LEC 01

CSE 122

Java Review & Functional Decomposition

Questions during Class?

Raise hand or send here

sli.do #cse122

BEFORE WE START

Talk to your neighbors:

What's your favorite guilty pleasure food?

Music: 122 26sp Lecture Jams

Instructor: Elba Garza

TAs:

David	Caleb	Cole	Yang
William	Neha	Blake R.	Cady
Dani	Wesley	Carson	Diya
Rohan	Isis	Sushma	
Andrew	Colin	Connor	
Ava	Naomi	Mahima	
Shreyank	Hanna	Nicolae	
Nicole	Blake P.	Ivory	

Lecture Outline

- Announcements/Reminders
- Review Java
- Code Quality
- Functional Decomposition
- First Assignment
  - Grading

Announcements

- Hope you had fun in your first quiz section yesterday!
- Creative Project 0 (C0) releasing later today; due Thursday, April 9th
  - Focused on Java Review + Functional Decomposition
- Java Review Session on Monday, April 6th
  - 2:30 – 3:30pm in JHN 102
  - Will be recorded!
- IPL will also open on Monday, April 6th!
- Elba Office Hours posted
  - Tuesdays 3pm – 4pm CSE 438
  - Thursdays 3:30pm – 4:30pm CSE 438
  - Viewable on the Staff page of the course website

Reminders

- Fill out the Introductory Survey
- ★ Complete the pre-class material (PCM) for next Wednesday (see calendar)
  - Will be posted after class today
- Attend quiz section on Tuesday!

Section Credit

- Students receive "section credit" for a quiz section by attending and engaging in the quiz section's class and activities.
- Section credit is logged and tracked by TAs on behalf of students.
- Students will be able track and verify their participation credits on Gradescope.
- Section 0 will be a freebie!

Section Credit

- Students can earn **one extra resubmission** at the end of the quarter by participating in 11+ sections throughout 26Sp!
- Missing a quiz section will not count against you, but attending section can help you earn that extra resubmission to use at the end of the quarter.

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Reminders: Review Java Syntax

Java Tutorial reviews all the relevant programming features you should familiar with (even if you don't know them in Java).

- Printing and comments
- Variables, types, expressions
- Conditionals (if/else if/ else)
- Loops (for and while)
- Strings
- Methods
- Arrays
- 2D arrays

Practice : Think

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In-Class Activities

- **Goal**: Get you actively participating in your learning
- Typical Activity
  - Question is posed
  - **Think** (1 min): Think about the question on your own
  - **Pair** (2 min): Talk with your neighbor to discuss question
    - If you arrive at different conclusions, discuss your logic and figure out why you differ!
    - If you arrived at the same conclusion, discuss why the other answers might be wrong!
  - **Share** (1 min): We discuss the conclusions as a class
- During each of the **Think** and **Pair** stages, you will respond to the question via a sli.do poll
  - Not worth any points, just here to help you learn! 😉

Practice : Think

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What is the output of this Java program?

```
public class Demo {
   public static void main(String[] args) {
      int[] nums = {1, 4, 4, 8, 13};

      int totalDiff = 0;
      for (int i = 1; i <= nums.length; i++) {
         totalDiff += (nums[i] - nums[i - 1]);
      }
      System.out.println("Total Diff = " + totalDiff);
   }
}
```

A) Total Diff = 12

B) Total Diff = 10

C) Total Diff = 9

D) Exception!

Practice : Pair

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Code Quality

"Programs are meant to be read by humans and only incidentally for computers to execute." – Abelson & Sussman, SICP

Code is about communication. Writing code with good **code quality** is important to communicate effectively.

Different organizations have different *standards* for code quality.

- Doesn't mean any one standard is wrong! (e.g., APA, MLA, Chicago, IEEE, ...)
- Consistency is very helpful within a group project
- See our Code Quality Guide for the standards we will all use in CSE 122

CSE 122 Code Quality

Examples relevant for this week

- Naming conventions
- Descriptive variable names
- Indentation
- Long lines
- Spacing
- Good method decomposition
- Writing documentation

Practice : Pair

What does this code do? How could you improve the quality of this code?

```
public static int l(String a,char b){
            int j=-1;for(int a1=0;a1<a.length();a1   ++) {
  if (a.charAt(a1) == b) {
        j = a1;
            }
               } if(j==-1){return -1;} else {
 return j;} }
```

No Slido poll!

