Java Barrier Synchronizers: Usage Considerations

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Learning Objectives in this Lesson

- Appreciate Java barrier synchronizer usage considerations

I will adopt Best Practices
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Java Barrier
Usage Considerations

Java Barrier Usage Considerations

- Java's barrier synchronizers can be used for several purposes

See stackoverflow.com/questions/6830904/java-tutorials-explanations-of-jsr166y-phaser/6831171#6831171

Java Barrier Usage Considerations

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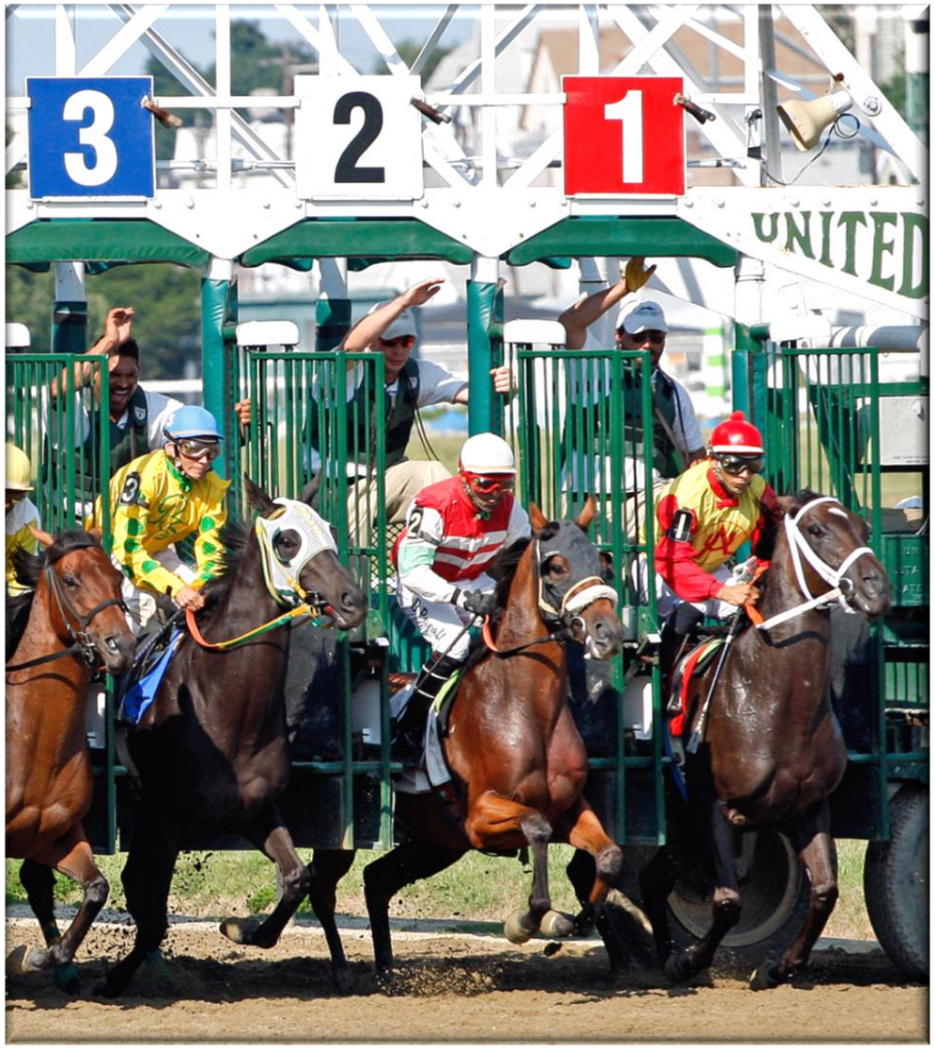
  - CountDownLatch focuses on actions



