COMP90041

Programming and Software Development

Semester 2, 2021

Lab 6

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Motivation for arrays

Goal: store the grades of 50 students

- *How do we loop through these 50 grades?*

- How do we pass these 50 grades to a method?

Solution: use an array

```
int s1_grade;
int s2_grade;
int s3_grade;
int s4_grade;
        .
        .
        .
int s50_grade;
```

Creating an array

Form: $baseType[]\ varName = \{value,...\};$

```
public static final int[] DAYS_IN_MONTH
    = {31,28,31,30,31,30,31,31,30,31,30,31};
```

Form: $new\ type[size]$

```
double[] data = new double[10];
```

int[] a = {1,2,3}   ✓

int[] b
b = {1,2,3}   ✗

int[] c
c = **new int**[3]   ✓
c[0] = 1
c[1] = 2
c[2] = 3

int[] d
d = **new int**[]{1,2,3}   ✓

Iterating arrays

```java
String[] cars = {"Volvo", "BMW", "Ford"};
```

If you need the index of an element:

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

*Otherwise, the **Foreach** method is handy:*

```java
for (String car : cars) {
        System.out.println(car);
}
```

Change an array element

```
String[] pl = {"java", "python", "go", "javascript"};
```

```
pl[2] = "c++";
```

POP QUIZ

What does this print?

```
int[] a = {1,1,2}
int sum=0;
for (int i=1; i<=a.length; ++i) sum += a[i];
System.out.println(sum);
```

Ⓐ 1

Ⓑ 2

Ⓒ 3

Ⓓ 4

Ⓔ There's a runtime error

String operations

s.substring()

- `s.substring(i, j)` returns the substring of `s` from character `i` through `j`-1, counting the first char as 0
- E.g., `"smiles".substring(1,5)`, returns `"mile"`

s.indexOf()

- `s.indexOf(s2)` returns the first position of `s2` in `s`

s.equals()

- `s.equals(s2)` returns true if a `s` and `s2` are identical

== VS equals

== can correctly test two values of a primitive type

However, when applied to two objects, such as objects of the String class, **==** tests to see if they are **stored in the same memory location**, not whether or not they have the same value

```java
String s1 = new String("abc");
String s2 = new String("abc");
System.out.println(s1 == s2); // false
```

Copying an array

```java
int[] arr = {1,2,3};
int[] cloneArr = arr.clone();

System.out.println(arr == cloneArr); // false
System.out.println(Arrays.equals(arr, cloneArr)); // true
```

Selection Sort