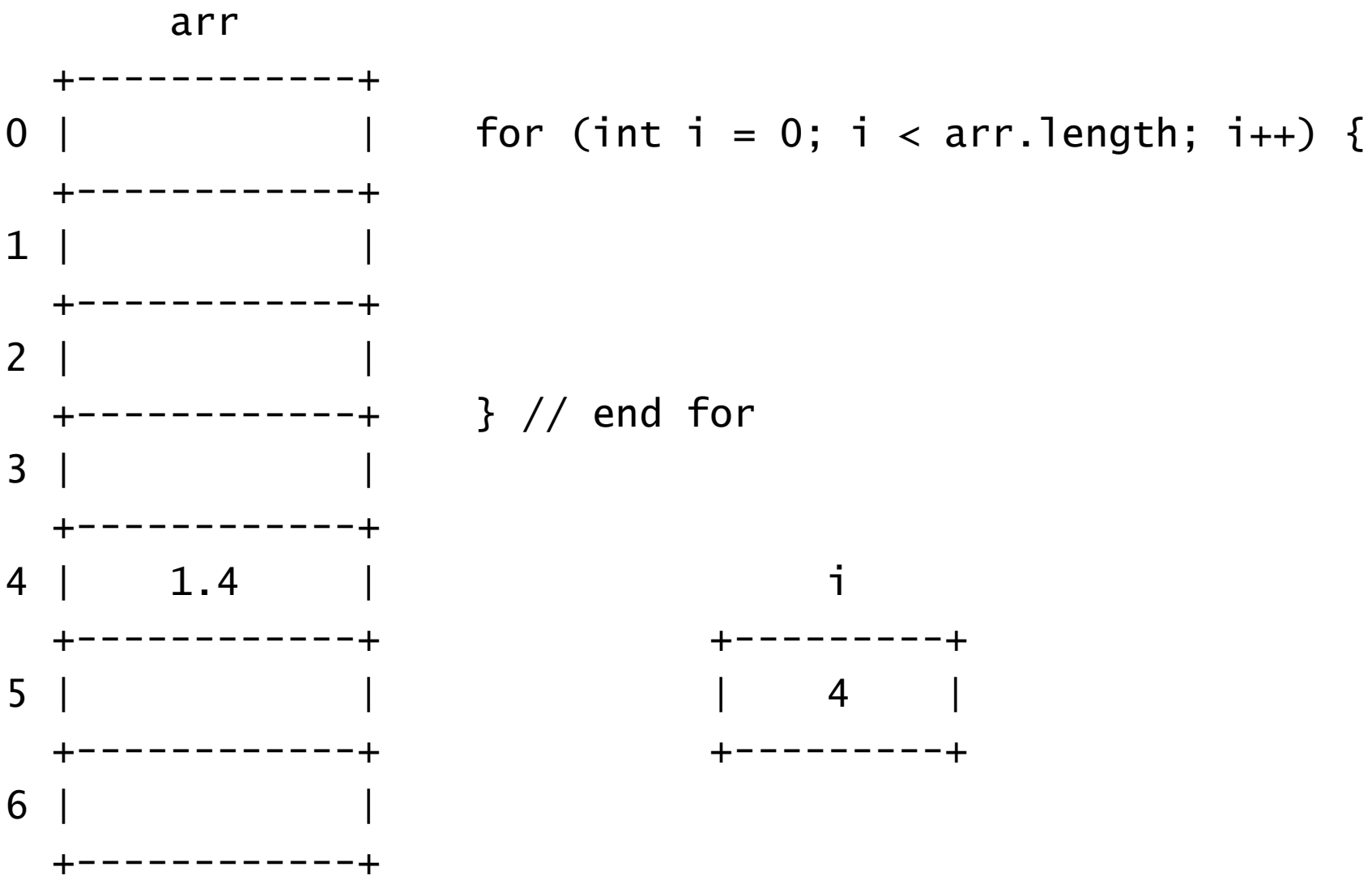
Find sum or min or max of array:



