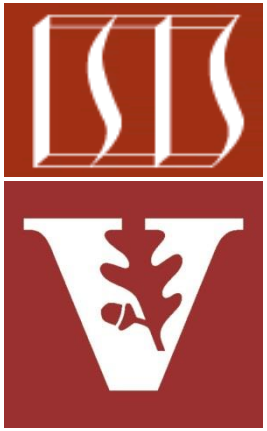
Java Semaphore: Mediating Access to Shared Resources



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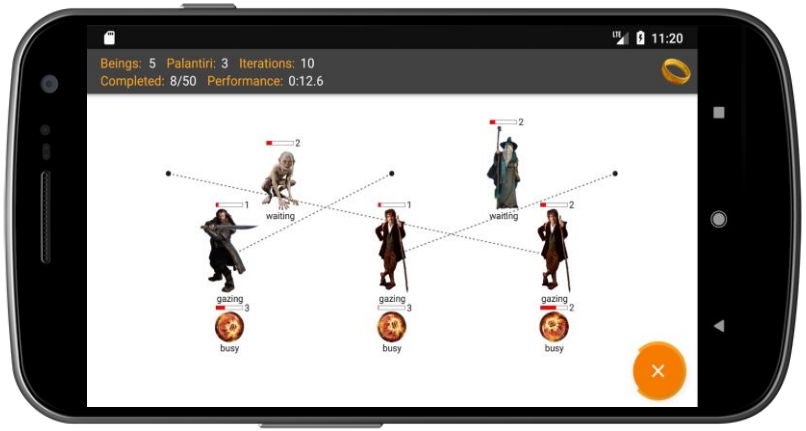
Learning Objectives in this Part of the Module

- Understand the concept of semaphores
- Be aware of the two types of semaphores
- Note a human known use of semaphores
- Recognize the structure & functionality of Java Semaphore
- Know the key methods defined by the Java Semaphore class
- Learn how Java semaphores enable multiple threads to
  - Mediate access to a limited # of shared resources

Semaphore



Applying a Java Semaphore to Mediate Access

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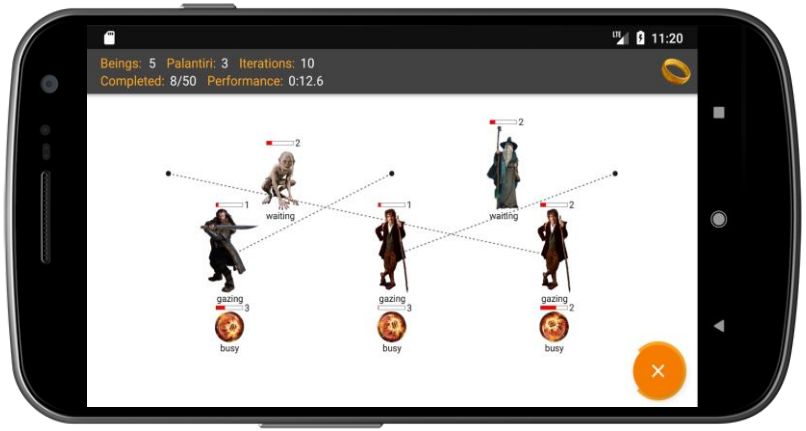
- This Android app show how an Java semaphore can be used to limit the # of Middle-Earth beings who can gaze into Palantiri concurrently

Semaphore

Each being is implemented to run in a separate thread



See en.wikipedia.org/wiki/Palantir

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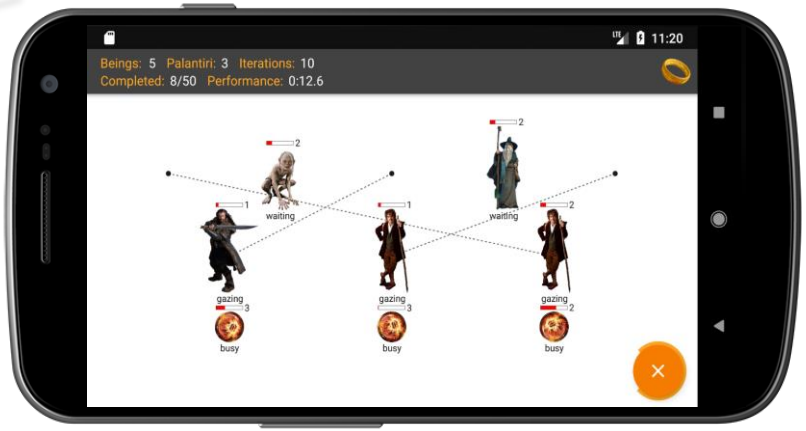
Semaphore

e.g., limit to two palantiri on a quad-core device to ensure system responsiveness



