# 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 = ?????;

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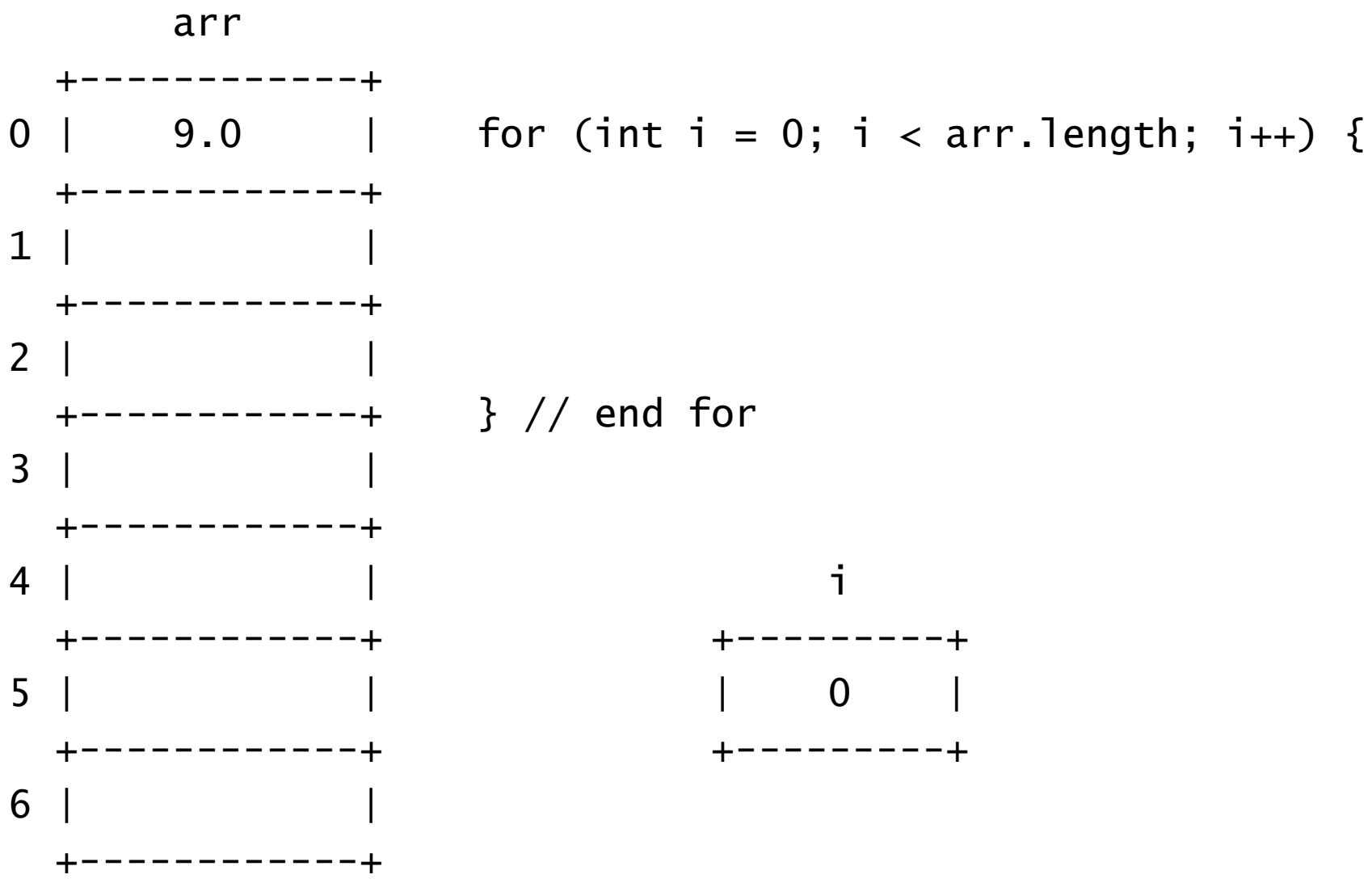
Before the loop begins, what should be the initial value of the variable you are using to keep track of the statistic?

