Overview of Java 8 Concurrent & Parallel Programming

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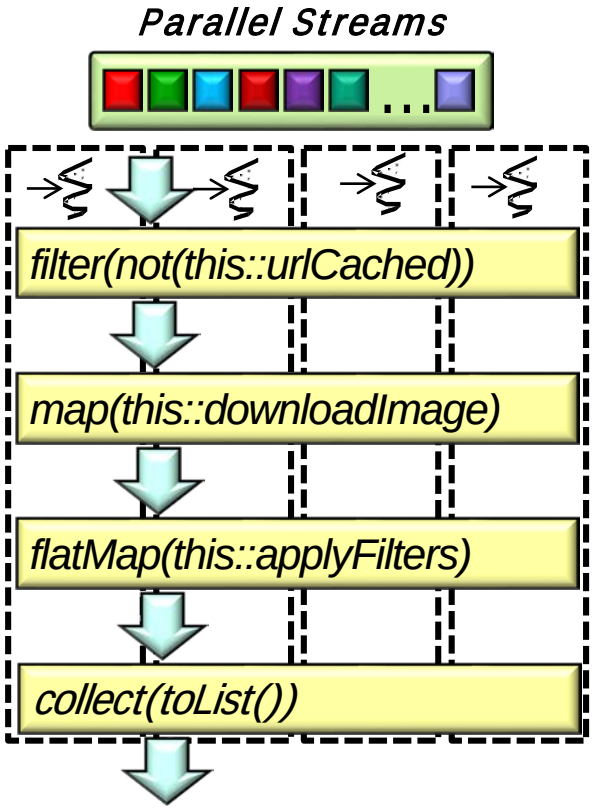
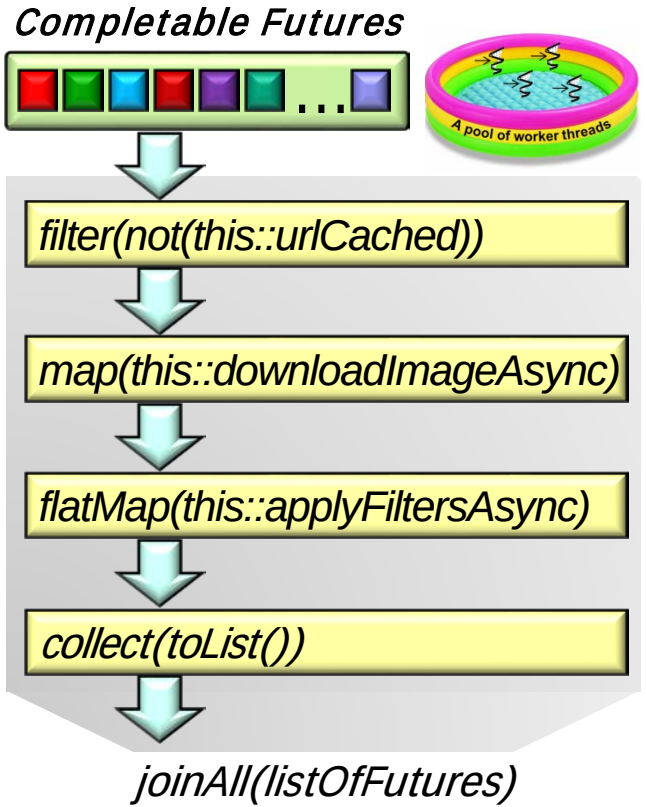
Learning Objectives in this Lesson

- Know what topics we'll cover





Learning Objectives in this Lesson

- Know what topics we'll cover
- Learn where to find Java 8 & relevant IDES

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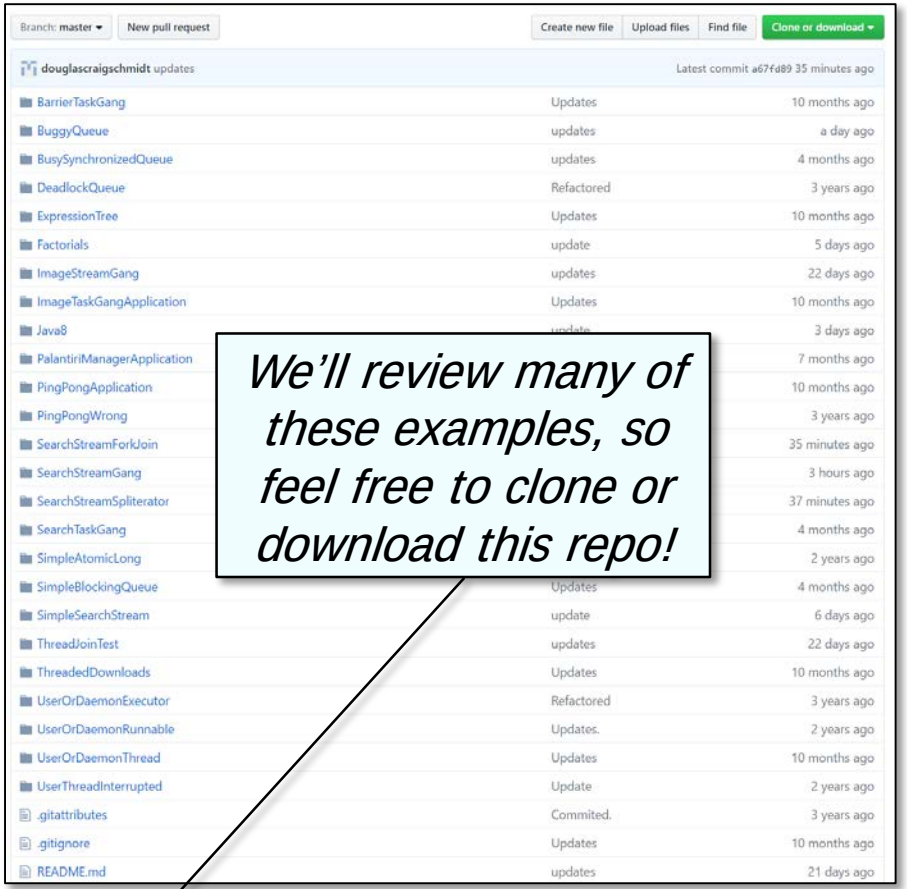
- Know what topics we'll cover
- Learn where to find Java 8 & relevant IDES
- Be able to locate examples of Java 8 concurrent & parallel programs



We'll review many of these examples, so feel free to clone or download this repo!

