LEC 16

CSE 121
Array Patterns

Questions during Class?

Raise hand or send here

sli.do #cse121

BEFORE WE START

Talk to your neighbors:

What is your favorite coffee shop around here?

Music: 121 25wi lecture playlist ❄

Instructor: Matt Wang

TAs:

Ailsa	Alice	Chloë	Christopher
Ethan	Hanna	Hannah	Hibbah
Janvi	Judy	Julia	Kelsey
Lucas	Luke	Maitreyi	Merav
Ruslana	Samrutha	Sam	Shayna
Sushma	Vivian		

Announcements, Reminders

- Quiz 2 in section **tomorrow (Thursday, March 6th)**!
  - Practice Quizzes and walkthrough videos are great resources for studying!
- P3 will be released tonight & due next **Tuesday, March 11th at 11:59pm**
- R5 due tomorrow (eligible: **P1**, C2, P2)
- New: **all** assignments will be eligible for resubmission on R7!
- Details about the final exam will be discussed on Friday

(PCM) Why Discuss Array Patterns?

- Arrays are important! This is our fourth lecture covering arrays
- Analogy: tools in toolbox
- Helpful for your future in programming

(PCM) Counting Elements that Meet a Condition

"one"	"two"	"three"	"six"	"seven"	"eight"	"ten"

```
public static int evenLength(String[] list) {
    int countEven = 0;
    for (int i = 0; i < list.length; i++) {
        if ( list[i].length() % 2 == 0 ) {
            countEven++;
        }
    }

    return countEven;
}
```

(PCM) Modifying Elements of an Array

4	8	15	16	23	42

```
public static void clamp(int min, int max, int[] list) {
    for (int i = 0; i < list.length; i++) {
        if (list[i] > max) {
            list[i] = max;
        } else if (list[i] < min) {
            list[i] = min;
        }
    }
}
```

(PCM) Searching for an Element

“one"	"two"	"three"	"six"	"seven"	"eight"	"ten"

```
public static int indexOfIgnoreCase(String phrase, String[] list) {
    for (int i = 0; i < list.length; i++) {
        if ( list[i].equalsIgnoreCase(phrase) ) {
            return i;
        }
    }

    return -1;
}
```

(PCM) Array of Counters

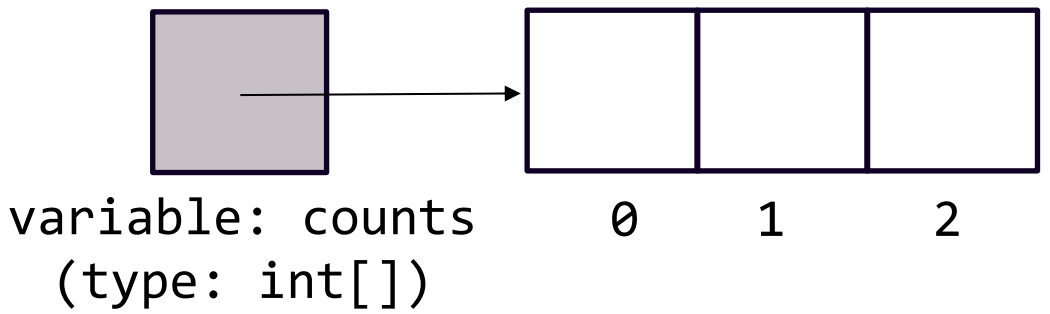
0	1	2	2	0	2

```
public static int[] numCount(Scanner input, int numPrompts) {
    int[] counts = new int[3];
    for (int i = 0; i < numPrompts; i++) {
        int num = input.nextInt();

        counts[num]++;

    }

    return counts;
}
```



(PCM) Analyzing Multiple Elements in an Array

0	1	9	1	0

```
public static boolean isPalindrome(int[] list) {
    for (int i = 0; i < list.length / 2; i++) {
        if (list[i] != list[list.length - 1 - i]) {
            return false;
        }
    }

    return true;
}
```

(PCM) Shifting Elements

9.6	-88.0	4.815	0.009	7.0184	42.9

```
public static void rotateRight(double[] list) {
    double lastElement = list[list.length - 1];

    for (int i = list.length - 1; i > 0; i--) {
        list[i] = list[i - 1];
    }

    list[0] = lastElement;

}
```

(PCM) Your Turn!

- On Ed, try the [TODO] rotateLeft: Shifting Elements problem
  - If you finish early, feel free to fill in the patterns we already discussed

(PCM) Questions to Ask Ourselves

- "Are we looking at each element in the array, one at a time?"
  - Loop traversal
- "Are we changing elements in the array?"
  - Update the array at a specific index
- "Do we only want to do a task if a certain condition is true?"
  - Conditional(s)

(PCM) Your Questions on Arrays!

- "Do all array problems follow the similar base pattern as the one's provided"
- "How do you resize an array when you need to add elements"
- "Can arrays of arrays have arrays?"