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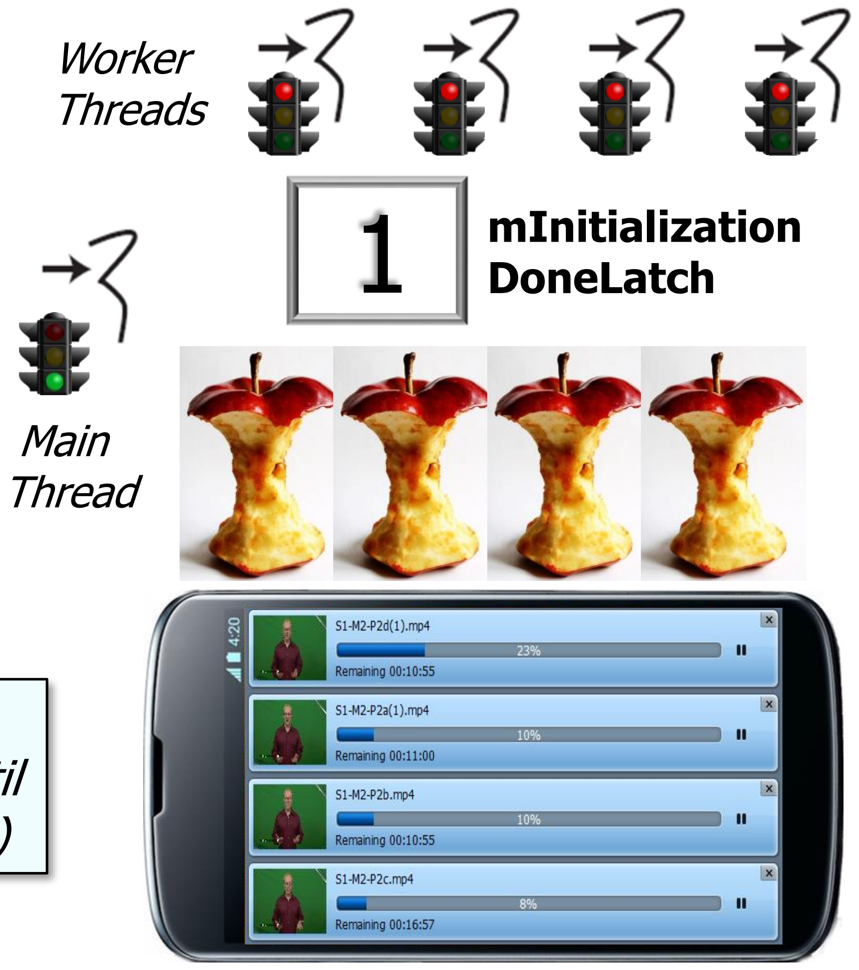

e.g., all video rendering threads invoking await() block at the latch until the main thread invokes countDown()

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    - It can be used an on/off latch for an entry barrier
    - It can also be used for more sophisticated exit barrier use cases