See www.github.com/douglascraigschmidt/LiveLessons

Overview of this Course

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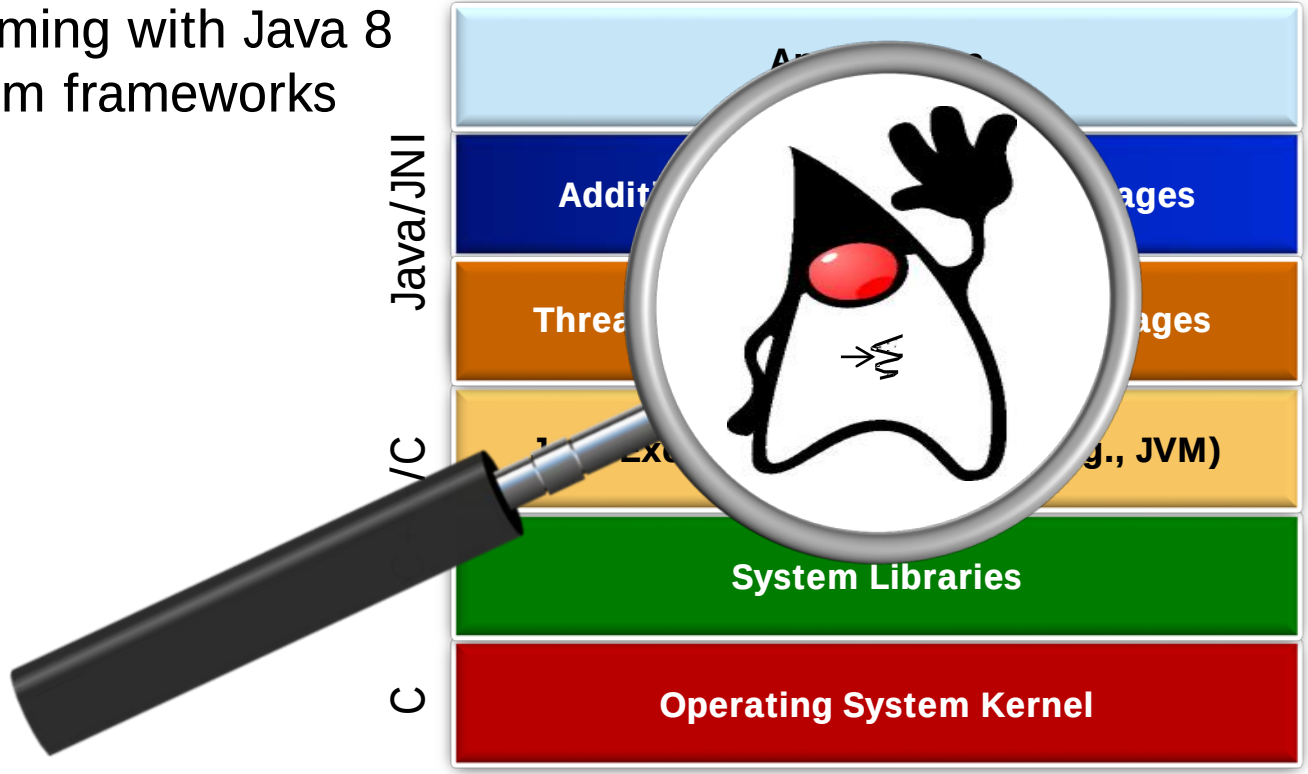
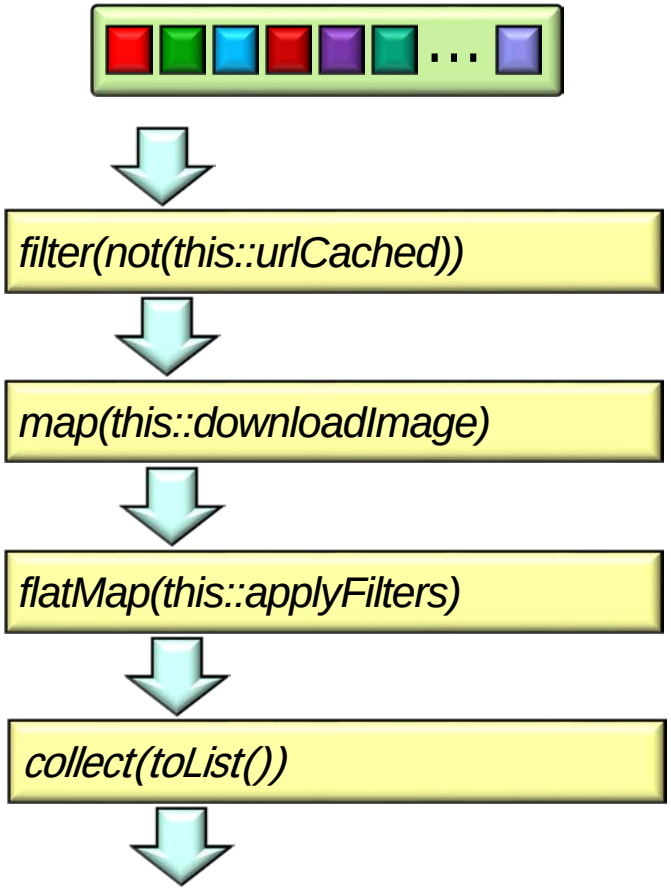
- We focus on programming with Java 8 concurrency/parallelism frameworks