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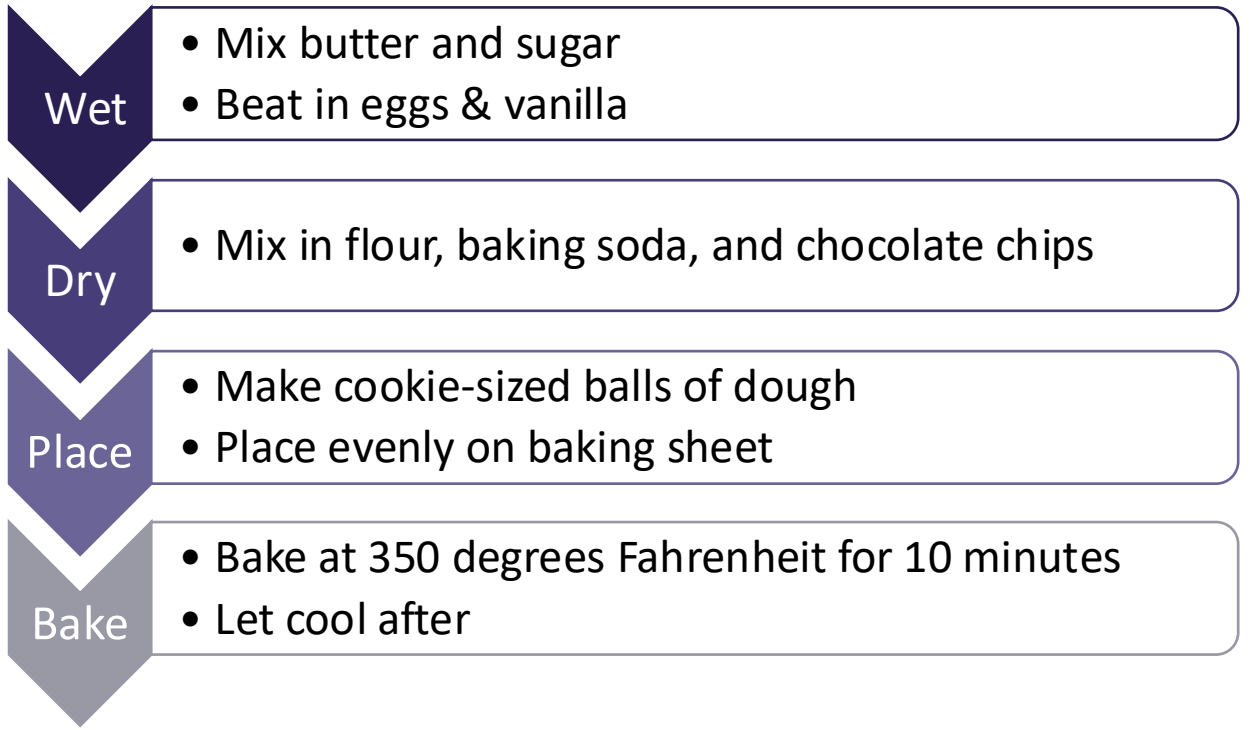
Functional Decomposition

Functional decomposition is the process of breaking down a complex problem or system into parts that are easier to *conceive, understand, program,* and *maintain.*

"Bake the cookies" ⟶



Functional Decomposition

In our code, functional decomposition often means breaking a task into smaller methods (also called functions).

Example: Bingo

- Set up populated game card
- Roll and call a new number
- Mark your card if the number called is present
- Check card for bingo

Avoid Trivial Methods

Introduce methods to decompose a complex problem, not just for the sake of adding a method.

Bad example:

```
public static void printMessage(String message) {
    System.out.println(message);
    System.out.println();
}
```

Good Example:

```
public static void sToQ(Stack<String> s, Queue<String> q) {
    while (!s.isEmpty()) {
        q.add(s.pop());;
    }
}
```

Rule of thumb: A method should do at least two steps

- Ask yourself: Does adding this method make my code easier to understand?

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Creative Project 0

- Released today, due next Thursday (Apr 9) at 11:59pm PT on Ed
  - Can hit the "Submit" button multiple times – we will grade the last submission made before the initial deadline.
  - Build good habits: Don’t “shotgun debug”
  - While you can resubmit this assignment, it's important to meet due date to get as much feedback as possible.
- Focused on reviewing Java concepts and Functional Decomposition
- See Grading Rubric to know what to expect
- IPL opens Monday!