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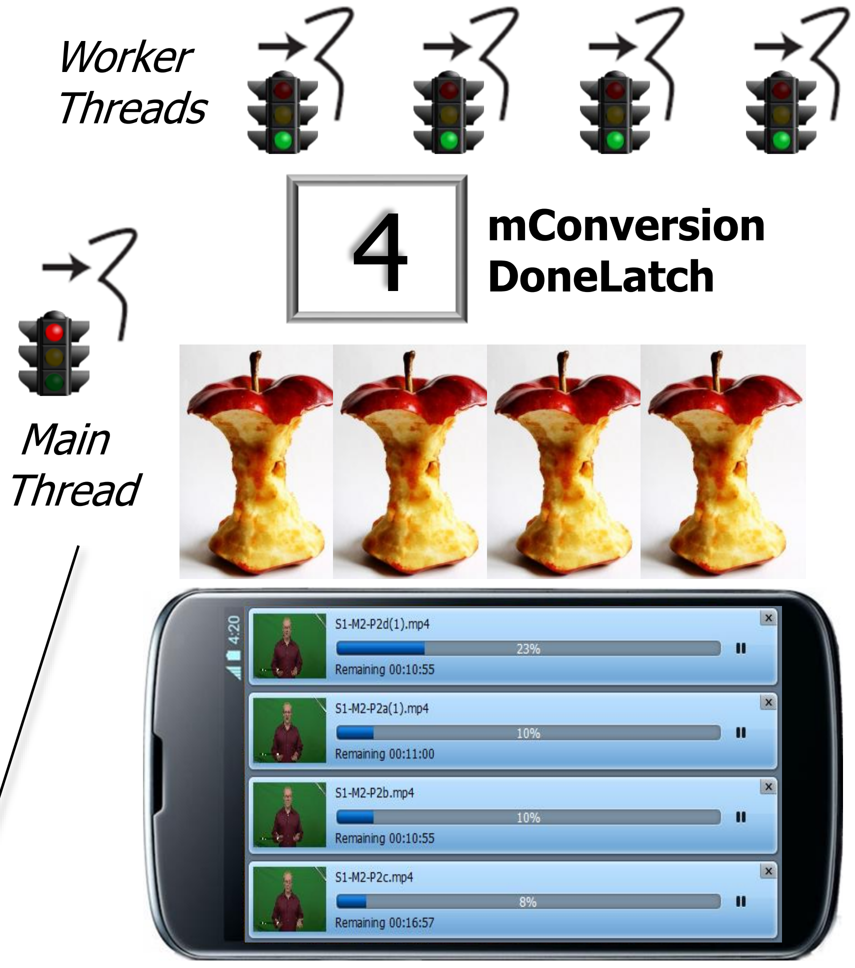
      - 1 thread waits until *N* threads have completed an action



e.g., the main thread waits until the worker threads are finished rendering the video

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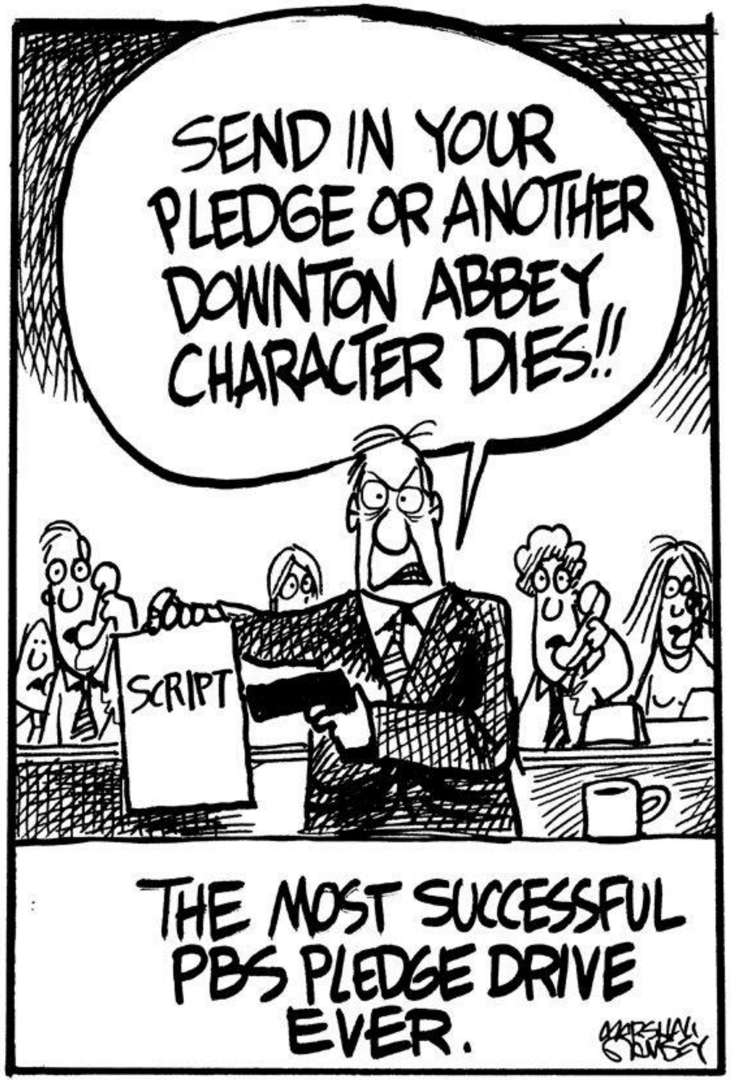
      - 1 thread waits until *N* threads have completed an action
      - 1 thread waits until an action has completed *N* times, irrespective of which thread(s) were responsible