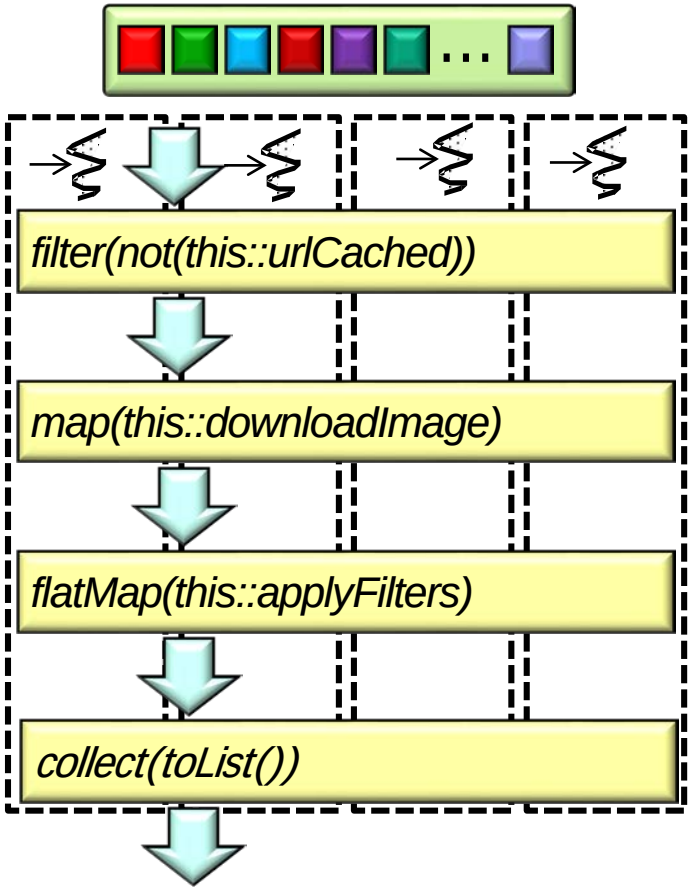
Overview of this Course

- We focus on programming with Java 8 concurrency/parallelism frameworks, e.g.
  - **Parallel streams**
    - Partition a stream into multiple substreams that run concurrently & combine into a “reduced” result



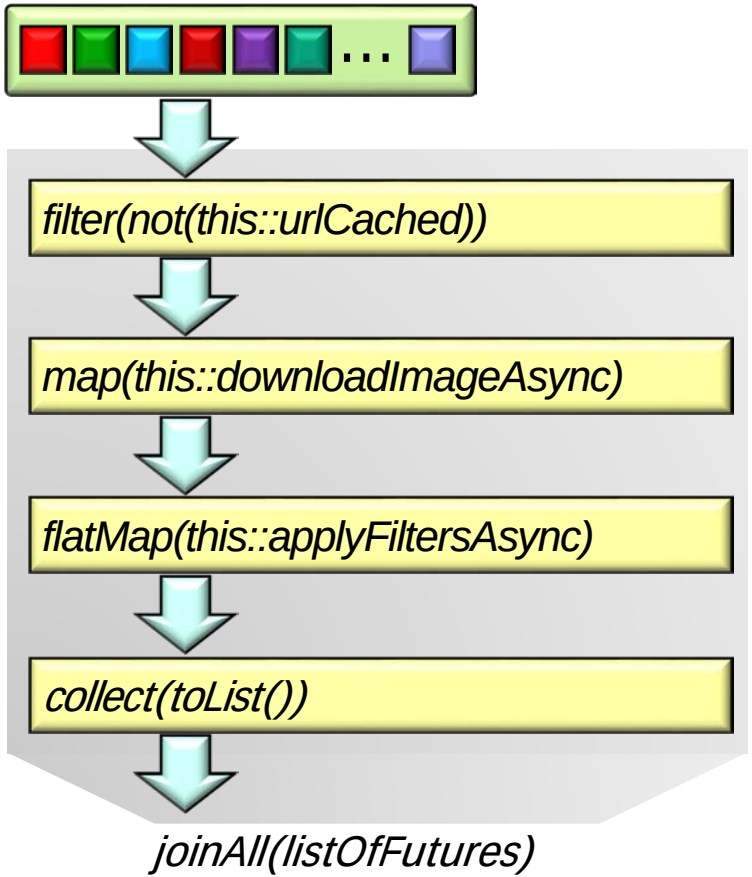
Overview of this Course

- We focus on programming with Java 8 concurrency/parallelism frameworks, e.g.
  - **Parallel streams**
    - Partition a stream into multiple substreams that run concurrently & combine into a “reduced” result
    - Chunks of data in a parallel stream can be mapped to multiple threads (& cores)