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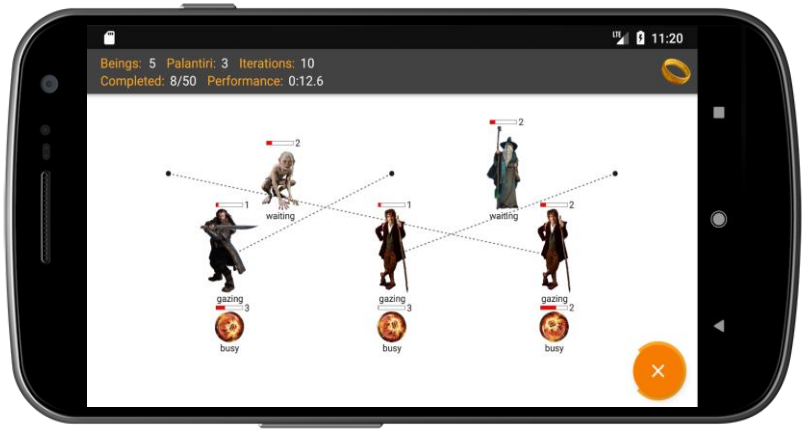
Semaphore

Acquiring a permit atomically decrements the permit count



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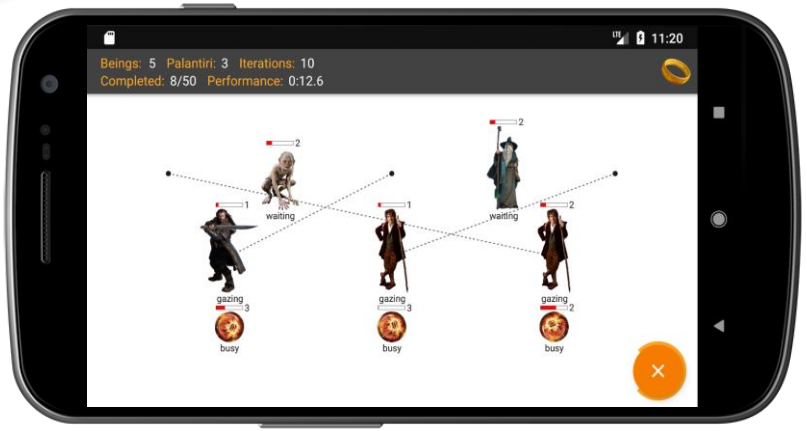
All available permits are now in use



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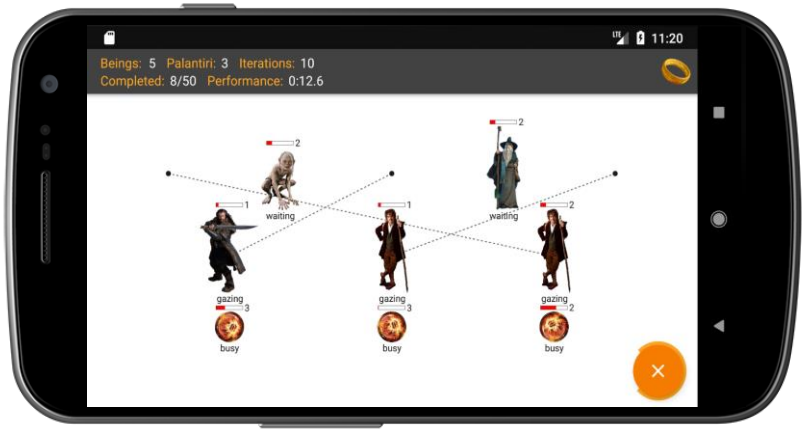

