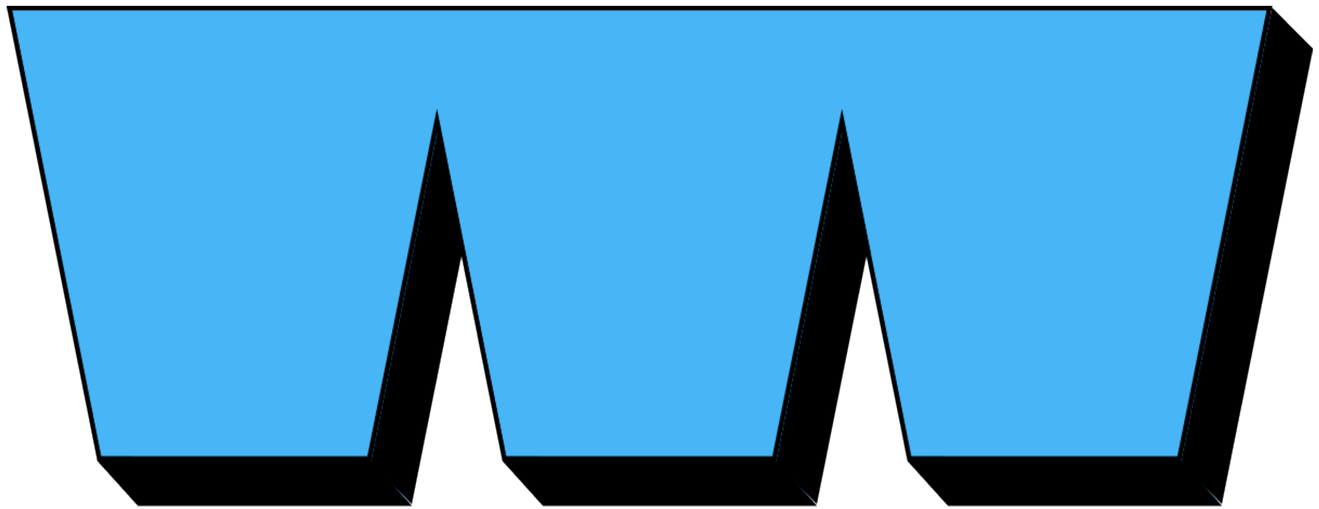
Essential Computing 1

Arrays



A fixed number of elements of same type

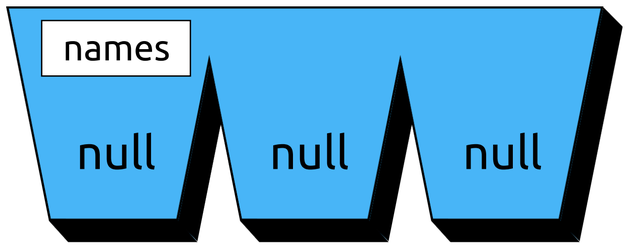
```
// This is getting tedious.
String name1 = "Ib";
String name2 = "Gry";
String name3 = "Bo";
```

Declaring an array variable

```
String[] names;
```

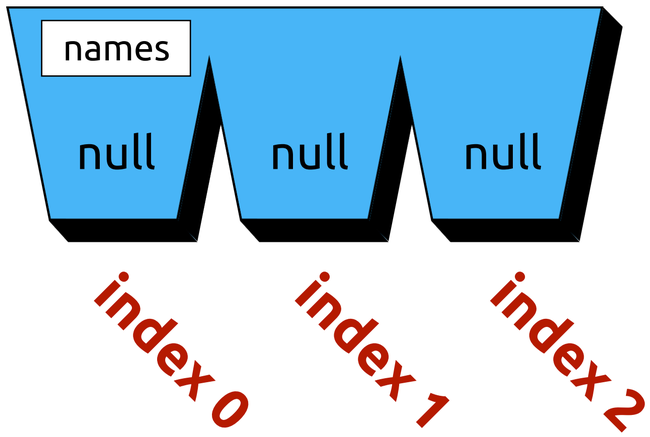
Creating a new array and assigning it to the variable

```
String[] names;
names = new String[3];
```



