

CSE 121 – Lesson 14

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Autumn 2023

Music: [121 23au Lecture Tunes](#) 



[sli.do #cse121](https://sli.do/#cse121)

TAs:	Trey	Christina	Sahej	Vinay	Kriti
	Sebastian	Colton	Anju	Maria	Minh
	Annie	Janvi	Jonus	Shreya	Vivian
	Jasmine	Arkita	Lydia	Andy	Nicole
	Christian	Vidhi	Luke	Nicolas	Simon
	Lucas	Ritesh	Andras	Shayna	Jessie
	Logan	Hibbah	Archit	Hannah	Lydia
	Jacob	Julia	Ayesha	Aishah	Yijia

Announcements, Reminders

- C3 deadline **extended** to Tuesday, Nov 28!
- Gumball (& friends) Visit on Monday, December 11 1:00pm-3:00pm
- Next week:
 - Tuesday: section cancelled
 - Wednesday: lecture optional (Lead TA Nic will be teaching!)
 - Thursday, Friday: University holidays (campus is closed)
 - IPL: reduced staffing Mon, Tues, Wed (maybe partial day); closed Thurs-Sun
- Final Exam: **Wednesday, Dec 13 12:30pm-2:20pm**

Poll in with your answer!



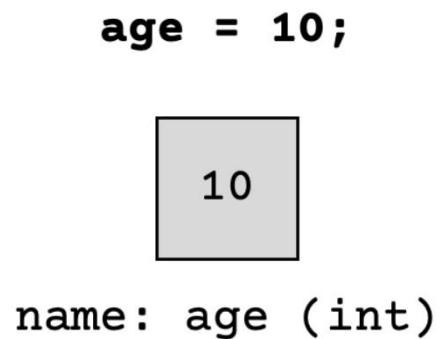
What would the array a store at the end of this arrayMystery method if $\{-20, 20, 26, 32, 50, 3\}$ was passed in?

```
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;  
        }  
    }  
}
```

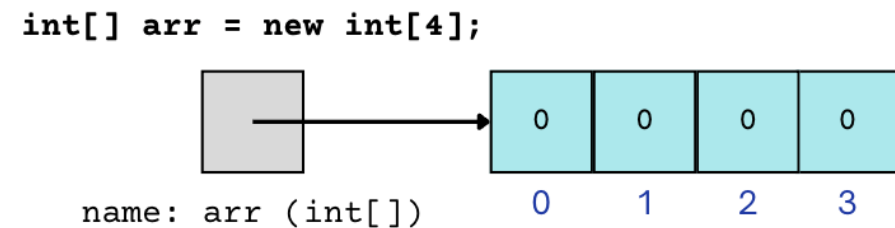
- A. $\{-20, 20, 26, 32, 50, 3\}$
- B. $\{-15, 25, 31, 37, 55, 8\}$
- C. $\{-15, 25, 31, 37, 50, 3\}$
- D. $\{-15, 20, 26, 37, 50, 3\}$

(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

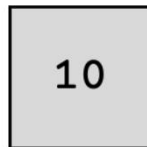


(PCM) Value Semantics vs. Reference Semantics

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

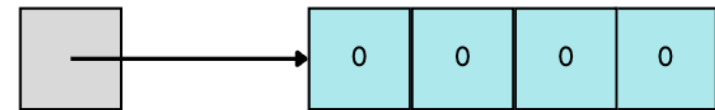
```
int[] list1 = {4, 8, 15, 16, 23};  
int[] list2 = list1;  
list1[1] = 99;
```

age = 10;



name: age (int)

int[] arr = new int[4];



name: arr (int[])

(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!



```
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?

Poll in with your answer!



```
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));
}
```