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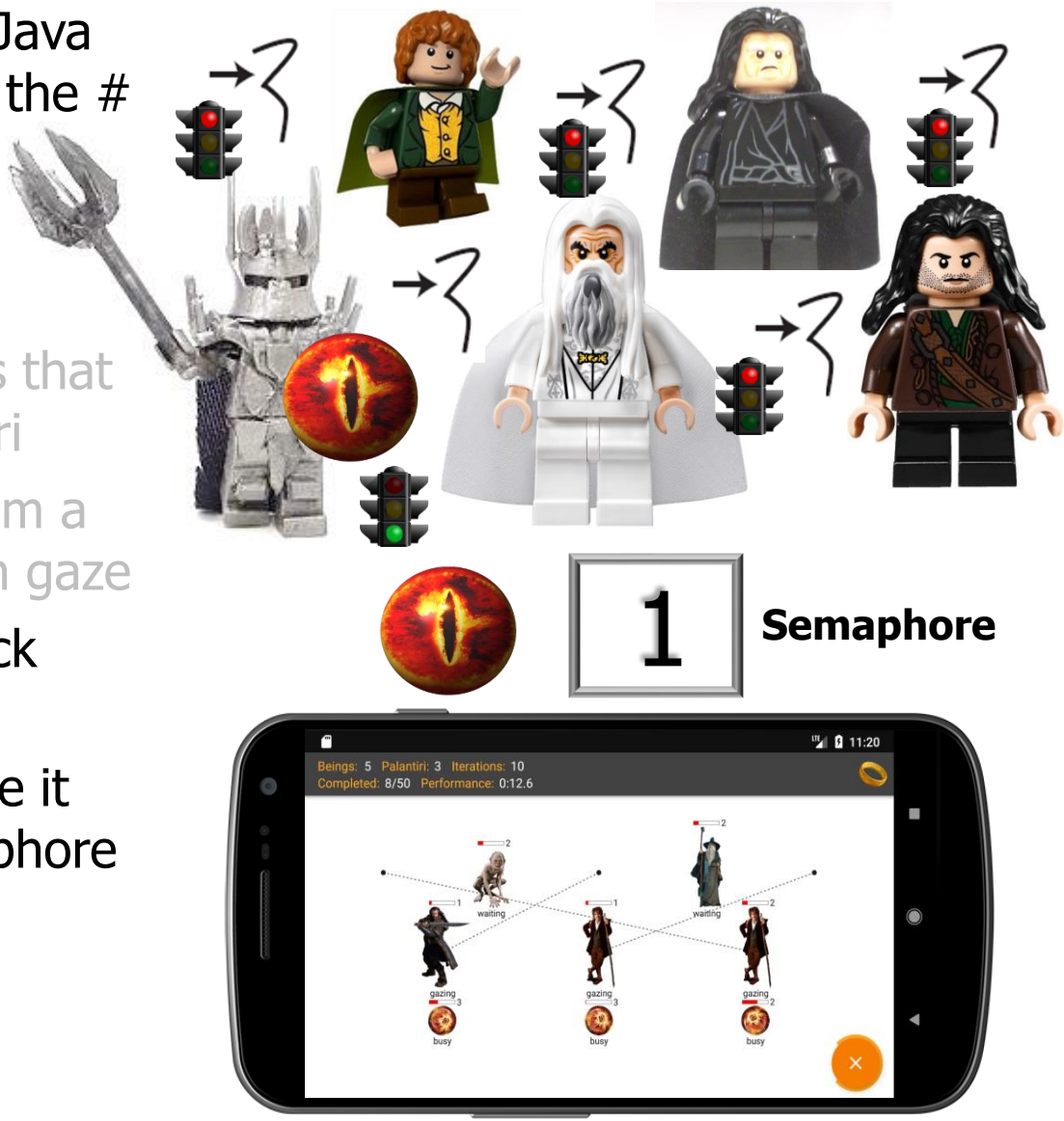

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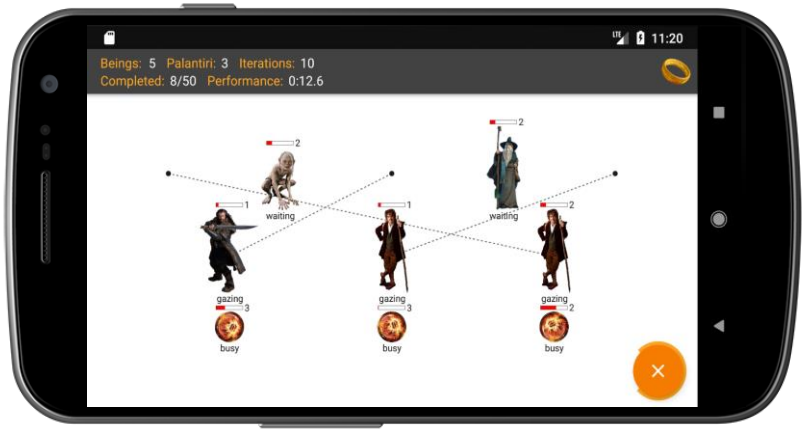

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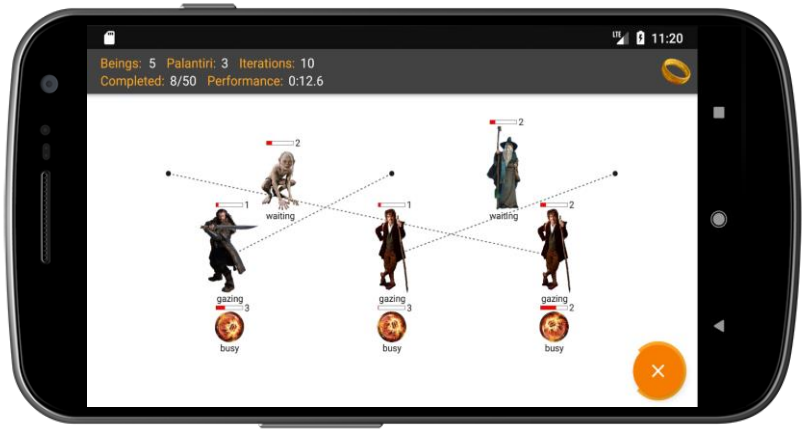

This example "fully brackets" the acquiring & releasing of permits, i.e., the thread that acquires a semaphore is the *same* as the one that releases it