SEND IN YOUR PLEDGE OR ANOTHER DOWNTON ABBEY CHARACTER DIES!!
SCRIPT
THE MOST SUCCESSFUL PBS PLEDGE DRIVE EVER.
MARSHALL RAMSEY

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    - It can be used an on/off latch for an entry barrier
    - It can also be used for more sophisticated exit barrier use cases
    - Most appropriate/optimized for relatively simple use cases

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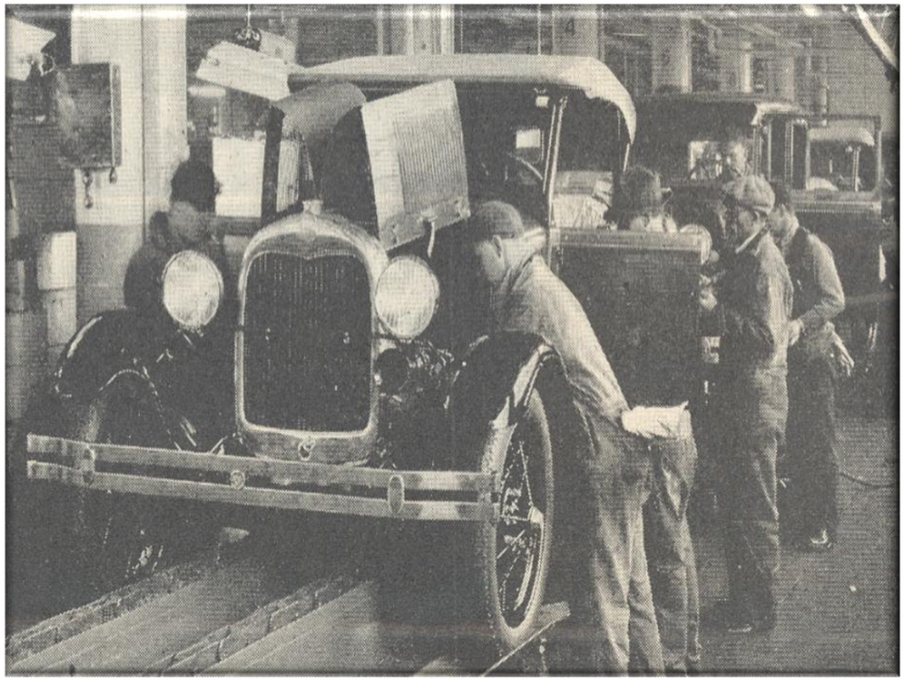
    - It enables a set of threads to all wait for each other to reach a common barrier point



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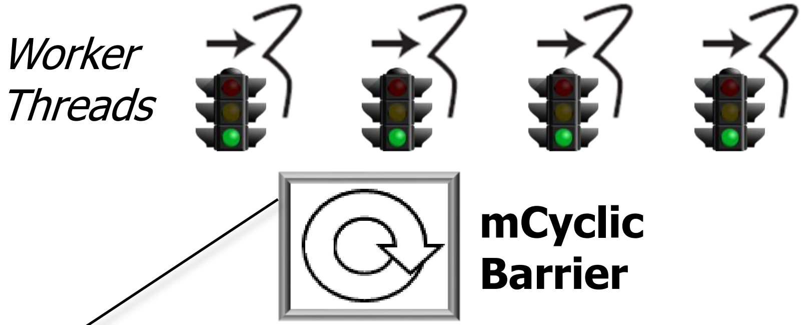