Double sum = 0.0;

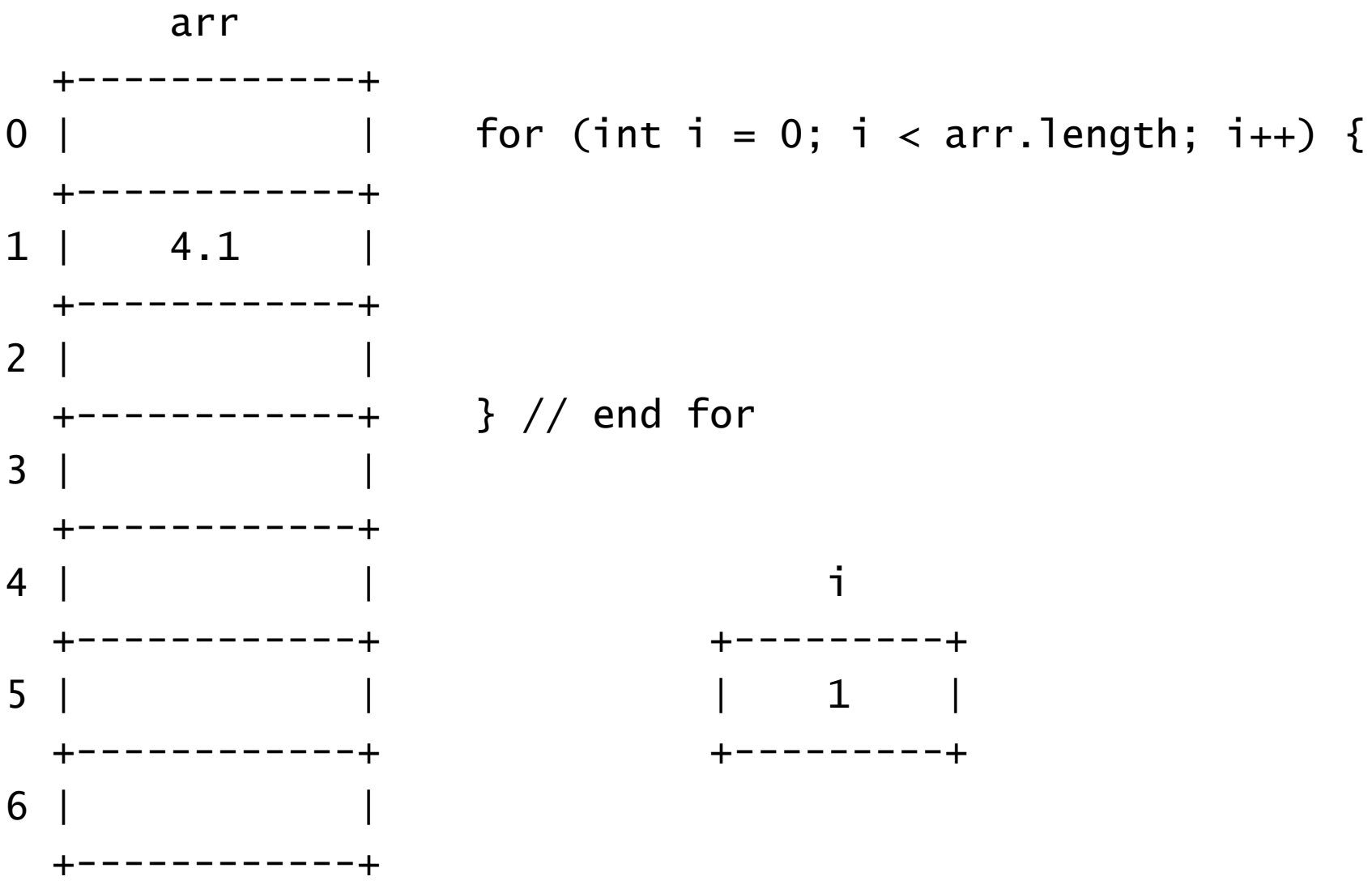
Double min = Double.MAX_VALUE;

Double max = Double.MIN_VALUE;