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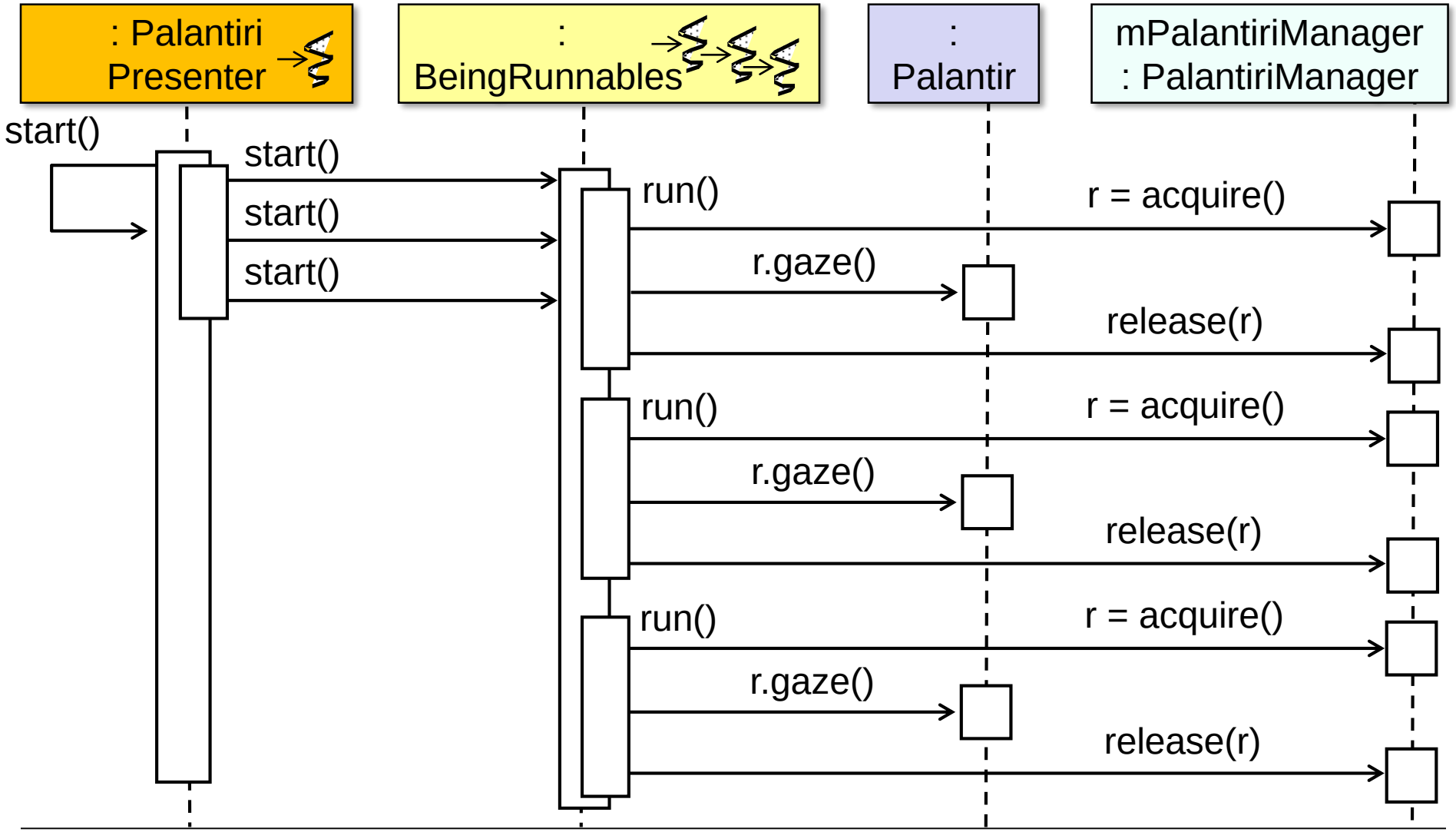
- UML sequence diagram for this app



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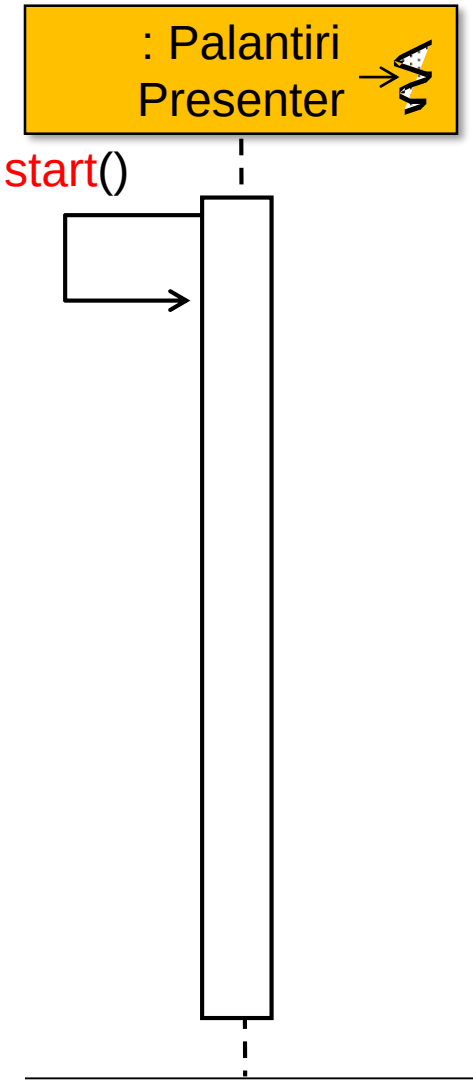