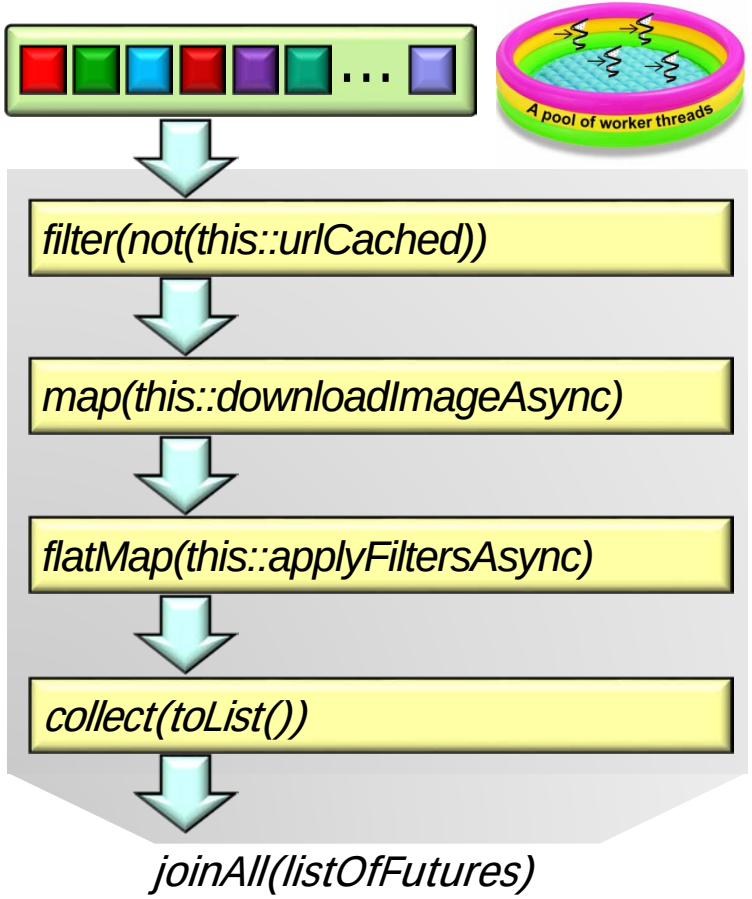
Overview of this Course

- We focus on programming with Java 8 concurrency/parallelism frameworks, e.g.
  - Parallel streams
  - **Competable futures**
    - Support dependent functions that trigger upon completion of asynchronous operations



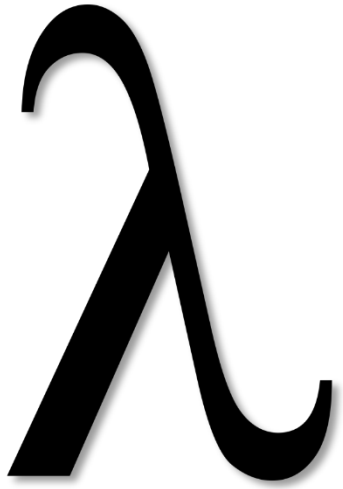
Overview of this Course

- We focus on programming with Java 8 concurrency/parallelism frameworks, e.g.
  - **Parallel streams**
  - **Competable futures**
    - Support dependent functions that trigger upon completion of asynchronous operations
    - Can be used in conjunction with thread pools to run asynchronous operations concurrently



Overview of this Course

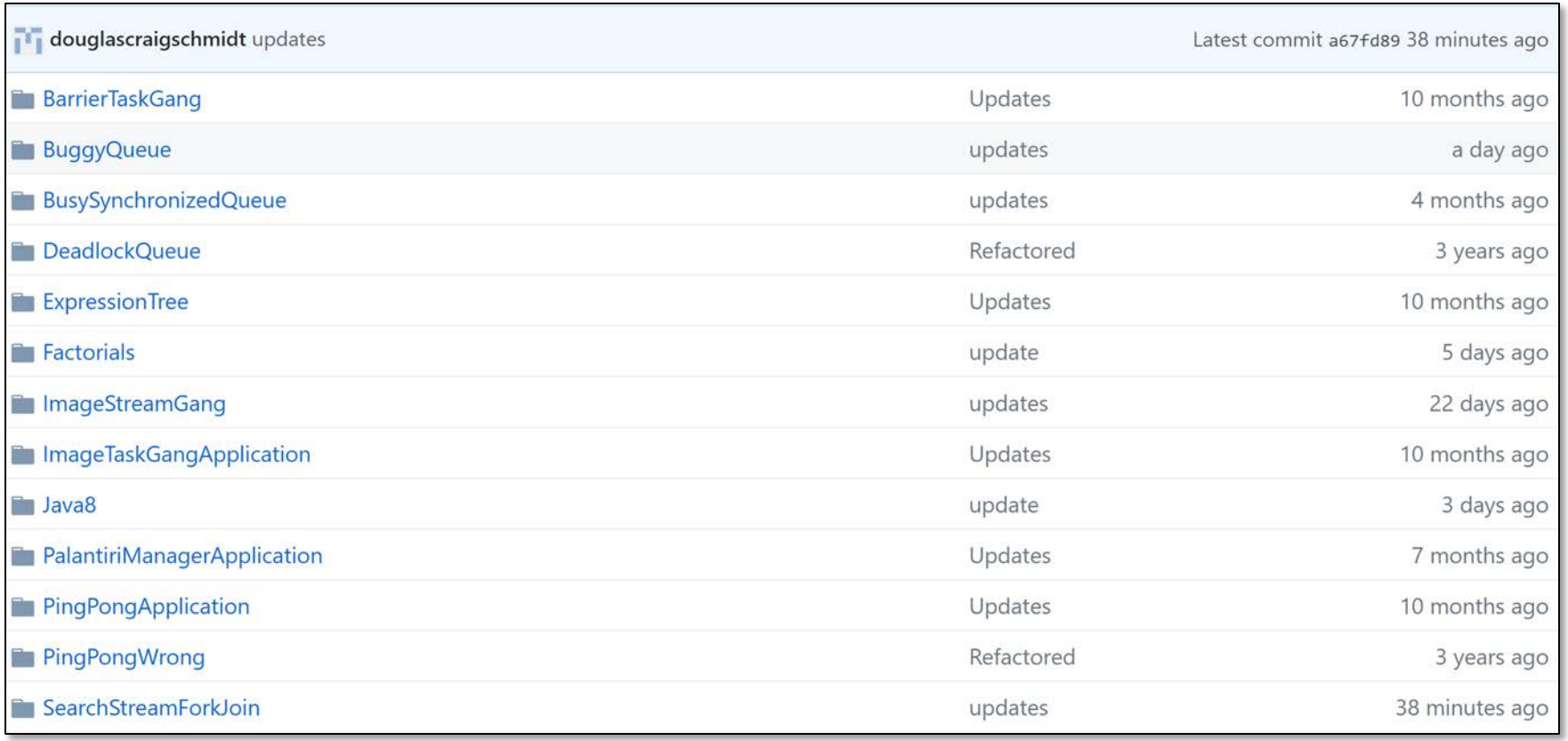
- We also briefly cover Java 8 functional programming concepts & features
  - e.g., lambda expressions, method references, & functional interfaces