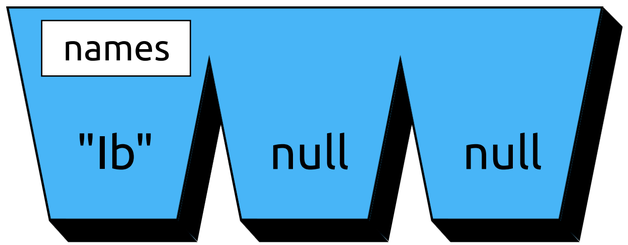
Index lookup values starts at zero

```
String[] names;
names = new String[3];
```



Writing data to array at index position 0

```
String[] names;
names = new String[3];
names[0] = "Ib";
```



Writing data to array at index position 1 and 2

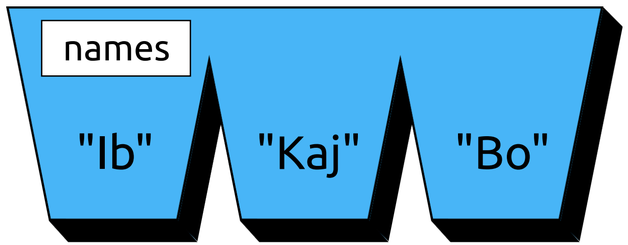
```
String[] names;
names = new String[3];
names[0] = "Ib";
names[1] = "Gry";
names[2] = "Bo";
```

Declaring, creating, writing and assigning in one line.

```
String[] names = { "Ib", "Gry", "Bo" };
```

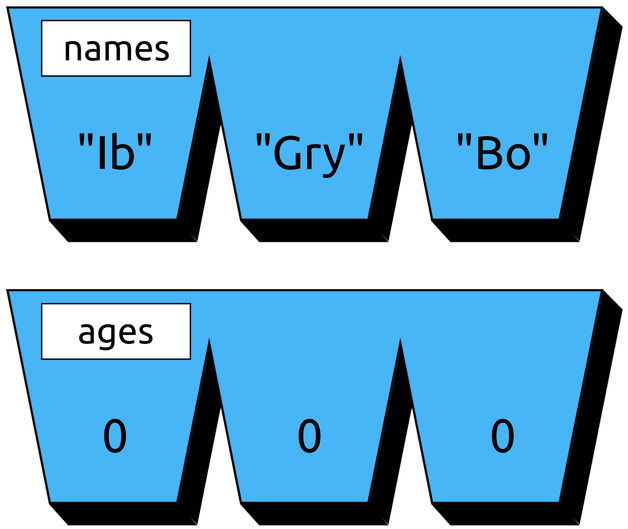
Overwriting

```
String[] names = { "Ib", "Gry", "Bo" };
names[1] = "Kaj";
```



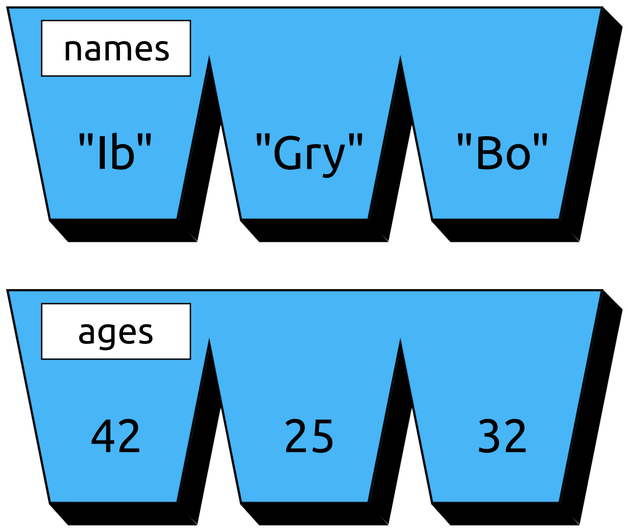
Multiple arrays of same length

```
String[] names = { "Ib", "Gry", "Bo" };
int[] ages = new int[3];
```