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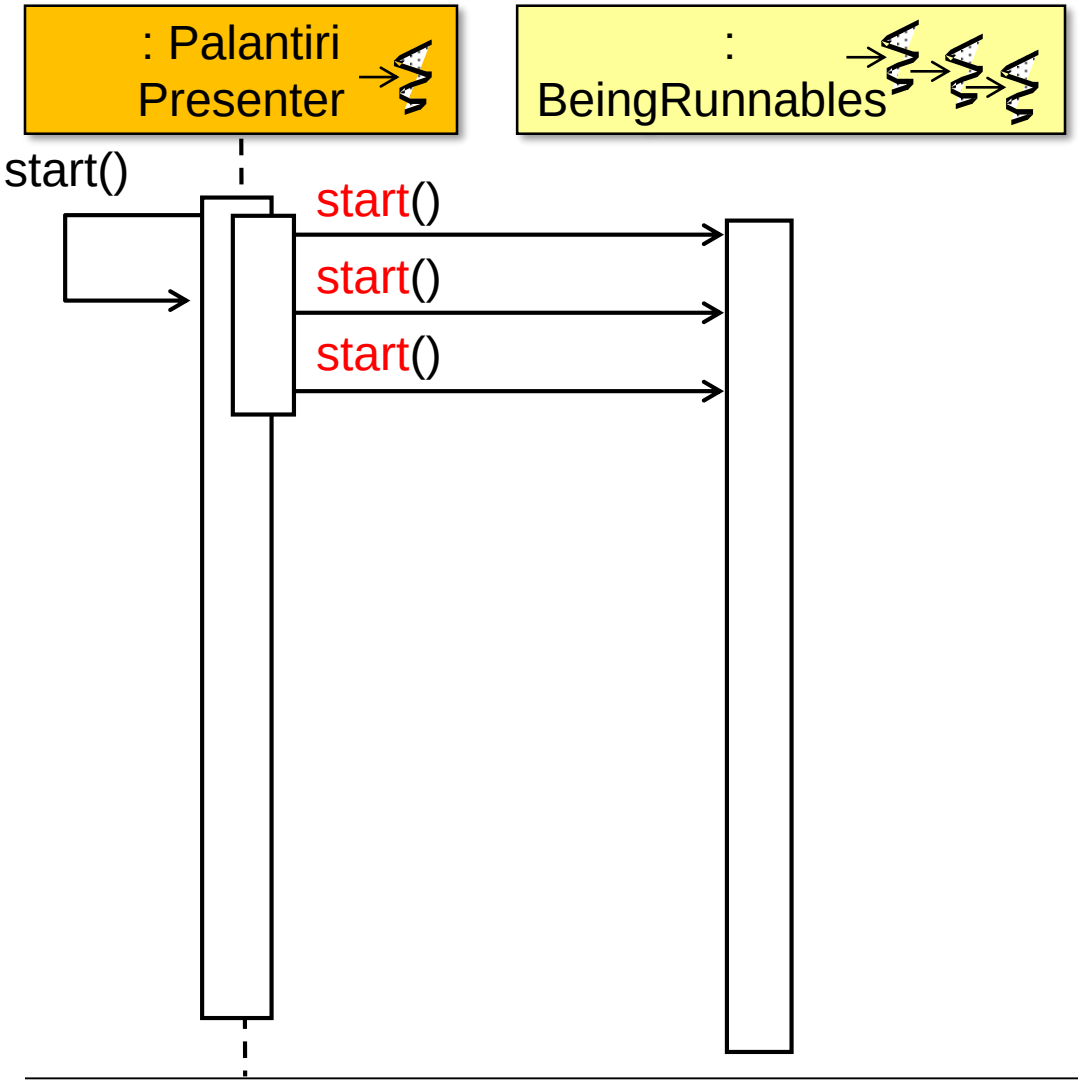