These features are the foundation for Java 8's concurrency/parallelism frameworks

Overview of this Course

- All Java 8 concurrent & parallel examples we cover are available on github

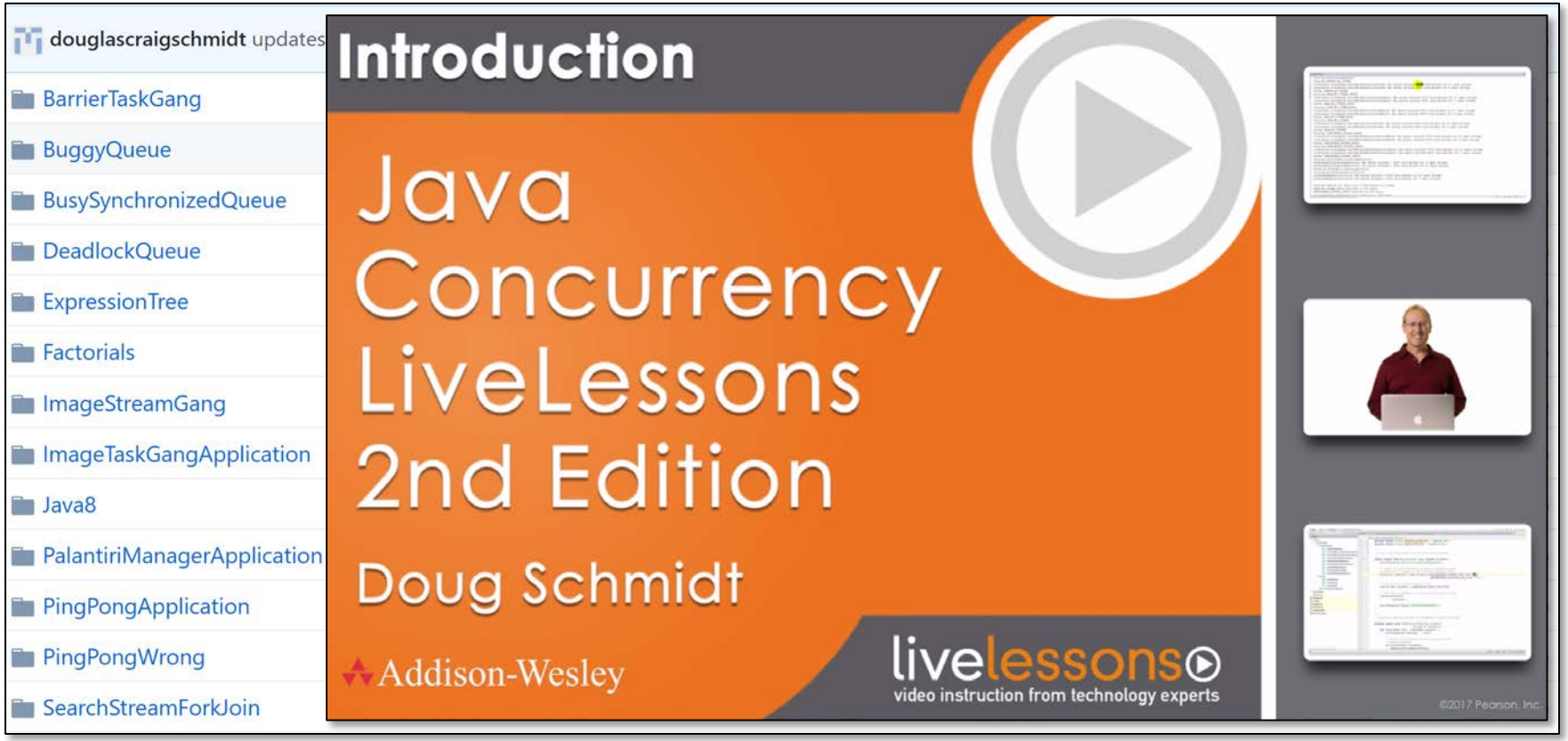


douglascraigschmidt updates		Latest commit a67fd89 38 minutes ago
BarrierTaskGang	Updates	10 months ago
BuggyQueue	updates	a day ago
BusySynchronizedQueue	updates	4 months ago
DeadlockQueue	Refactored	3 years ago
ExpressionTree	Updates	10 months ago
Factorials	update	5 days ago
ImageStreamGang	updates	22 days ago
ImageTaskGangApplication	Updates	10 months ago
Java8	update	3 days ago
PalantiriManagerApplication	Updates	7 months ago
PingPongApplication	Updates	10 months ago
PingPongWrong	Refactored	3 years ago
SearchStreamForkJoin	updates	38 minutes ago

See www.github.com/douglascraigschmidt/LiveLessons

Overview of this Course

- Examples we don't cover in this course are covered in my LiveLessons course



See www.dre.vanderbilt.edu/~schmidt/LiveLessons/CPiJava

Overview of this Course

- My website has *lots* more information on concurrent & parallel programming

Digital Learning Offerings

Douglas C. Schmidt (d.schmidt@vanderbilt.edu)
Associate Chair of Computer Science and Engineering,
Professor of Computer Science, and Senior Researcher
in the Institute for Software Integrated Systems (ISIS)
at Vanderbilt University

