

# Applying AI+ to Enhance Lecture Material & Quiz/Exam Assessments in Vandy CS Courses

**Douglas C. Schmidt**

**[d.schmidt@vanderbilt.edu](mailto:d.schmidt@vanderbilt.edu)**

**[www.dre.vanderbilt.edu/~schmidt](http://www.dre.vanderbilt.edu/~schmidt)**

**Professor of Computer Science**

**Institute for Software  
Integrated Systems**

**Vanderbilt University  
Nashville, Tennessee, USA**



# Learning Objectives in this Part of the Lesson

- Understand the difference between generative artificial intelligence & augmented intelligence (AI+)
- Learn how we're applying AI+ to enhance lecture material & quiz/exam assessments in Vandy CS courses

**Learning Objectives in this Part of the Lesson**

- Learn the history of Java parallelism from 2010 to 2022
  - i.e., fork-join, parallel streams, completable futures, & reactive streams frameworks

**JAVA HISTORY**

2

D

Generate a four item multiple choice question (with multiple correct choices) based on the transcript from this video along with an explanation of the correct choice(s).



## Multiple Choice Question

Which of the following frameworks or models are introduced in Java to support parallelism?

- A) Parallel Streams
- B) Fork-Join Pool
- C) RxJava
- D) asyncio

## Explanation of Correct Choices

Correct choices: A) Parallel Streams, B) Fork-Join Pool

- A) Parallel Streams: Introduced in Java 8, Parallel Streams are designed to support fine-grained functional programming and data parallelism. They allow the data to be processed in small chunks through a pipeline of operations.
- B) Fork-Join Pool: Introduced in Java 7, the Fork-Join Pool model focuses on fine-grained object-oriented data parallelism. It uses a "split-apply-combine" strategy and provides foundational parallelism support in Java.
- C) RxJava: Though mentioned as one of the frameworks implementing the Reactive Streams interface introduced in Java 9 and beyond, RxJava itself is not a parallelism model introduced by Java. It is an external library that operates based on Java's Reactive Streams model.
- D) asyncio: This is a Python library for asynchronous programming and is not related to Java's parallelism support.

---

# Using AI+ to Enhance Lecture Material & Quiz/Exam Assessments

# Using AI+ to Enhance Lecture Material & Quiz/Exam Assessments

- AI+ helps improve the online material & quiz/exam assessments for my Vandy CS courses



Vanderbilt University, Department of Electrical Engineering and Computer Science

CS 891, Spring 2018, Ninth Quiz

1. (2 points) Briefly explain two key differences between a Java CountdownLatch and a CyclicBarrier.
2. (2 points) Briefly explain what a “barrier action” is in the context of a CyclicBarrier.,
3. (4 points) Briefly describe the two primary concurrency frameworks provided by Android in terms of how they compare and contrast.
4. The following question has three parts:
  - (1 point) Briefly describe the purpose of the Android AsyncTask class.
  - (2 points) Briefly explain a key design pattern it implements and outline that pattern’s intent.

# Using AI+ to Enhance Lecture Material & Quiz/Exam Assessments

- AI+ helps improve the online material & quiz/exam assessments for my Vandy CS courses
  - Generating “knowledge check” questions for presentations & online courses

## Discussion Questions

1. What is the primary objective of the "FileCounter" case study?
  - a. To evaluate the effectiveness of different programming languages*
  - b. To benchmark the speed of file reading operations in Java*
  - c. To evaluate different Java parallel programming models with a focus on trade-offs between conciseness & performance*
  - d. To demonstrate the superiority of the fork-join framework in Java*

16

# Using AI+ to Enhance Lecture Material & Quiz/Exam Assessments

- AI+ helps improve the online material & quiz/exam assessments for my Vandy CS courses
  - Generating “knowledge check” questions for presentations & online courses
- Create bi-weekly quizzes based on class lecture videos

The screenshot shows a YouTube video player with the title "Learning Objectives in this Part of the Lesson". The video content includes a list of learning objectives and a diagram illustrating the layers of Java history. The objectives are:

- Learn the history of Java parallelism from 2010 to 2022
  - i.e., fork-join, parallel streams, completable futures, & reactive streams frameworks

The diagram, titled "JAVA HISTORY", shows a stack of layers from bottom to top:

- C**: Operating System Kernel
- C++/C**: System Libraries
- C++/C**: Java Execution Environment (e.g., JVM)
- Java/JNI**: Threading & Synchronization Packages
- Java/JNI**: Additional Frameworks & Languages
- Applications**: Applications

The number "2" is visible at the bottom of the video frame.

The screenshot shows an AI-generated multiple choice question and its explanation. The question is:

**Multiple Choice Question**

Which of the following frameworks or models are introduced in Java to support parallelism?

- A) Parallel Streams
- B) Fork-Join Pool
- C) RxJava
- D) asyncio

**Explanation of Correct Choices**

Correct choices: A) Parallel Streams, B) Fork-Join Pool

- A) Parallel Streams: Introduced in Java 8, Parallel Streams are designed to support fine-grained functional programming and data parallelism. They allow the data to be processed in small chunks through a pipeline of operations.
- B) Fork-Join Pool: Introduced in Java 7, the Fork-Join Pool model focuses on fine-grained object-oriented data parallelism. It uses a "split-apply-combine" strategy and provides foundational parallelism support in Java.
- C) RxJava: Though mentioned as one of the frameworks implementing the Reactive Streams interface introduced in Java 9 and beyond, RxJava itself is not a parallelism model introduced by Java. It is an external library that operates based on Java's Reactive Streams model.
- D) asyncio: This is a Python library for asynchronous programming and is not related to Java's parallelism support.



# Using AI+ to Enhance Lecture Material & Quiz/Exam Assessments

- AI+ helps improve the online material & quiz/exam assessments for my Vandy CS courses
  - Generating “knowledge check” questions for presentations & online courses
- Create bi-weekly quizzes based on class lecture videos
  - You can leverage this feature of ChatGPT to help study for our quizzes & exams



*No-/low-cost around-the-clock tutoring on-demand*

See [www.youtube.com/watch?v=gA-dYPDv1qo](https://www.youtube.com/watch?v=gA-dYPDv1qo)

# Using AI+ to Enhance Lecture Material & Quiz/Exam Assessments

- AI+ helps improve the online material & quiz/exam assessments for my Vandy CS courses
  - Generating “knowledge check” questions for presentations & online courses
  - Create bi-weekly quizzes based on class lecture videos
- Generate accurate summaries of videos I upload to YouTube
  - “Generate a 100-word summary of this video based on the transcript”

## Video details

Title (required) ?

The History of Parallelism Support in Java

Description ?

The video delves into the evolution of parallelism support in Java, starting with Java 7's Fork-Join pool, which enables fine-grained object-oriented data parallelism but is tedious to use. Java 8 introduced easier-to-use Parallel Streams for data parallelism and Completable Futures for asynchronous tasks. Java 9 added Reactive Streams, which is a publisher-subscriber model that further parallelism support. These frameworks aim to balance developer productivity with performance. While they simplify parallel programming, however, they may impose limitations on fine-grained control and introduce some overhead. The video concludes by quoting Industry thought leaders like Brian Getz, Rob Pike, and Ron Pressler, who have contributed to the understanding of concurrency and parallelism in Java.

## Thumbnail

Select or upload a picture that shows what's in your video. A good thumbnail stands out and draws viewers' attention.

[Learn more](#)



See [www.youtube.com/playlist?list=PLZ9NgFYEMxp7Gx4LMVH8OTNW9Ny66Q\\_WE](http://www.youtube.com/playlist?list=PLZ9NgFYEMxp7Gx4LMVH8OTNW9Ny66Q_WE)



---

End of the Applying AI+ to Enhance  
Lecture Material & Quiz/Exam  
Assessments in Vandy CS Courses