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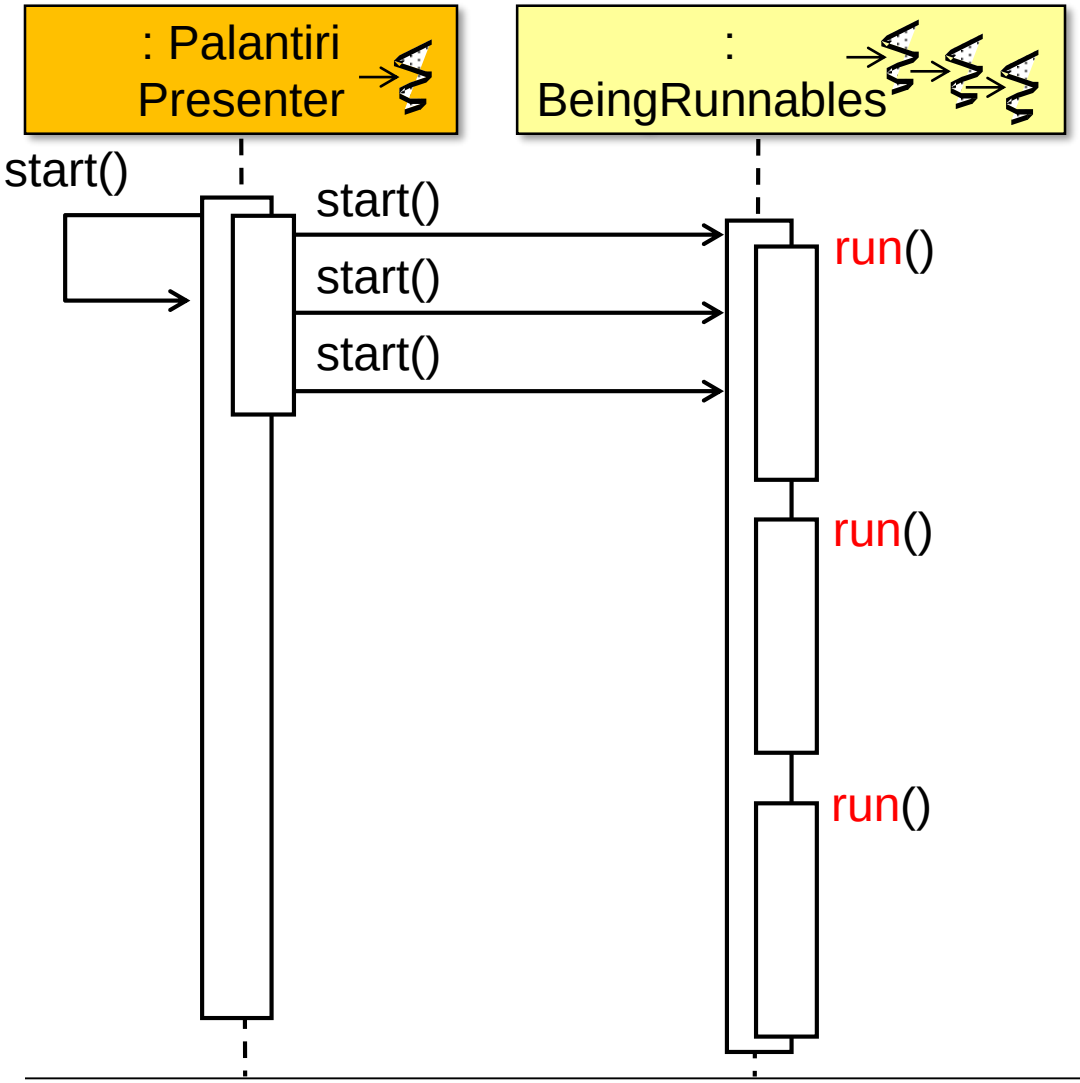