Pearson LiveLessons Courses

- Java Concurrency
- Design Patterns in Java

Coursera MOOCs

- Android App Development Coursera Specialization
- Pattern-Oriented Software Architecture (POSA)

Vanderbilt University Courses

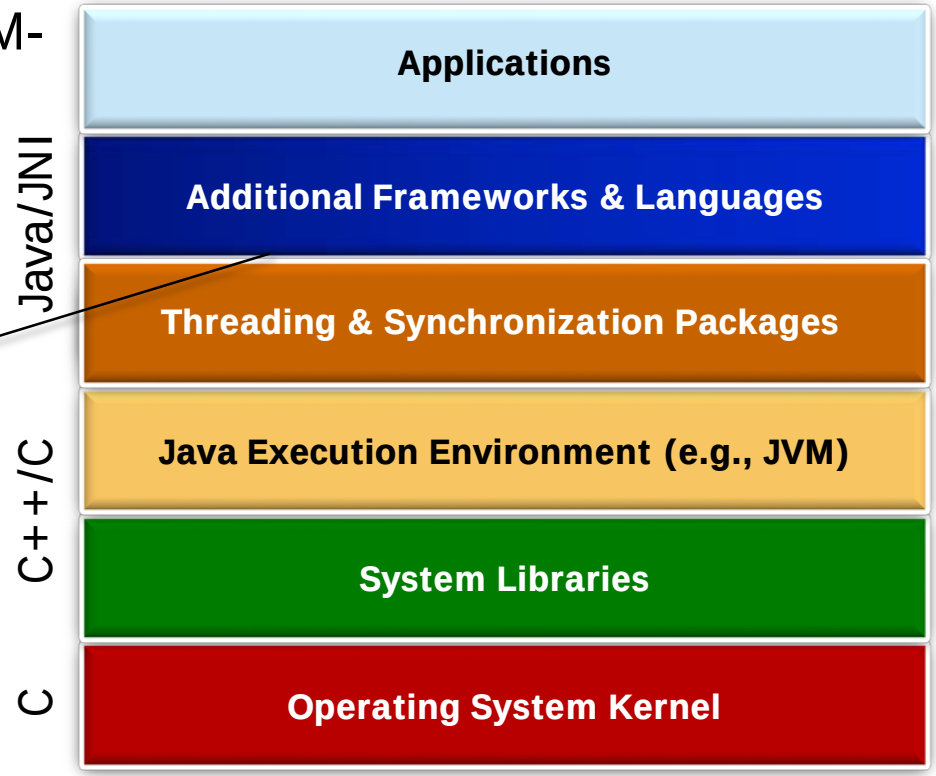
- Playlist from my YouTube Channel videos from CS 892: Concurrent Java Programming with Android
- Playlist from my YouTube Channel videos from CS 251: Intermediate Software Design with Java
- Playlist from my YouTube Channel videos from CS 282: Concurrent Java Network Programming in Android
- Playlist from my YouTube Channel videos from CS 251: Intermediate Software Design with C++
- Playlist from my YouTube Channel videos from CS 282: Systems Programming for Android

See www.dre.vanderbilt.edu/~schmidt/DigitalLearning

Overview of this Course

- There are also other Java-based & JVM-related frameworks & languages for concurrency & parallelism

e.g., RxJava, Android, Java 9 Flow APIs, Scala, Kotlin, etc.



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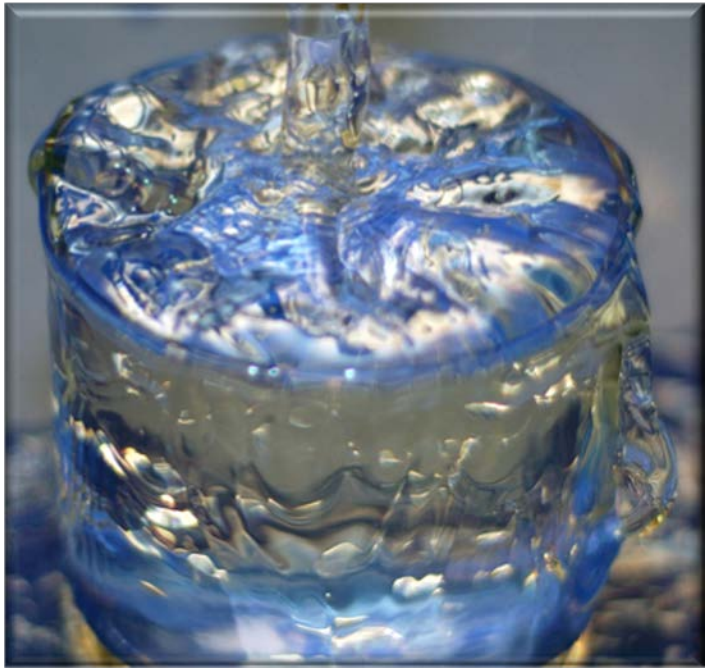
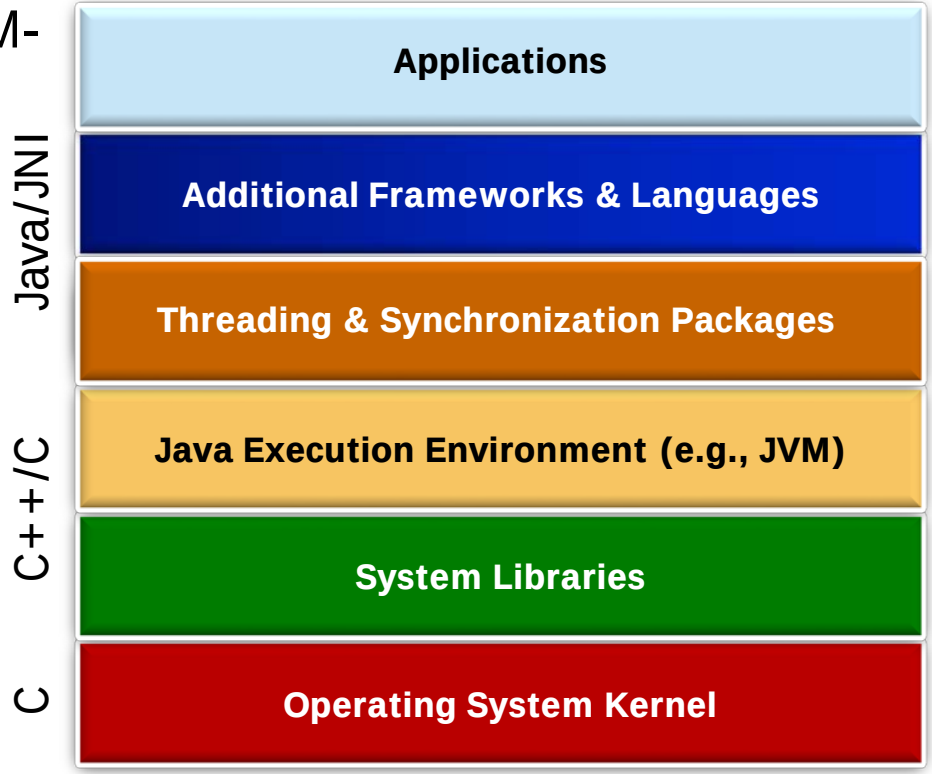