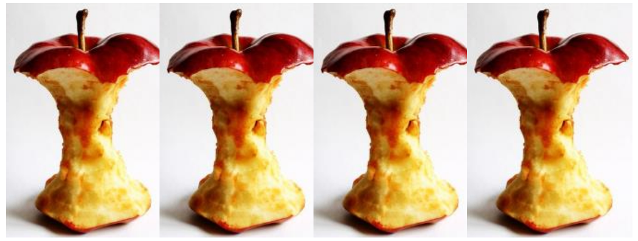

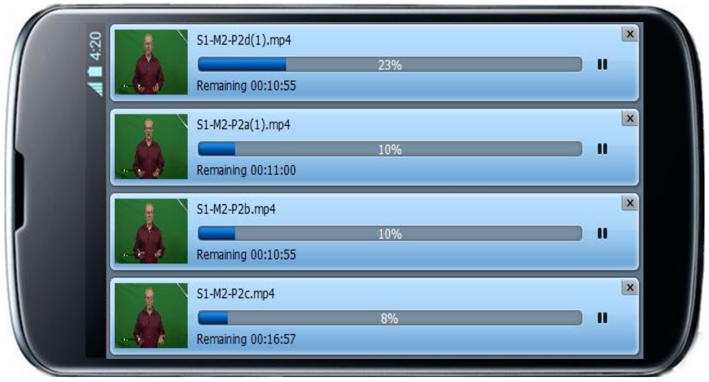

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Remaining 00:10:55

S1-M2-P2c.mp4
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e.g., a barrier can be used to wait for one or more algorithm iterations to finish before deciding to move on to the next cycle

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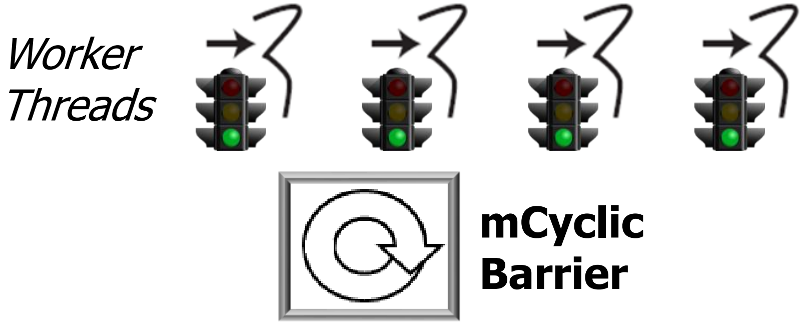