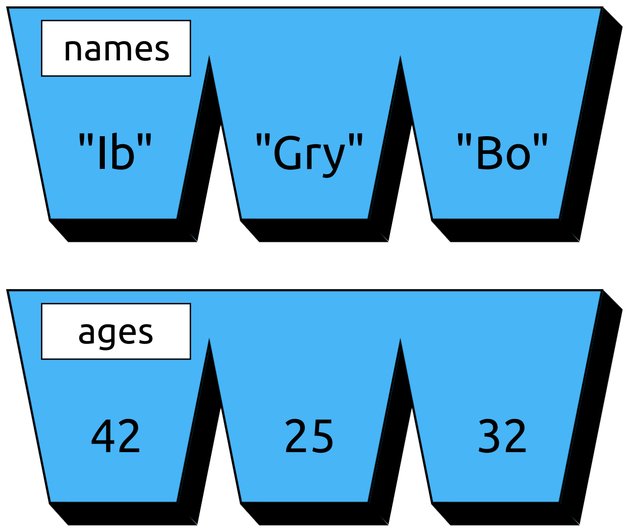
Multiple arrays of same length

```
String[] names = { "Ib", "Gry", "Bo" };
int[] ages = new int[3];
ages[0] = 42;
ages[1] = 25;
ages[2] = 32;
```



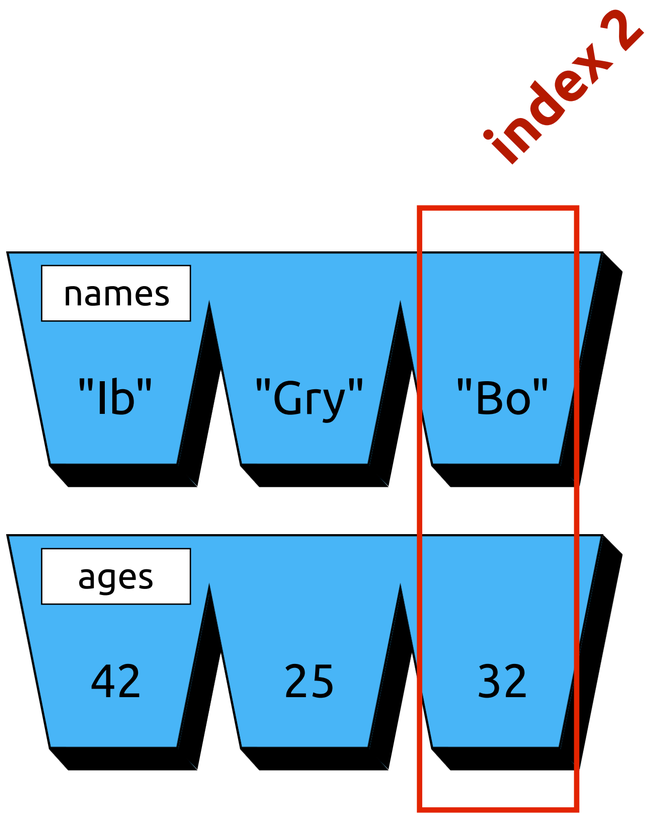
Multiple arrays of same length

```
String[] names = { "Ib", "Gry", "Bo" };
int[] ages = { 42, 25, 32 };
```