# Find sum or min or max of array:



# Find sum or min or max of array:



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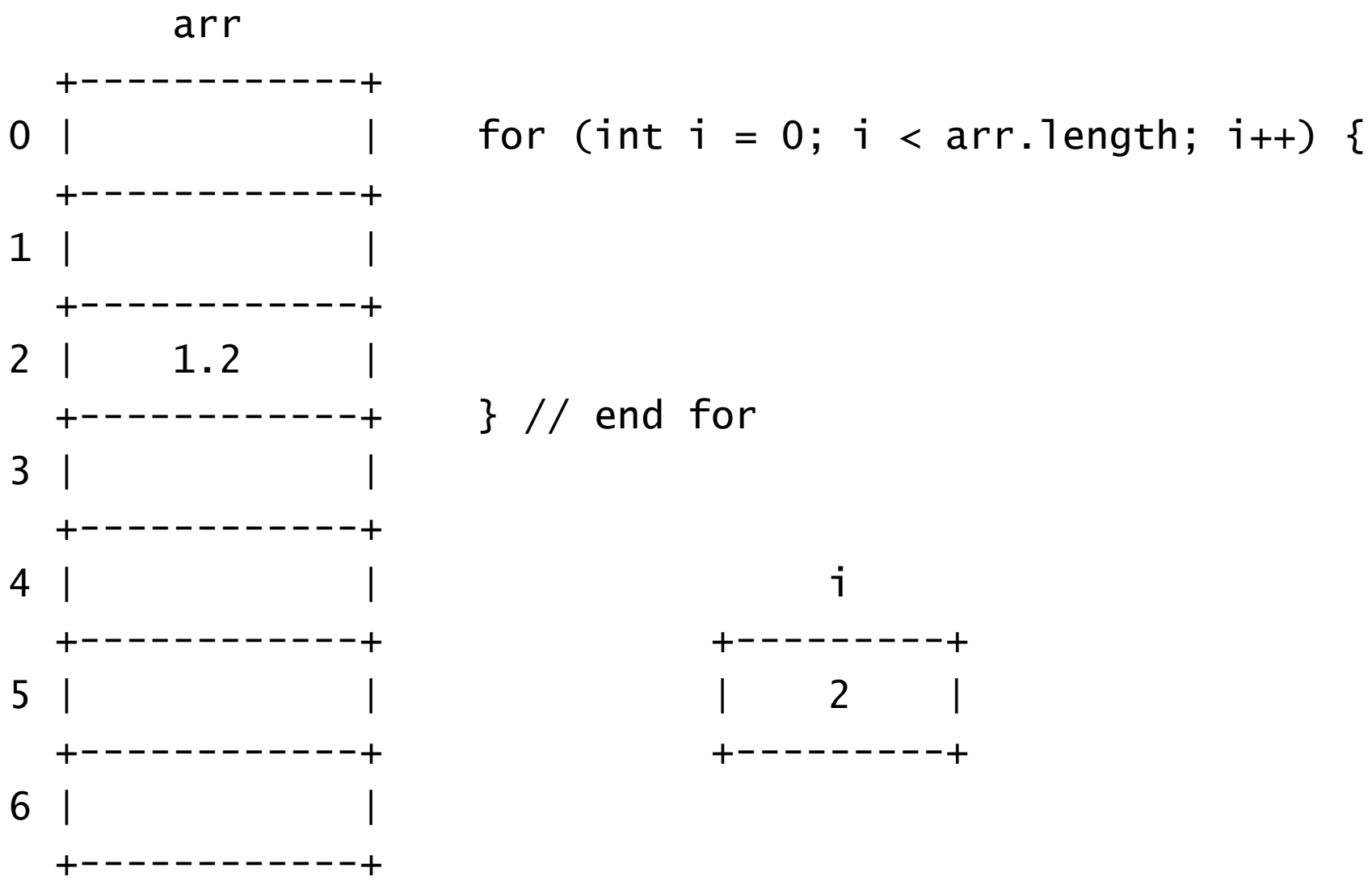

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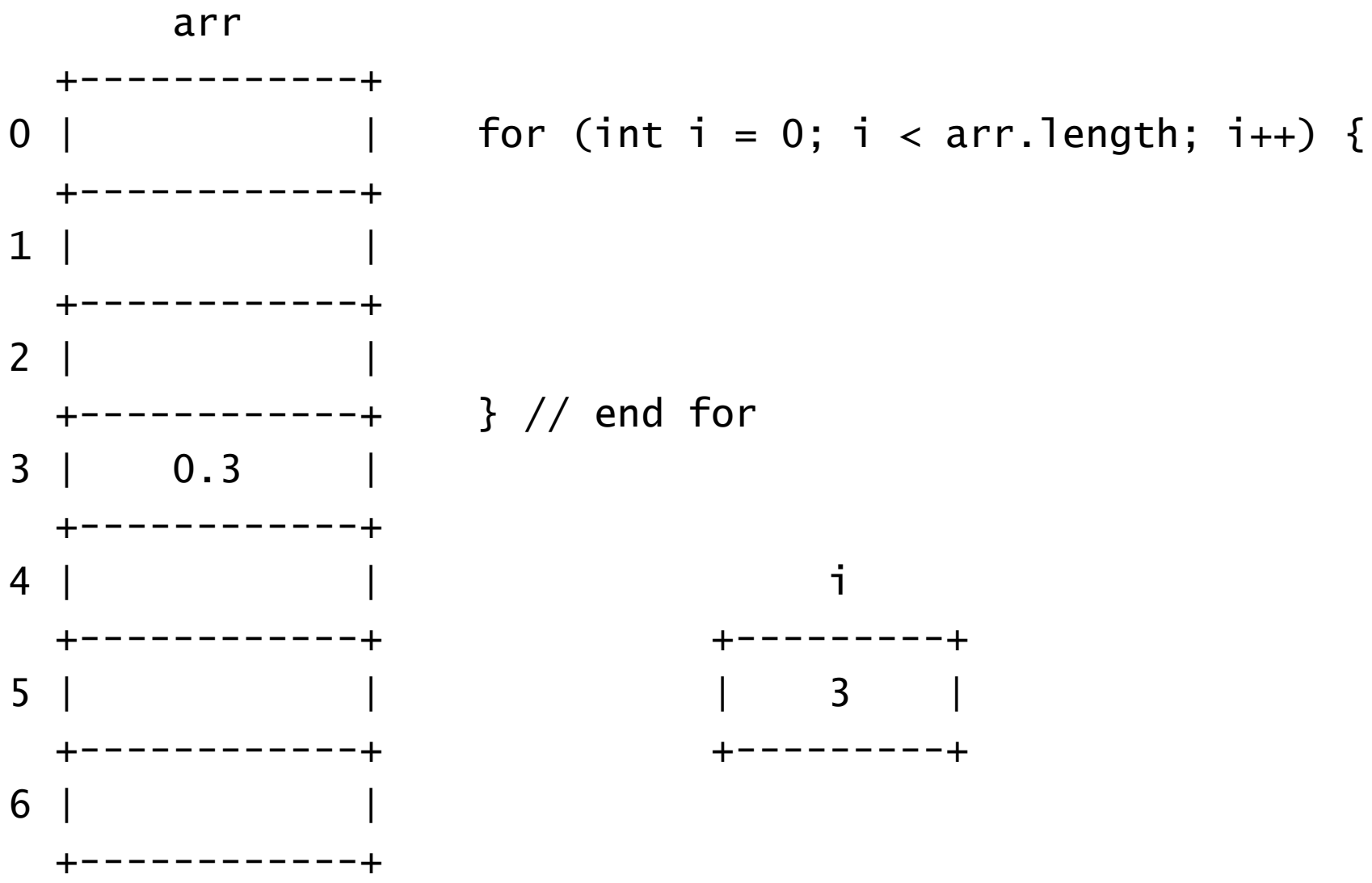