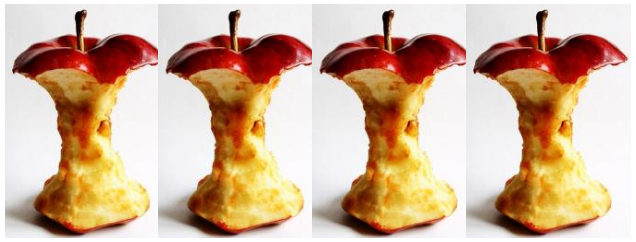

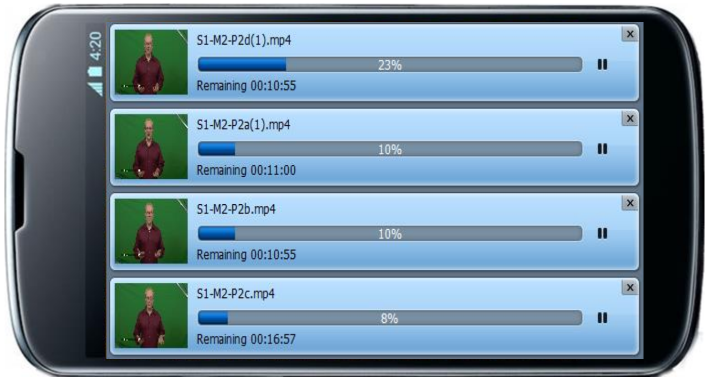
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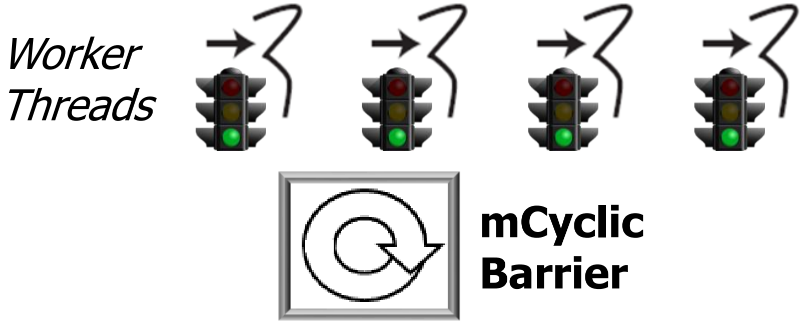
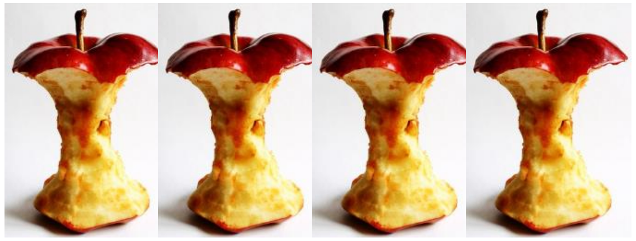
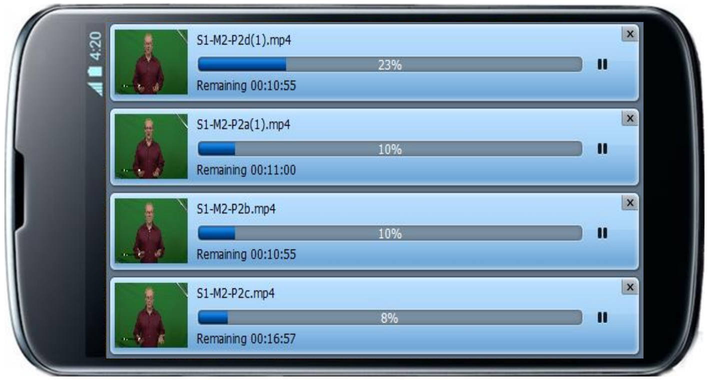
  - CyclicBarrier focuses on threads
    - It enables a set of threads to all wait for each other to reach a common barrier point
    - It requires a fixed # of threads
      - This may be overly limited







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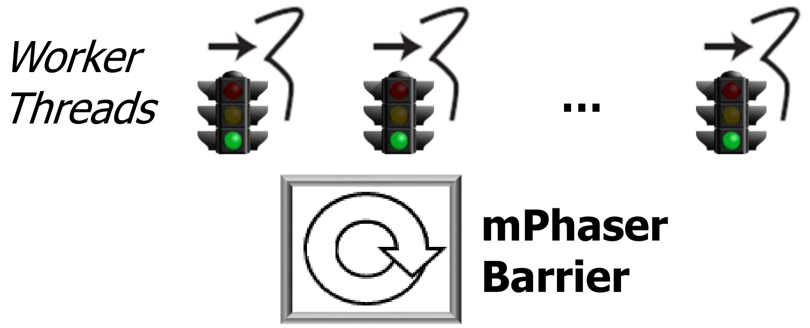
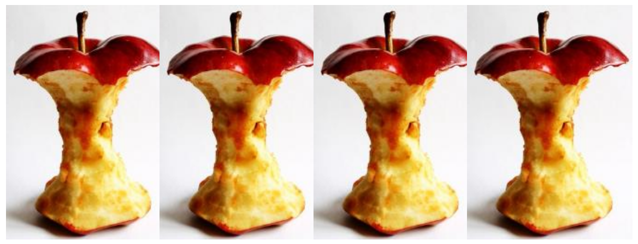
  - CyclicBarrier focuses on threads
  - Phaser focuses on a variable (or fixed) # of threads
    - It enables threads to wait for each other to complete processing in cycles