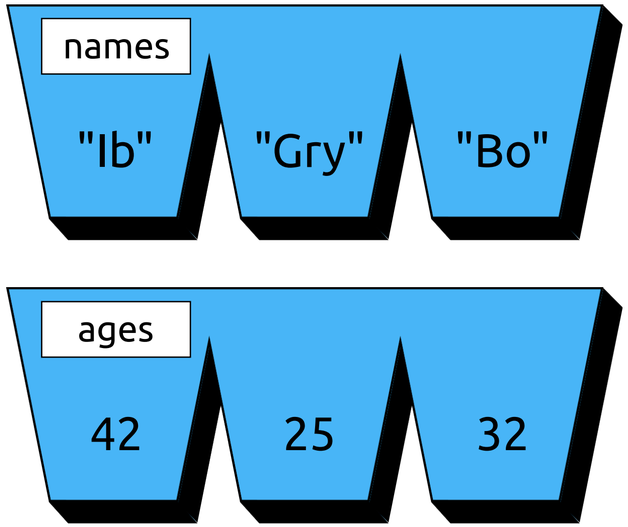
Reading from arrays at index position 2

```
String[] names = { "Ib", "Gry", "Bo" };
int[] ages = { 42, 25, 32 };

String name3 = names[2];
int age3 = ages[2];
```



Reading from arrays at index position

```
String[] names = { "Ib", "Gry", "Bo" };
int[] ages = { 42, 25, 32 };

String name3 = names[2];
int age3 = ages[2];
System.out.print( name3 + ", " + age3 );
```

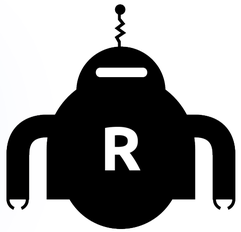


Console

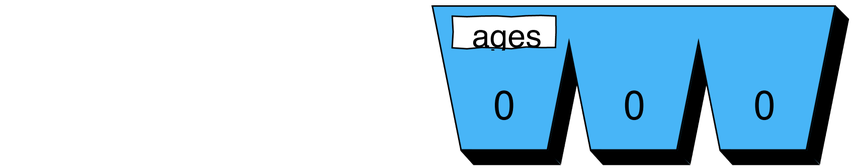
```
Bo, 32
```

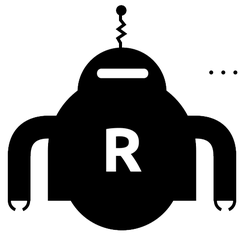
Example

```
int[] ages = new int[3];
ages[0] = 10;
ages[1] = 20;
ages[2] = ages[0] + ages[1];
```



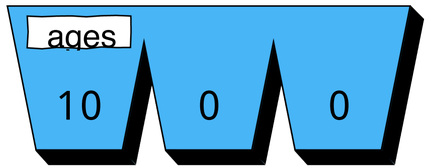

```
int[] ages = new int[3];
ages[0] = 10;
ages[1] = 20;
ages[2] = ages[0] + ages[1];
```

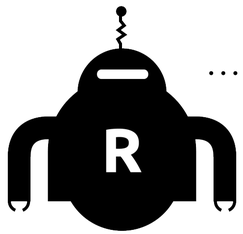





```
int[] ages = new int[3];
ages[0] = 10;
ages[1] = 20;
ages[2] = ages[0] + ages[1];
```

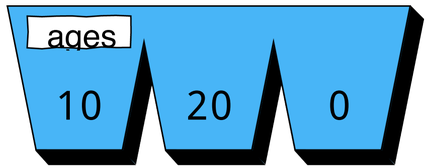
declaring, creating and assigning array of type int.



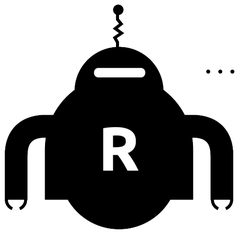



```
int[] ages = new int[3];
ages[0] = 10;
ages[1] = 20;
ages[2] = ages[0] + ages[1];
```

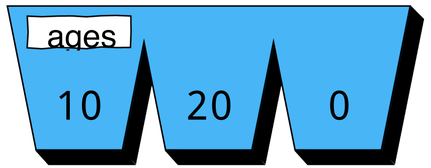
writing to array at index position 0.