Very interesting, but beyond the scope of this course!

Accessing Java 8 Features & Functionality

Accessing Java 8 Features & Functionality

- The Java 8 (& beyond) runtime environment (JRE) supports Java 8 features

See docs.oracle.com/javase/8/docs/technotes/guides/install/install_overview.html

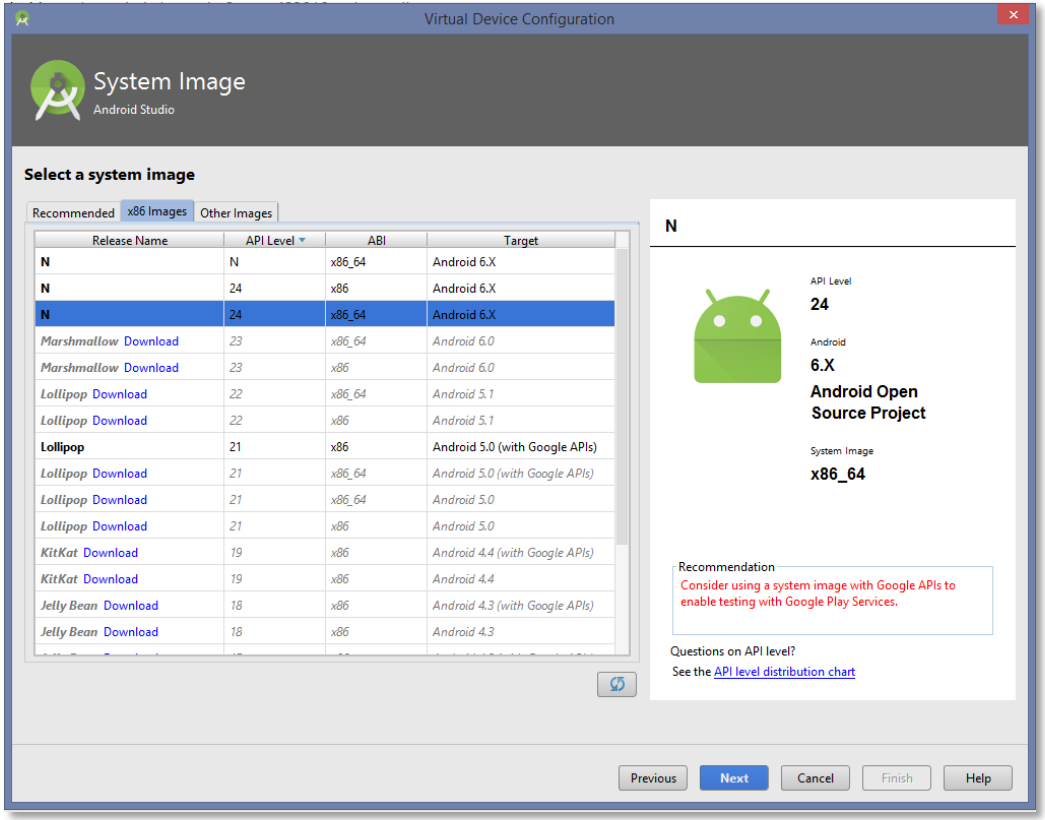
Accessing Java 8 Features & Functionality

- The Java 8 (& beyond) runtime environment (JRE) supports Java 8 features
  - Intellij & Eclipse are popular Java 8 IDEs

See www.eclipse.org/downloads & www.jetbrains.com/idea/download

Accessing Java 8 Features & Functionality

- The Java 8 (& beyond) runtime environment (JRE) supports Java 8 features
  - Intellij & Eclipse are popular Java 8 IDEs
  - Most Java 8 features are supported by Android API level 24 (& beyond)



See android-developers.googleblog.com/2017/03/future-of-java-8-language-feature.html