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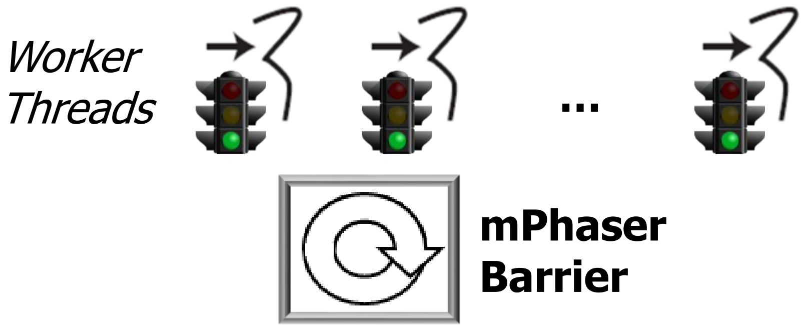

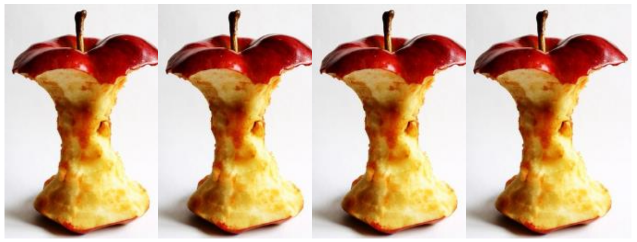

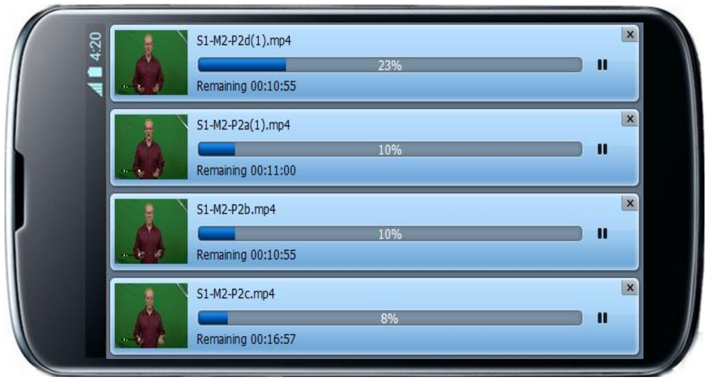

Using Phasers for a fixed # of threads is typically overkill!

