

LEC 15

CSE 121

Array Patterns

BEFORE WE START

*Talk to your neighbors:**How was your long weekend?*

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Questions during Class?

Raise hand or send here

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Announcements, Reminders

- Quiz 2 grades released before final exam
- P3 will be released tonight & due **Friday, August 21st**
- R5 due **Thursday, August 20th** (eligible: P1, C2, P2, C3)
 - P1 cycling out of eligibility after R5
- R6 and R-extra released today:
 - Due **Saturday, August 22nd** – you can do this after the final!
 - Only submit R-extra if you have ≥ 9 section credit (on Gradescope)
- Final Exam on **Friday, August 21st from 12:00 – 1:00 PM** (in this room!)

The “Core” of the Final Exam

- In-person
- Same general logistics as quizzes:
 - on paper
 - we will provide you with one **reference sheet**, and
 - you may bring **one double-sided 8.5 x 11-inch page of notes**
- Will have 6 problems, all similar in style to the quizzes
- These will be *much* shorter
- Focus is on behavior (not code style); minor syntax errors allowed (when unambiguous)

CSE 121 “Exam Review Systems”

- Entire last week is focused on final exam review and prep
 - Lecture 16: some strategies & live practice
 - Section 15 and 16: *even more* practice
- **IPL will close Thursday EOD**
- Several asynchronous resources, including:
 - multiple previous actual finals
 - many existing programming problems

Some Miscellaneous Exam Thoughts

- Be very careful about how you use the previous actual finals
 - Great study resource (and matched difficulty), but...
 - Hard to “unsee” solutions after looking & too easy to “overfit”
 - Use for targeted study, mimic the actual test-taking environment
- **Make your own cheatsheet**, don't use someone else's!
 - Making the cheatsheet *is* studying
- It is your responsibility to know the policies & procedures
 - Let's take a quick spin of the website page right now :)

(PCM) Why Discuss Array Patterns?

- Arrays are important! This is our fourth lecture covering arrays
- Analogy: tools in toolbox
- Helpful for your future 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 (  
            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 (            > max) {  
            = max;  
        } else if (            < min) {  
            = 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 (  
            return i;  
        }  
    }  
  
    return -1;  
}
```

(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];  
    }  
  
    ;  
  
}
```

(PCM) Analyzing Multiple Elements in an Array (isPalindrome)

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 ;  
        }  
    }  
  
    return ;  
}
```

(PCM) Analyzing Multiple Elements in an Array (isMirrored)

4.1	5.5	4.1
6.0	-1.1	6.0

```
public static boolean isMirrored(double[][] arr) {  
    for (int i = 0; i < arr.length; i++) {  
        int rowLength =  
        ;  
        for (int j = 0; j <  
        ; j++) {  
            if (arr[i][j] != arr[i][rowLength - 1 - j]) {  
                return  
                ;  
            }  
        }  
    }  
    return  
    ;  
}
```

(PCM) Array of Counters



0 1 2 2 0 2

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

(PCM) Your Turn!



- Review the problems in the Array Patterns PCM
 - On Slido, vote for any problems you would like to go over together!
- If you have time, try some new problems!
 - [NEW] rotateLeft: Shifting Elements problem
 - [NEW] isAllPairs: Analyzing Multiple Elements problem
 - [NEW] transpose: 2D Analyzing Multiple Elements/Shifting Elements problem

(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)

rotateLeft

0.1	0.2	0.3	0.4	0.5
-----	-----	-----	-----	-----

isAllPairs

3	3	4	4	5	5	6	6	7	7
---	---	---	---	---	---	---	---	---	---

-1	-1	0	0	4	8	8	9	10	10
----	----	---	---	---	---	---	---	----	----

transpose

1	2	3
4	5	6
7	8	9

readData: 2, Bothell

How many days' data would you like to input? 3

Next day's data:

Temperature in Seattle? 44

Temperature in Tacoma? 40

Temperature in Bothell? 43

Next day's data:

Temperature in Seattle? 42

Temperature in Tacoma? 40

Temperature in Bothell? 44

Next day's data:

Temperature in Seattle? 42

Temperature in Tacoma? 41

Temperature in Bothell? 43

...

	Seattle	Tacoma	Bothell
1	44	40	43
2	42	40	44
3	42	41	43