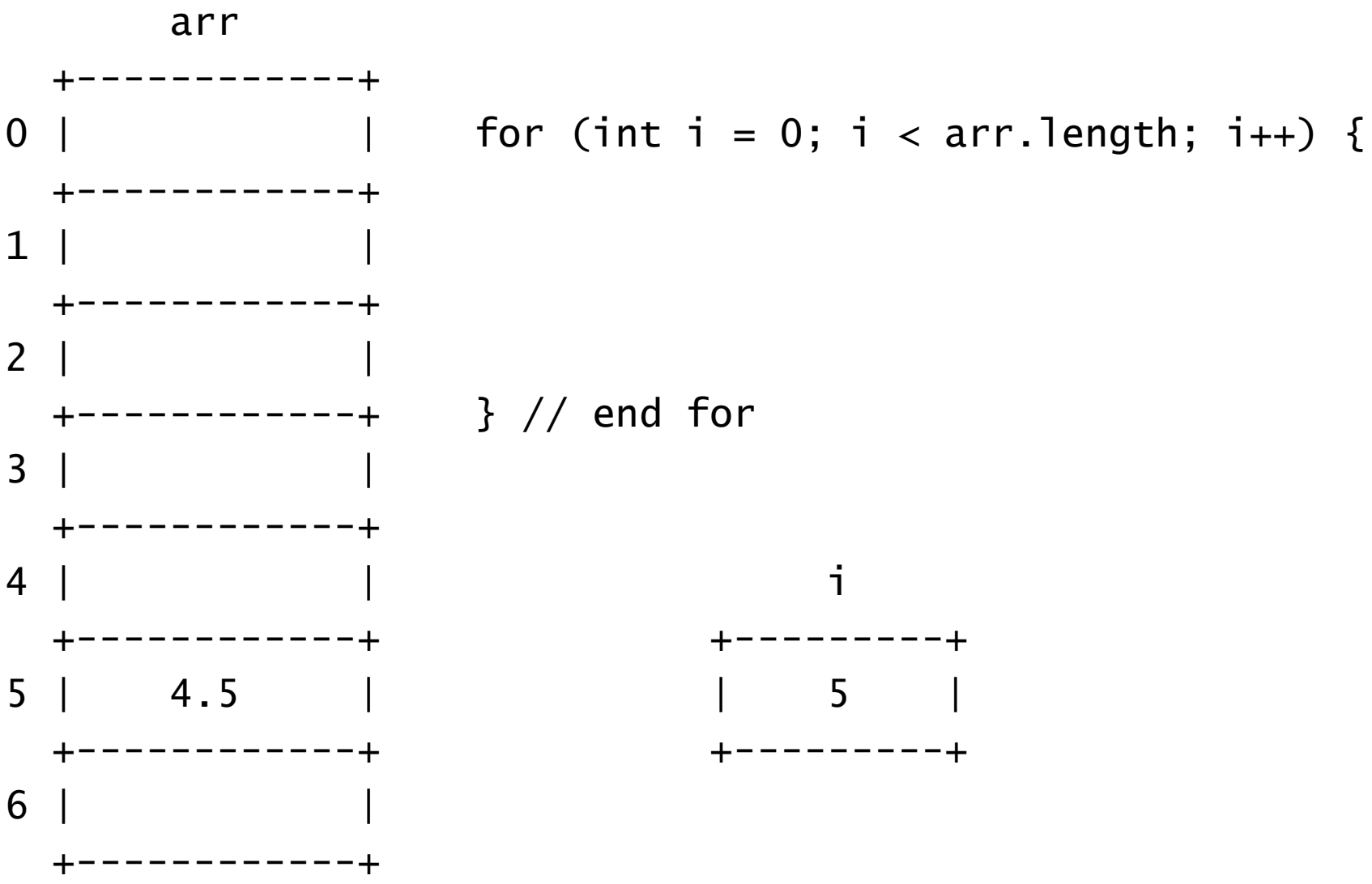
Find sum or min or max of array:



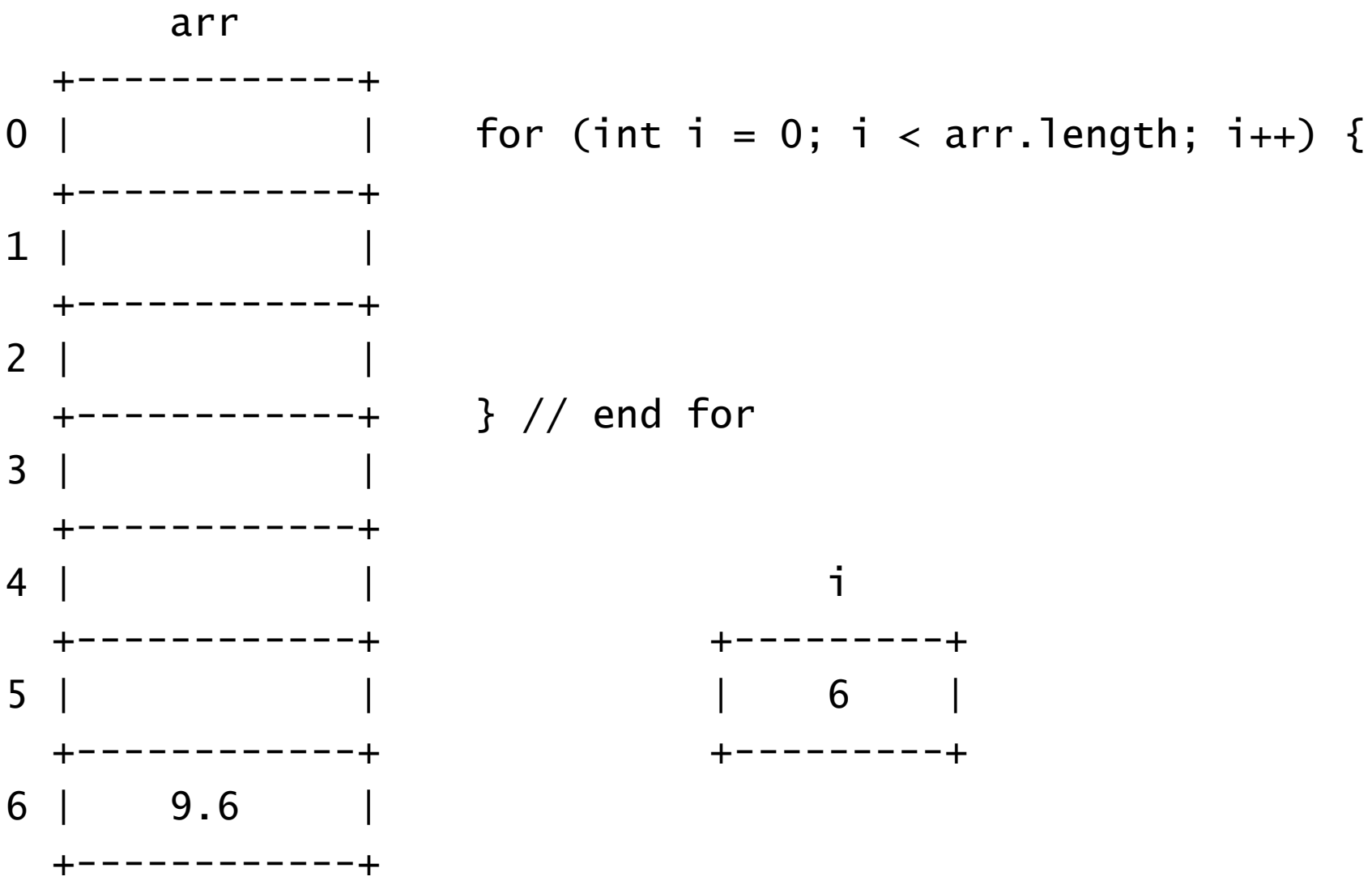
Find sum or min or max of array:



Find sum or min or max of array:

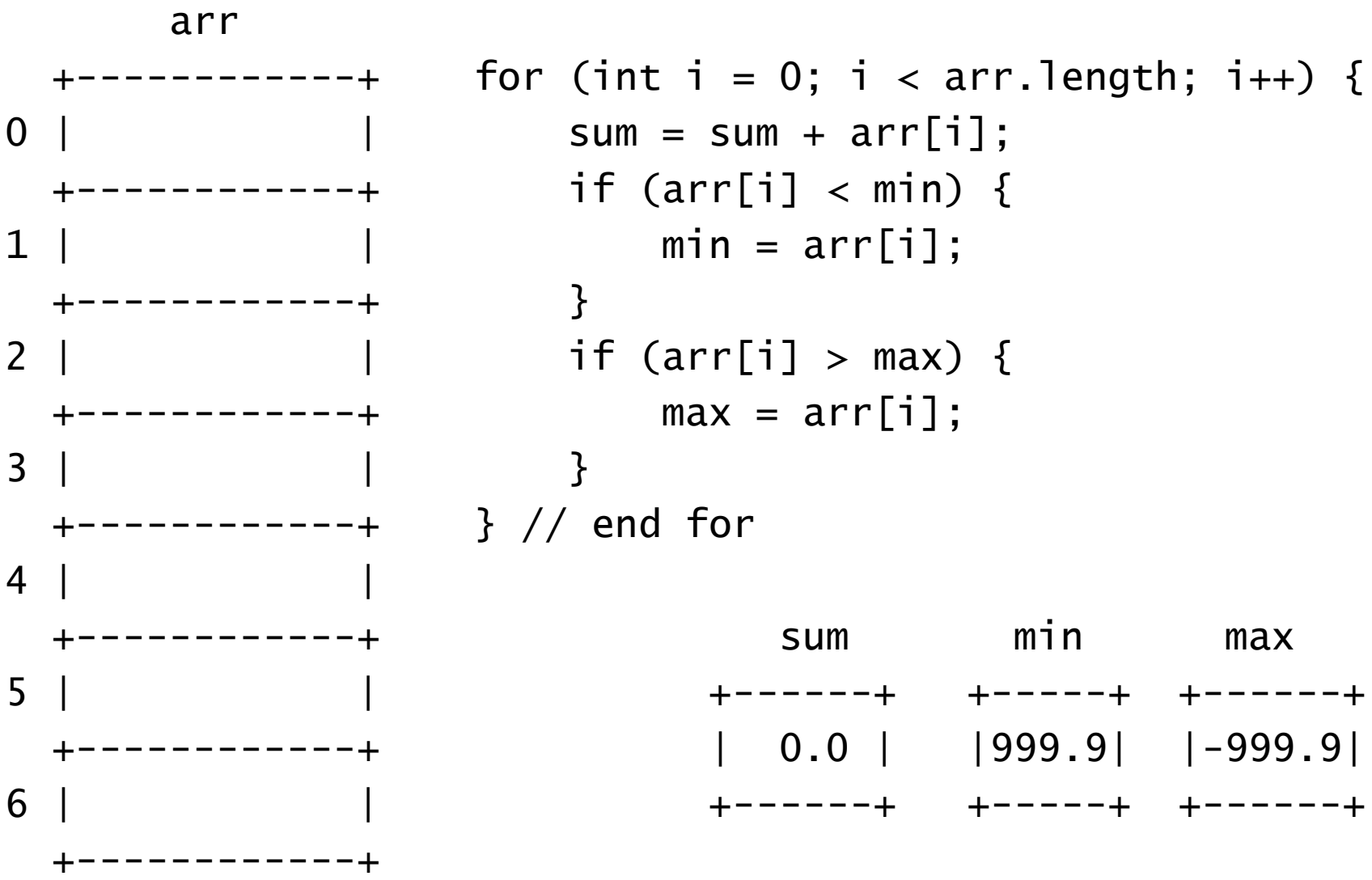


Find sum or min or max of array:



Find sum or min or max of array:

(before start of loop)



Find sum or min or max of array:

```
      arr
  +------------+
0 |    9.0     |
  +------------+
1 |            |
  +------------+
2 |            |
  +------------+
3 |            |
  +------------+
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
```

i	sum	min	max
0	9.0	9.0	9.0

Find sum or min or max of array:

```
      arr
  +------------+
0 |            |
  +------------+
1 |    4.1     |
  +------------+
2 |            |
  +------------+
3 |            |
  +------------+
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
```

i	sum	min	max
1	13.1	4.1	9.0

Find sum or min or max of array:

```
      arr
  +------------+
0 |            |
  +------------+
1 |            |
  +------------+
2 |    1.2     |
  +------------+
3 |            |
  +------------+
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
```

i	sum	min	max
2	14.3	1.2	9.0

Find sum or min or max of array:

```
      arr
  +------------+
0 |            |
  +------------+
1 |            |
  +------------+
2 |            |
  +------------+
3 |    0.3     |
  +------------+
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
```

i	sum	min	max
3	14.6	0.3	9.0

Find sum or min or max of array:

```
      arr
  +------------+
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
```

i	sum	min	max
4	16.0	0.3	9.0

Find sum or min or max of array:

```
      arr
  +------------+
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
```

i	sum	min	max
5	22.5	0.3	9.0

Find sum or min or max of array:

```
      arr
  +------------+
0 |            |
  +------------+
1 |            |
  +------------+
2 |            |
  +------------+
3 |            |
  +------------+
4 |            |
  +------------+
5 |            |
  +------------+
6 |    9.6     |
  +------------+
```

```
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
```

i	sum	min	max
6	30.1	0.3	9.6

Processing Arrays

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