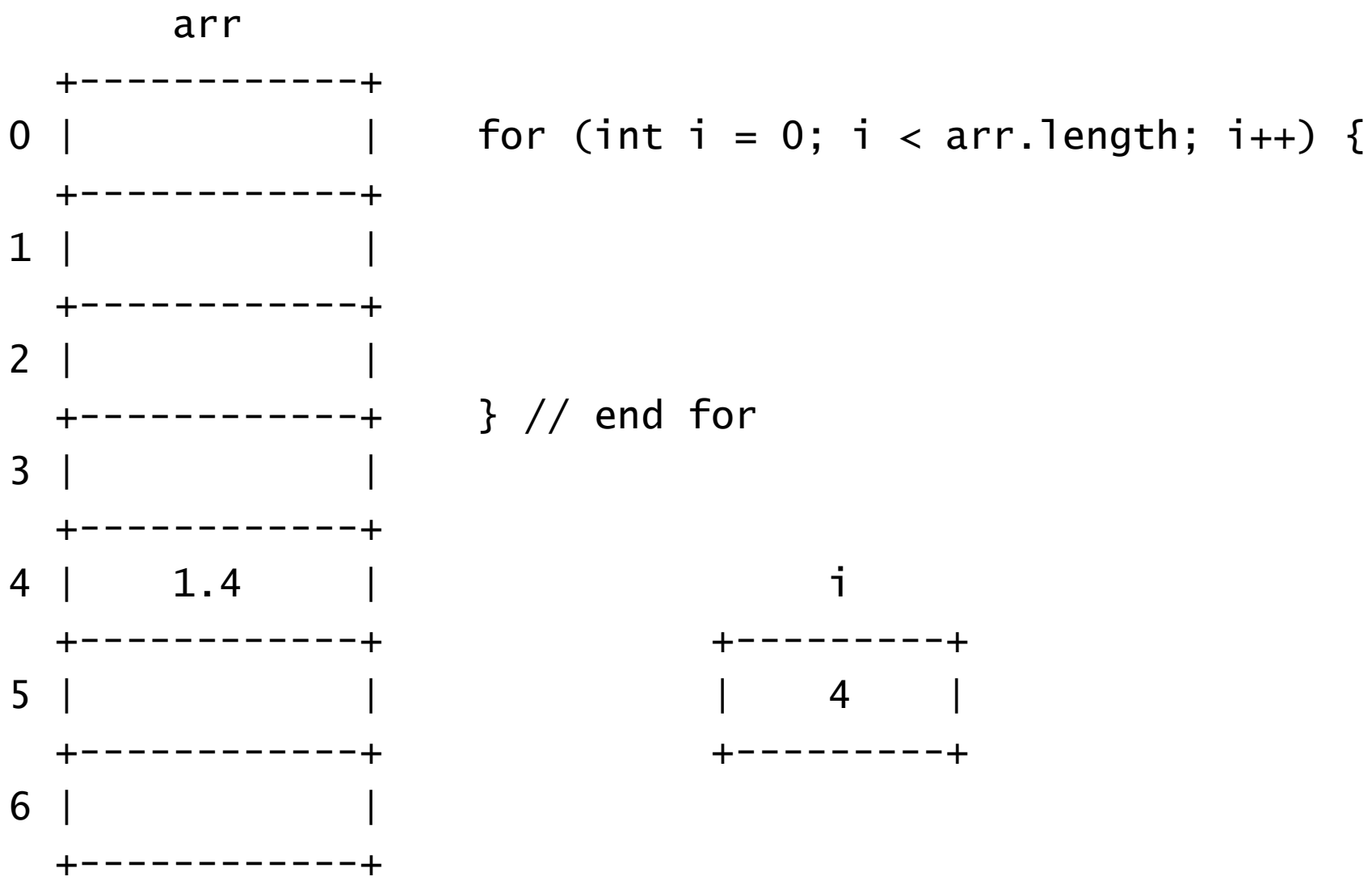
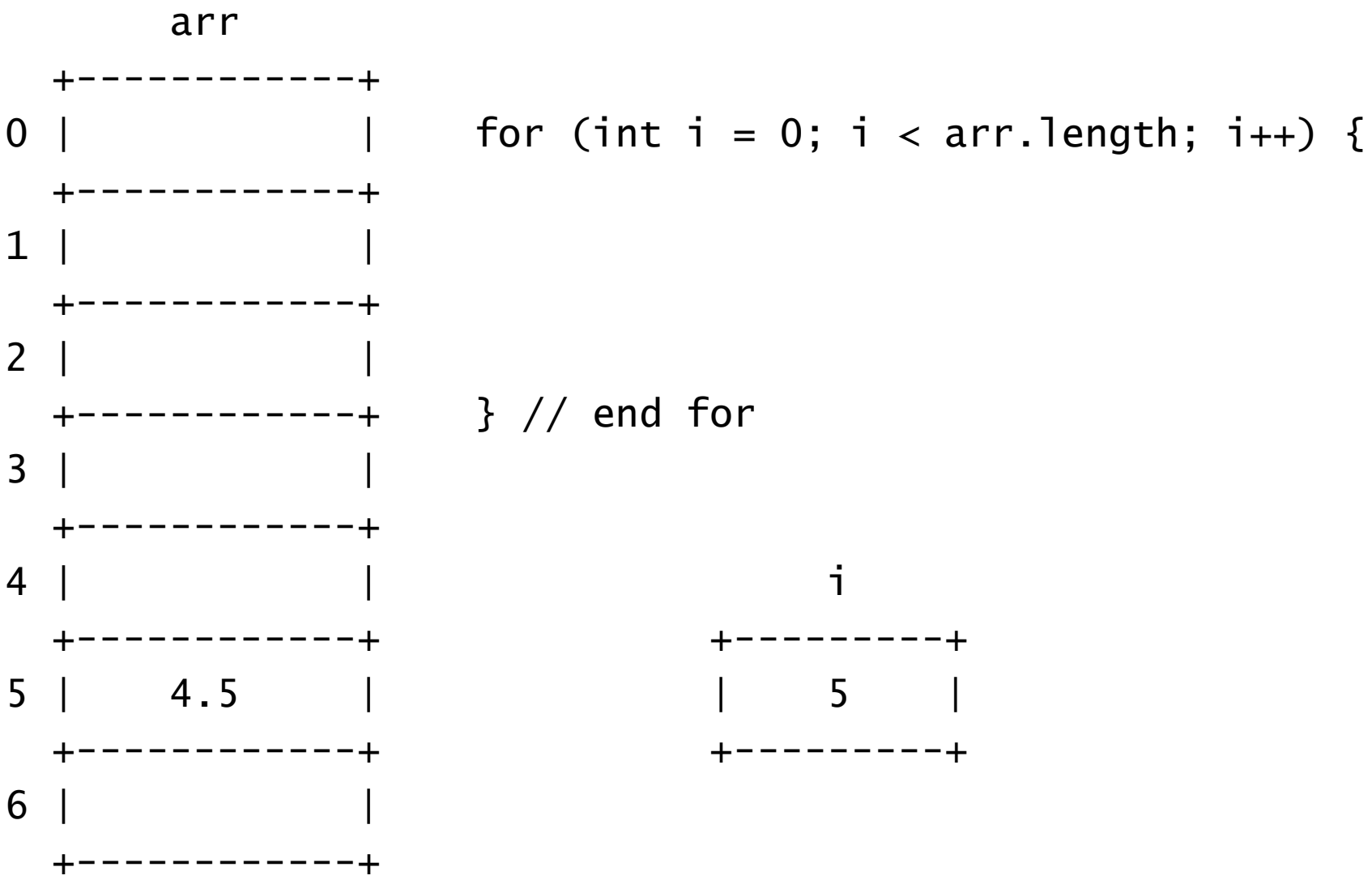


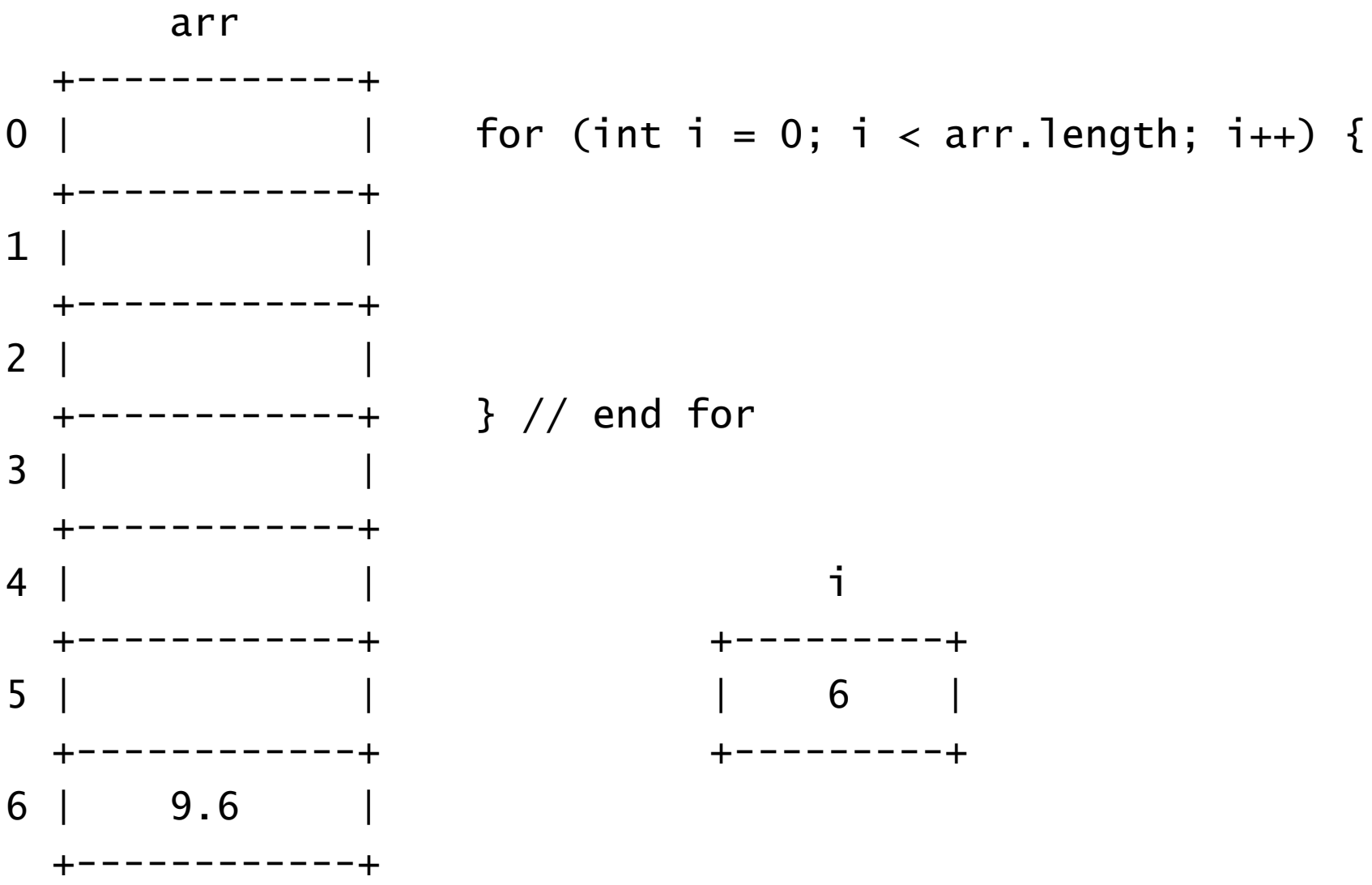
# Find sum or min or max of array:



# Find sum or min or max of array:



# Find sum or min or max of array:



# Find sum or min or max of array:

```
     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 |

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