Accessing Java 8 Features & Functionality

- The Java 8 (& beyond) runtime environment (JRE) supports Java 8 features
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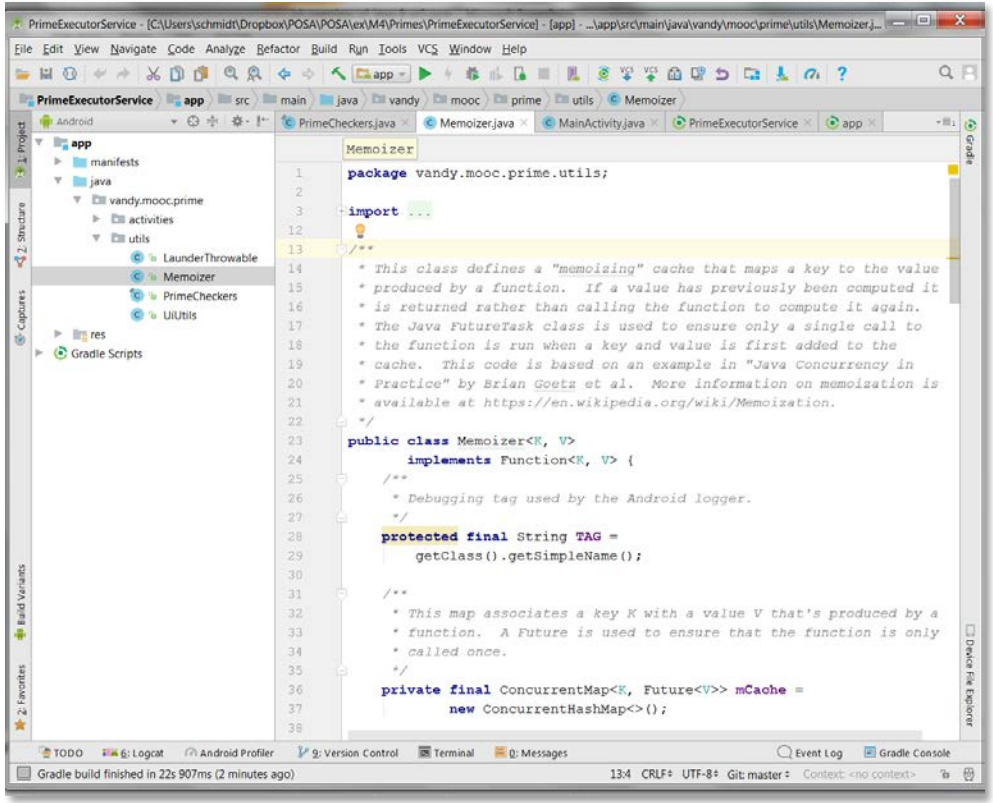
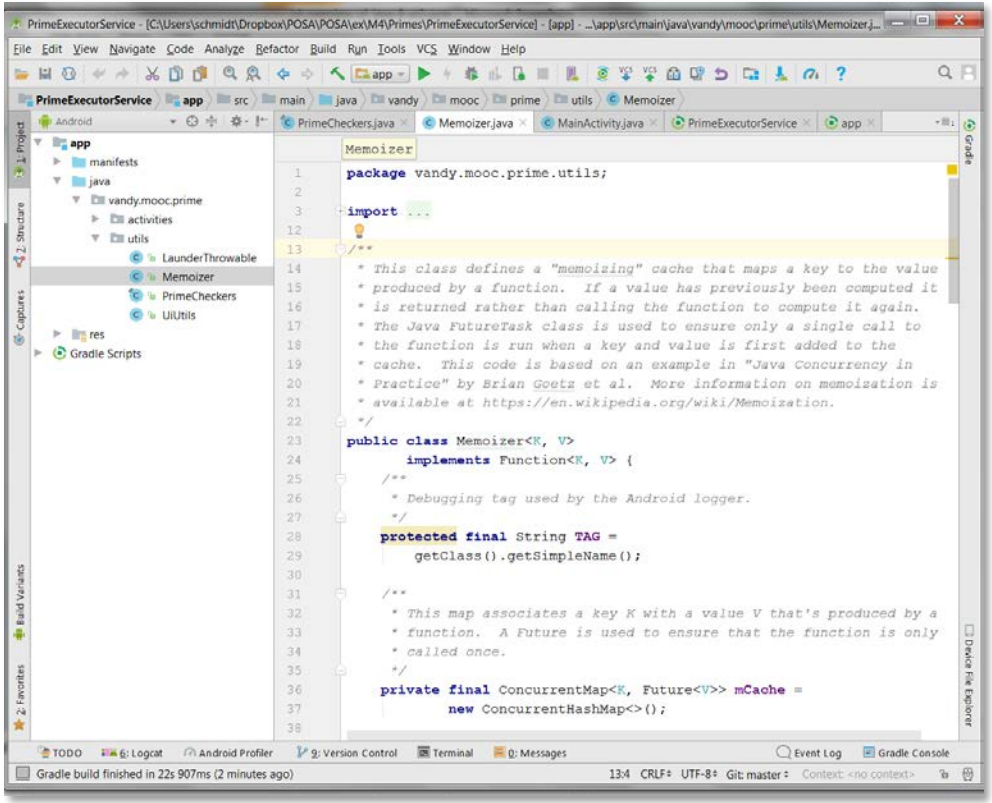
  - Most Java 8 features are supported by Android API level 24 (& beyond)
    - A subset of Java 8 features are available in earlier Android releases, as well



See android-developers.googleblog.com/2017/04/java-8-language-features-support-update.html

Accessing Java 8 Features & Functionality

- The Java 8 (& beyond) runtime environment (JRE) supports Java 8 features
  - Intellij & Eclipse are popular Java 8 IDEs
  - Most Java 8 features are supported by Android API level 24 (& beyond)
    - A subset of Java 8 features are available in earlier Android releases, as well
    - Make sure to get Android Studio 2.4 or later!



See developer.android.com/studio/preview/features/java8-support.html

Accessing Java 8 Features & Functionality

- Java 8 source code is available online
  - For browsing grepcode.com/file/repository.grepcode.com/java/root/jdk/openjdk/8-b132/java
  - For downloading jdk8.java.net/download.html

End of Course Overview