

Arrays

Example

- Write a program to keep track of all students' scores on exam 1.
- Need a *list* of everyone's score
- Declare 14 double variables?

- What about next semester?

Arrays

- Declare a list of variables – all with the *same* type
- Size is determined at time of declaration

```
double[] scores = new double[14];
```

Example

scores:

90.5	73	87
------	----	----

Example

scores:

--	--	--

```
//declare the array  
double[] scores = new double[3];  
//put 90.5 in the first box
```

Example

scores:

90.5		
------	--	--

```
//declare the array  
double[] scores = new double[3];  
//put 90.5 in the first box  
scores[0] = 90.5;
```

Example

scores:

90.5	73	87
------	----	----

```
//declare the array
double[] scores = new double[3];
//put 90.5 in the first box
scores[0] = 90.5;
scores[1] = 73;
scores[2] = 87;
```

Alternative

```
double[] scores = {90.5, 73, 87};
```

- Initializes elements of the array to values given when array is created

Subscripts

- Subscript describes which box of the array you are dealing with
- Array of size N has subscripts
 - 0, 1, 2, ... (n-1)
 - array of size 3 – 0, 1, 2
 - subscript added to base address of array
- Subscript can be a variable or expression which produces an integer
 - scores[i];
 - scores[i+5];
- If subscript specified does not exist – runtime error (ArrayIndexOutOfBoundsException)

Example

scores:

90.5	73	87
------	----	----

```
//access 1 - 73:
sum = scores[1] + scores[2];
sum = scores[1] + scores[1+6];
scores[2] = scores[1] + 6;
```

Accessing Array Elements

- Print all elements of the array *scores*
 - Use only one `System.out.println` statement

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 - Use only one `System.out.println` statement

```
double[] scores = {90.5, 73, 87};
for(int i = 0; i < 3; i++) {
    System.out.println("Score " + (i+1) + ": " + scores[i]);
}
```

foreach

```
double[] scores = {80.5, 73, 82};
for(double d : scores) {
    System.out.println("Score " + d);
}
```

Passing Array Elements

- Write a method to add two elements of an array

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- Write a method to add two elements of an array
 - How is the method called?

```
double add(double num1, double num2) {
    return (num1 + num2);
}
```

Passing Array Elements

- Write a method to add two elements of an array
 - How is the method called?

```
add(scores[0], scores[1]);
-
double add(double num1, double num2) {
    return (num1 + num2);
}
```

Passing Arrays

- Would like to pass an entire array into a method
 - Sum all elements, prompt user for values

Example

```
sum(scores);

static double sum(double[] scores) {
    double sum = 0;
    for(double d: scores) {
        sum+=d;
    }
    return sum;
}
```