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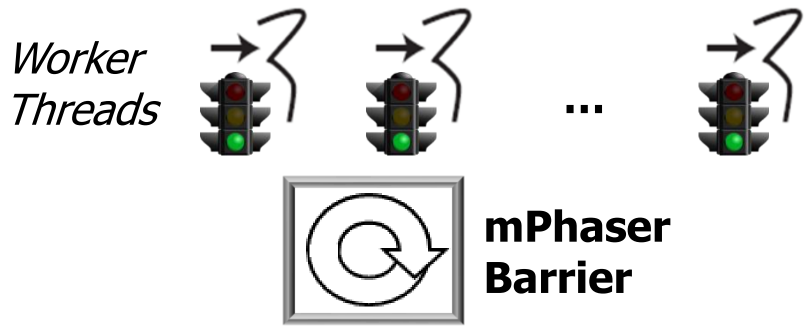
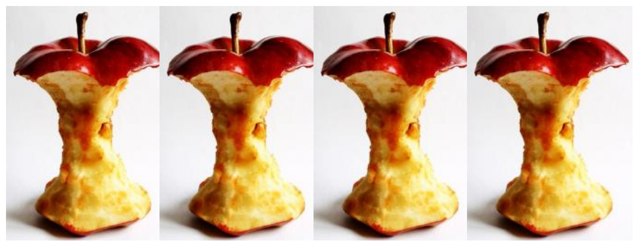
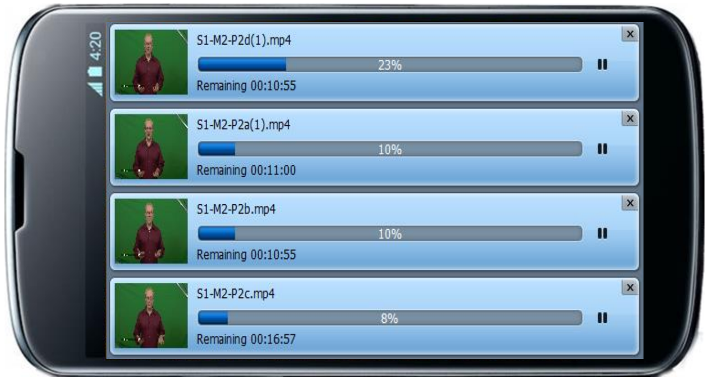
  - CountDownLatch focuses on actions
  - CyclicBarrier focuses on threads
  - Phaser focuses on a variable (or fixed) # of threads
    - It enables threads to wait for each other to complete processing in cycles
    - It's more flexible than the two other types of Java barrier synchronizers



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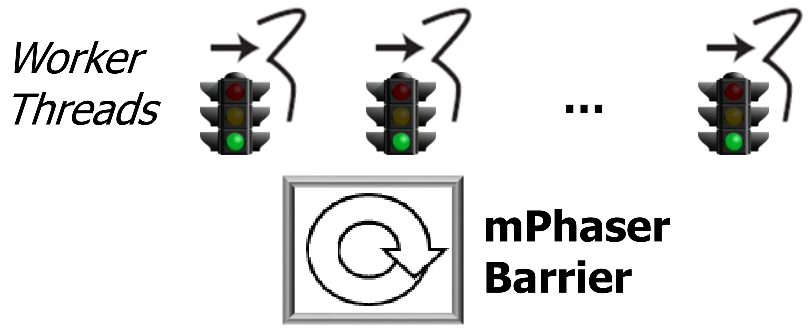
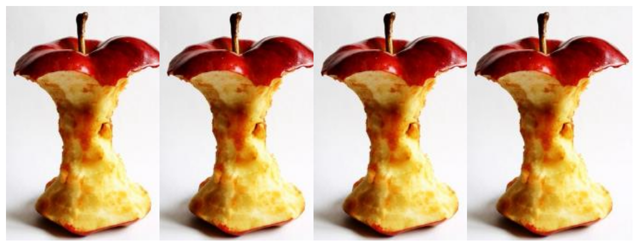
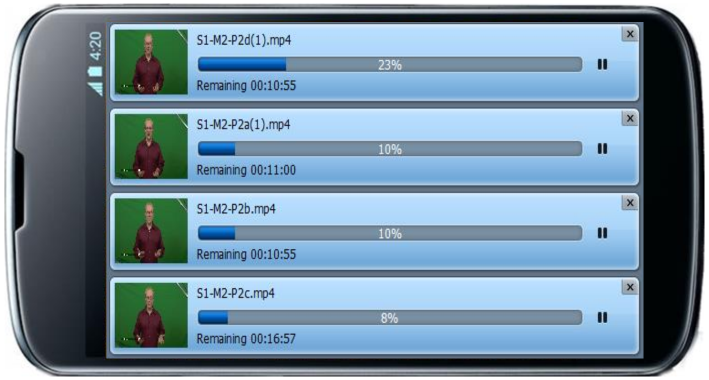
    - It enables threads to wait for each other to complete processing in cycles
    - It's more flexible than the two other types of Java barrier synchronizers
      - However, they are are also more complex to program







End of Java Barrier Synchronizers: Usage Considerations