

4 Arrays – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English

Write it 3 times (English)

array

Recall

A single variable holds one value, but real problems have many:

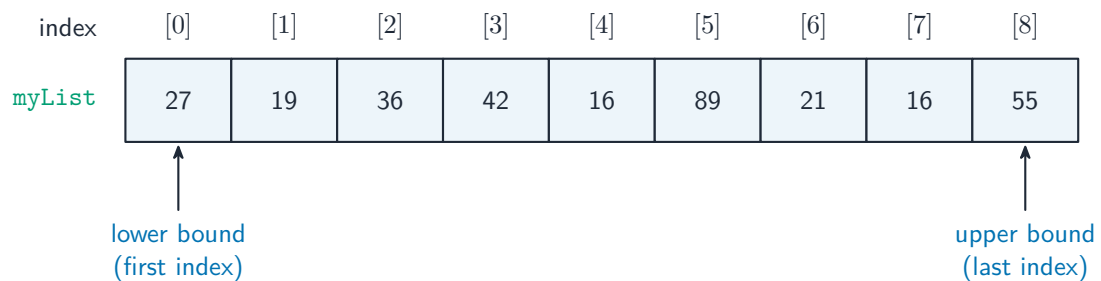
- A class has many students' scores, not just one.
- You cannot make a separate variable for every value.

This sheet lines up how to store many values in an array. Each idea has a worked example.

New ideas

■ 1 What an array is

An **array** is a fixed-size, ordered list of values of the same type. Its positions are numbered from 0 to **length** - 1:



```
int[] vals = {3, 1, 4, 1, 5};
```

■ 2 Reading and writing

Use the index in square brackets:

```
int first = vals[0];    // 3
vals[1] = 9;           // change index 1 to 9
int n = vals.length;   // 5
```

■ 3 Looping through

Visit every element with a for loop:

```
for (int i = 0; i < vals.length; i++) {
    System.out.println(vals[i]);
}
```

■ 4 Common tasks

Summing or finding the largest is a loop with a running result.

Worked example. To sum {3, 1, 4}: start at 0, add each element $\rightarrow 0+3+1+4 = 8$.

Watch out: the valid indices run from 0 to `length - 1`. For an array of length 5, `vals[5]` is **out of bounds** – the last valid index is 4.

Practice

Try these in order. The methods are all above. Use `int[] a = {7, 2, 9, 4};`.

2.1 State the value of `a[0]` and `a[2]`. [2]

2.2 State the value of `a.length`. [1]

2.3 State the largest valid index of `a`. [1]

2.4 Find the sum of all the elements of `a`.

[2]

2.5 State what is wrong with writing `a[4]`.

[2]