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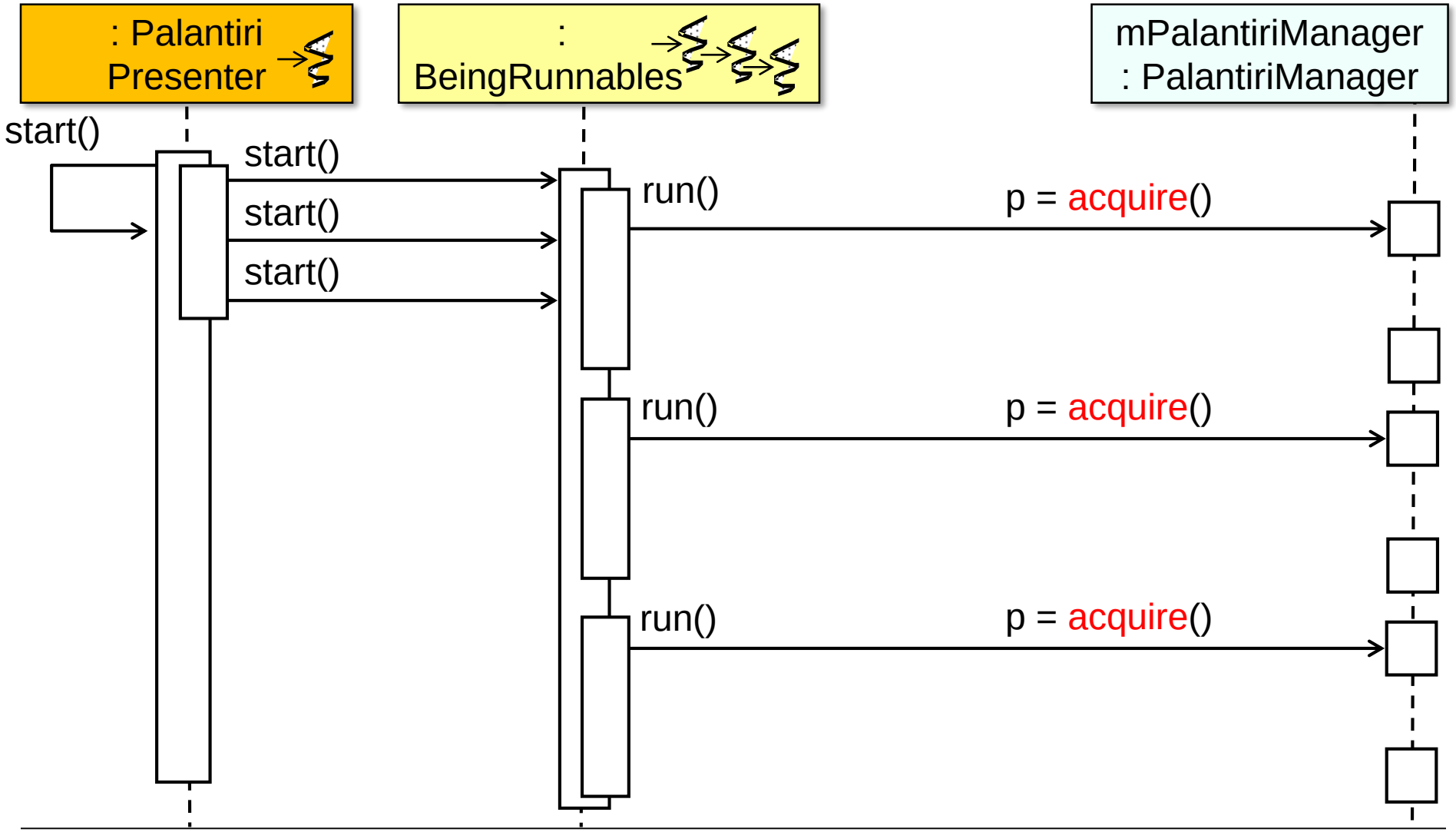

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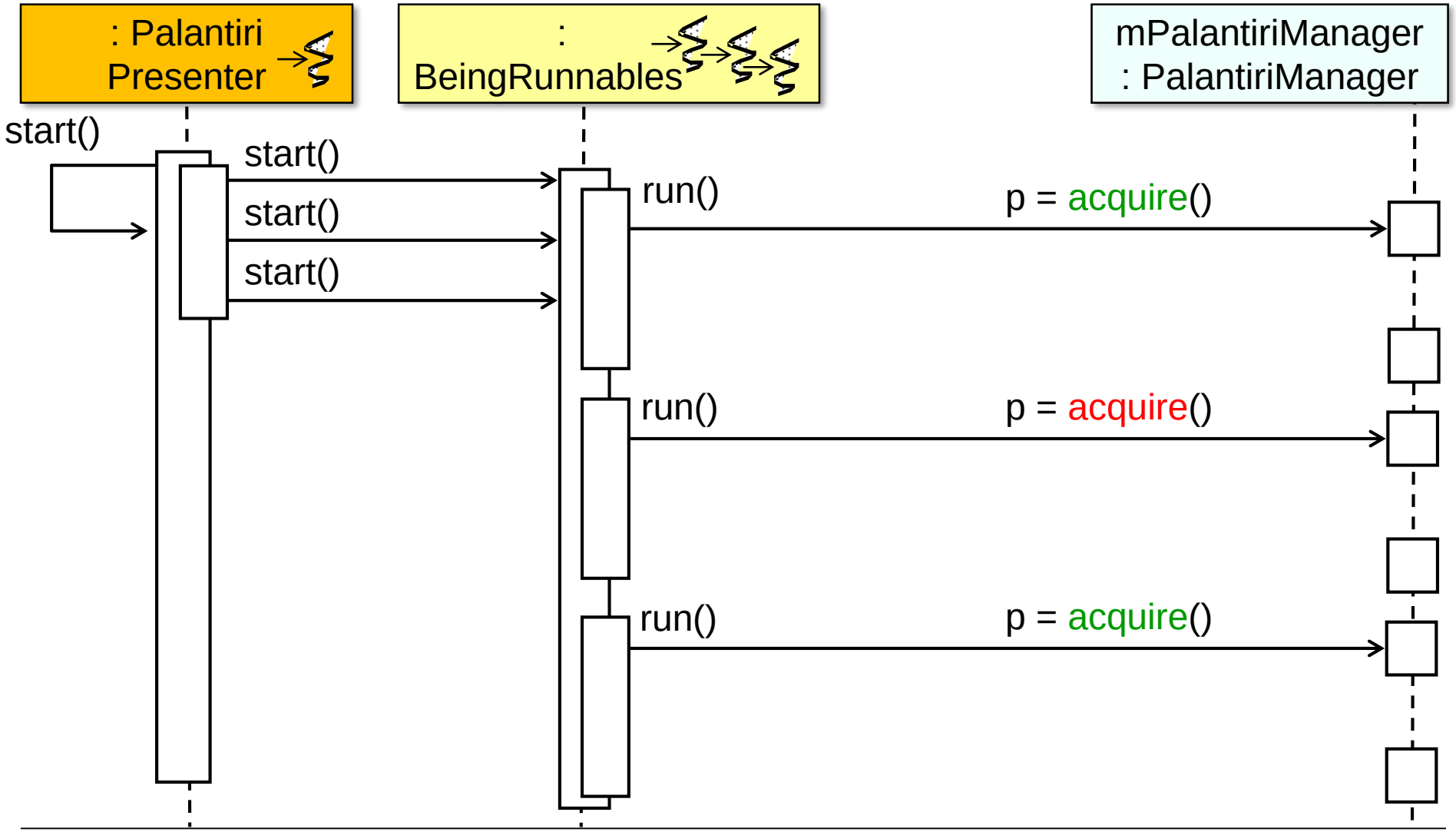

