

CSE 121 Lesson 15:

Arrays & Reference Semantics

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Today's playlist:
[CSE 121 24wi lecture beats :D](#)

Reminders & Announcements

- C3 released Wednesday, due Tuesday Feb 27th
- R5 released yesterday, due Thursday Feb 29th
 - note: last chance for P1!
- Quiz 2 next Thursday, Feb 29th
 - topics: everything up until Arrays on Wednesday (i.e. not today's material)
 - next week: many practice quizzes :)
- In the future: Final Exam (Tuesday March 12th at 12:30 – 2:20pm)
 - more logistical details coming soon!

Poll in with your answer!



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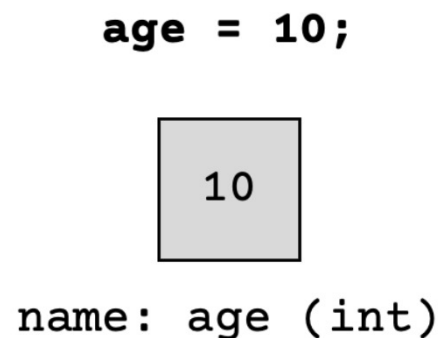
What would the array `a` store at the end of this `arrayMystery` method if `{-20, 20, 26, 32, 50, 3}` was passed in?

```
public static void arrayMystery(int[] a) {  
    for (int i = a.length - 1; i >= 1; i--) {  
        if (a[i] > a[i - 1] + 10) {  
            a[i - 1] = a[i - 1] + 5;  
        }  
    }  
}
```

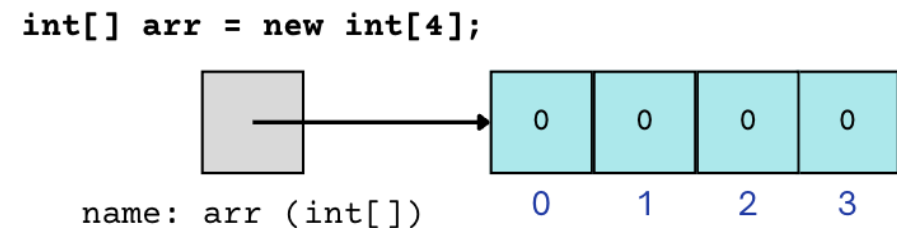
- A. `{-20, 20, 26, 32, 50, 3}`
- B. `{-15, 25, 31, 37, 55, 8}`
- C. `{-15, 25, 31, 37, 50, 3}`
- D. `{-15, 20, 26, 37, 50, 3}`

(PCM) Value Semantics vs. Reference Semantics

- Applies when working with primitive types
- Variables/parameters hold a *copy* of the actual value



- Applies when working with objects
- Variables/parameters hold a *reference* to the object

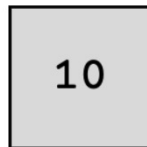


(PCM) Value Semantics vs. Reference Semantics

```
int a = 3;  
int b = a;  
a = 99;
```

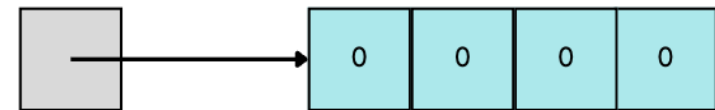
```
int[] list1 = {4, 8, 15, 16, 23};  
int[] list2 = list1;  
list1[1] = 99;
```

age = 10;



name: age (int)

int[] arr = new int[4];



name: arr (int[])

Poll in with your answer!

Without knowing what someMethod does, what are the possible values of num?



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```
int num = 42;  
someMethod(num);  
System.out.println(num);
```

- A. anything!
- B. just 42

Poll in with your answer!

Without knowing what anotherMethod does, what are the possible values of nums[0]?



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```
int[] nums = {42, 43, 44};  
anotherMethod(nums);  
System.out.println(nums[0]);
```

- A. anything!
- B. just 42

(PCM) Value Semantics vs. Reference Semantics

```
boolean test = true;
flipValue(test);
public static void flipValue(boolean b) {
    b = !b;
}
```

```
boolean[] tests =
    {true, true, false, true, false, false};
flipValues(tests);
public static void flipValues(boolean[] b) {
    for (int i = 0; i < b.length; i++) {
        b[i] = !b[i];
    }
}
```


(PCM) null

The *absence* of a reference!

Sort of like a "zero-equivalent" for references!

Default value for object types

`NullPointerException` occur when you try to ask a reference "do something", but there isn't a reference there...it's null!

"do something" such as get an element from an array, or call a method on an object)

Poll in with your answer!



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```
public static void main(String[] args) {  
    int x = 0;  
    int[] a = new int[4];  
  
    x++;  
    mystery(x, a);  
    System.out.println(x + " " + Arrays.toString(a));  
  
    x++;  
    mystery(x, a);  
    System.out.println(x + " " + Arrays.toString(a));  
}
```

```
public static void mystery(int x, int[] a) {  
    x++;  
    a[x]++;  
    System.out.println(x + " " + Arrays.toString(a));  
}
```

Four lines of output would be produced by this code. What would those four lines be?