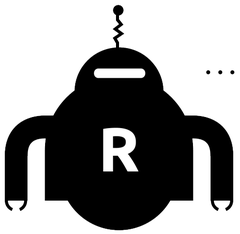

```
int[] ages = new int[3];
ages[0] = 10;
ages[1] = 20;
ages[2] = ages[0] + ages[1];
```



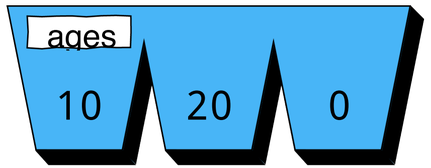
writing to array at
index position 1.



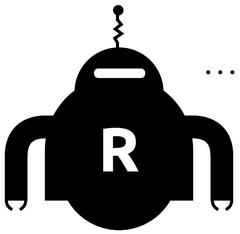

```
int[] ages = new int[3];
ages[0] = 10;
ages[1] = 20;
ages[2] = ages[0] + ages[1];
```



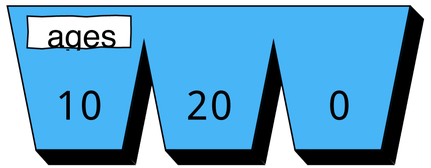
reading from array at index position 0 and 1



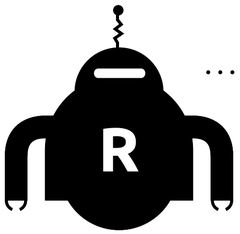

```
int[] ages = new int[3];
ages[0] = 10;
ages[1] = 20;
ages[2] = 10 + 20;
```



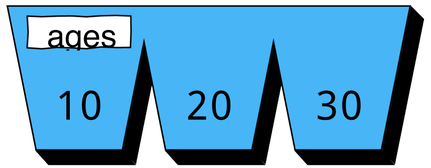
adding



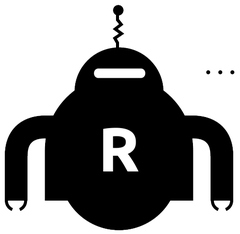

```
int[] ages = new int[3];
ages[0] = 10;
ages[1] = 20;
ages[2] = 30;
```



writing to array
at index position 2




```
int[] ages = new int[3];
ages[0] = 10;
ages[1] = 20;
ages[2] = 30;
```



```
int[] ages = new int[3];
ages[0] = 10;
ages[1] = 20;
ages[2] = ages[0] + ages[1];
```

Traversing an array

```
String[] names = { "Ib", "Gry", "Bo" };
for( int i=0; i<3; i++ ){
    System.out.print( names[i] + " ," );
}
```

Running the code

```
String[] names = { "Ib", "Gry", "Bo" };
for( int i=0; i<3; i++ ){
    System.out.print( names[i] + " ," );
}
```

```
Ib, Gry, Bo
```

ArrayIndexOutOfBoundsException. Ouch!

```
String[] names = { "Ib", "Gry", "Bo" };
for( int i=0; i<4; i++ ){
    System.out.print( names[i] + " ," );
}
```

Exception in thread "main" java.lang.ArrayIndexOutOfBoundsException: Index 3 out of bounds for length 3

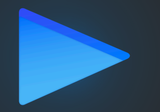
Getting the **length of an array** to avoid out of bounds access

```
String[] names = { "Ib", "Gry", "Bo" };
for( int i=0; i<names.length; i++ ){
    System.out.print( names[i] + " ," );
}
```

The **enhanced for loop** for traversing arrays

```
String[] names = { "Ib", "Gry", "Bo" };
for( String name : names ){
    System.out.print( name + " ," );
}
```

Running the code



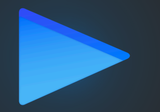
```
String[] names = { "Ib", "Gry", "Bo" };
for( String name : names ){
    System.out.print( name + " ," );
}
```

```
Ib, Gry, Bo
```

Importing java.util.Arrays to use the **Arrays.*toString*** method

```
String[] names = { "Ib", "Gry", "Bo" };
System.out.println( Arrays.toString( names ) );
```

Running the code



```
String[] names = { "Ib", "Gry", "Bo" };
System.out.println( Arrays.toString( names ) );
```

```
[Ib, Gry, Bo]
```