

LEC 15

CSE 122

Collections

BEFORE WE START

Talk to your neighbors:*What plans do you have for Spring break? Going anywhere fun?*Music: [122 24sp Lecture Tunes](#) **Instructors** Miya Natsuhara and Kasey Champion

TAs				
Ayush	Kyle	Colin	Chaafen	
Poojitha	Jacob	Ronald	Smriti	
Chloe	Atharva	Saivi	Ambika	
Ailsa	Rucha	Shivani	Elizabeth	
Jasmine	Megana	Kavya	Aishah	
Lucas	Eesha	Steven	Minh	
Logan	Zane	Ken	Katharine	


Questions during Class?

Raise hand or send here

sli.do #cse122



Lecture Outline

- **Announcements** 
- Optional
- Recap of Collections
- Dumb Data Structures
- Collections

Announcements

- Resubmission Cycle 5 (R5) out; due May 21st by 11:59 PM
- Programming Assignment 3 (P3) out tonight!
 - Due May 23rd by 11:59 PM
- Quiz 2 Thursday, May 21st
- Reminder on Final Exam: **Thursday, June 6th 8:30 – 10:20 AM**

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Optional

`Optional` is a Java class that is used to handle situations where a value is *sometimes* there.

- A variable that can *sometimes* be initialized
- `Optional<String> keepPlaying = Optional.empty();`
- `Optional<Integer> maxValue = Optional.of(-1);`

Like a collection, `Optional` uses `<>` to denote the type it contains..

- e.g., `Optional<String>`, `Optional<Integer>`, `Optional<Point>`

Optional Methods

Method	Description
<code>Optional.empty()</code>	Creates an empty <code>Optional</code> object
<code>Optional.of(...)</code>	Creates an <code>Optional</code> object holding the object it's given
<code>isEmpty()</code>	Returns <code>true</code> if there <i>is no</i> value stored, and <code>false</code> otherwise
<code>isPresent()</code>	Returns <code>true</code> if there <i>is a</i> value stored, and <code>false</code> otherwise
<code>get()</code>	Returns the stored object from the <code>Optional</code> (if one is stored; otherwise throws a <code>NoSuchElementException</code>)

The `Optional` class has more than just these methods, but these are what you'll need to focus on for this class!

Optional Methods

`isEmpty()`, `isPresent()`, and `get()` are called like normal instance methods (on an actual instance of `Optional`).

`Optional.of(...)` and `Optional.empty()` are called differently

(Like the `Math` class methods)

Why Optional?

Using `Optional` can help programmers avoid `NullPointerException`s by making it explicit when a variable may or may not contain a value.

- Remember – `null` refers to the absence of an object!

There are other `Optional` methods (that you should explore in your own time if you're interested) that can be really useful to cleanly work with data that may or may not be present.

Student / Course Example one more time...

Let's add two more methods to `Course.java`:


```
public void setCourseEvalLink(String url)
```

```
public Optional<String> getCourseEvalLink()
```

The link to the evaluations for a course doesn't usually exist until the last few weeks of the quarter. What if a client calls `getCourseEvalLink` before one is set up?

`Optional` to the rescue!

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Goal for Today

Review some of the data structures we've talked about this quarter

Understand how Java organizes them with *interfaces*

Collections: What *classes* have we seen so far?

...

Array,

ArrayList,

Linked List,

Stack,

HashSet & HashMap,

TreeSet & TreeMap

Collections: What *interfaces* have we seen so far?

...


Set,

Queue,

List,

Comparable

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Dumb Data Structures

We're going to create our own versions of these classes so we can dig into how they all relate to each other!

BUT they're going to be real dumb.

If you want to get a sense of how they're *actually* implemented, go take CSE 123!

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IntCollection Relationships