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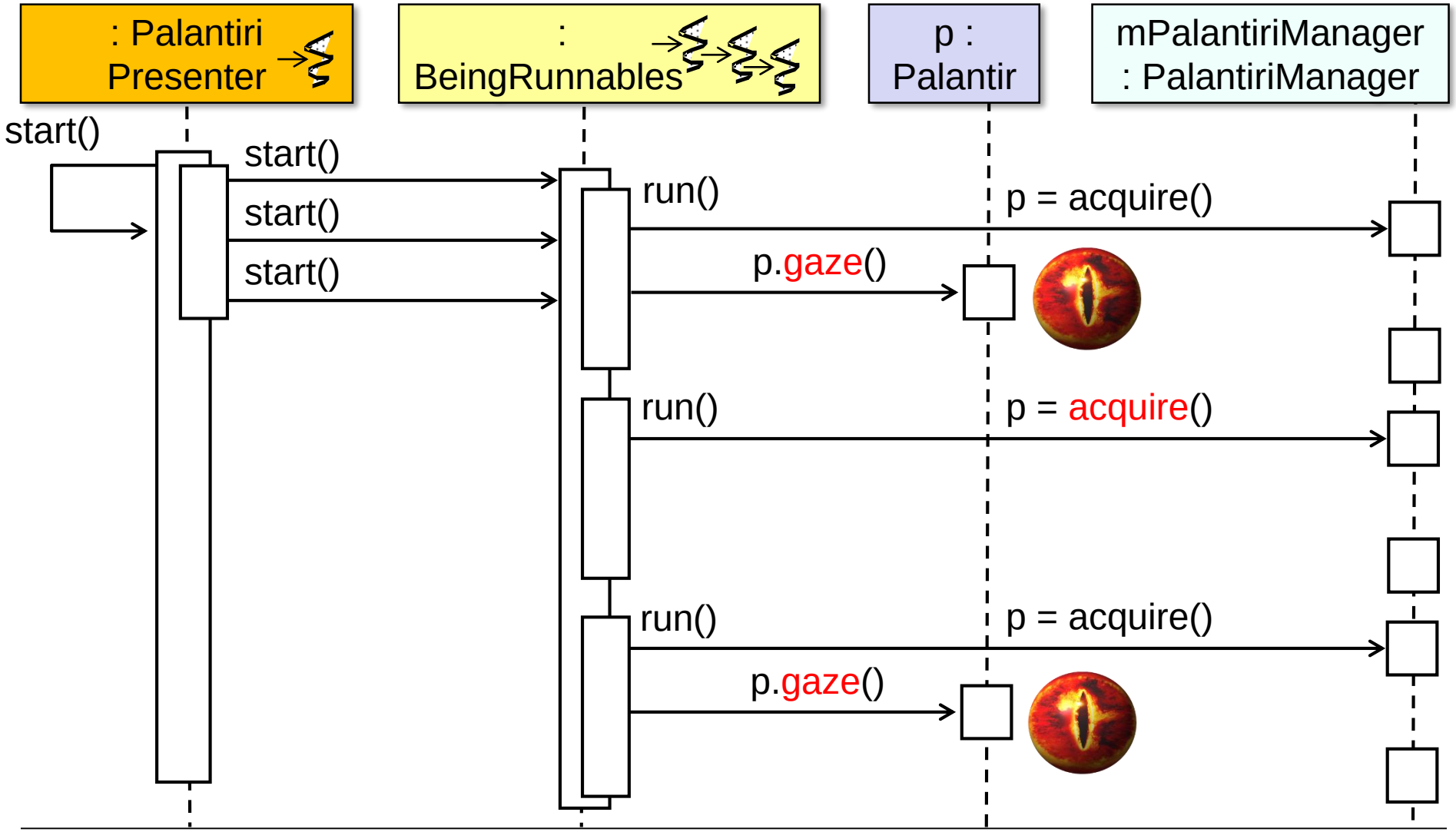

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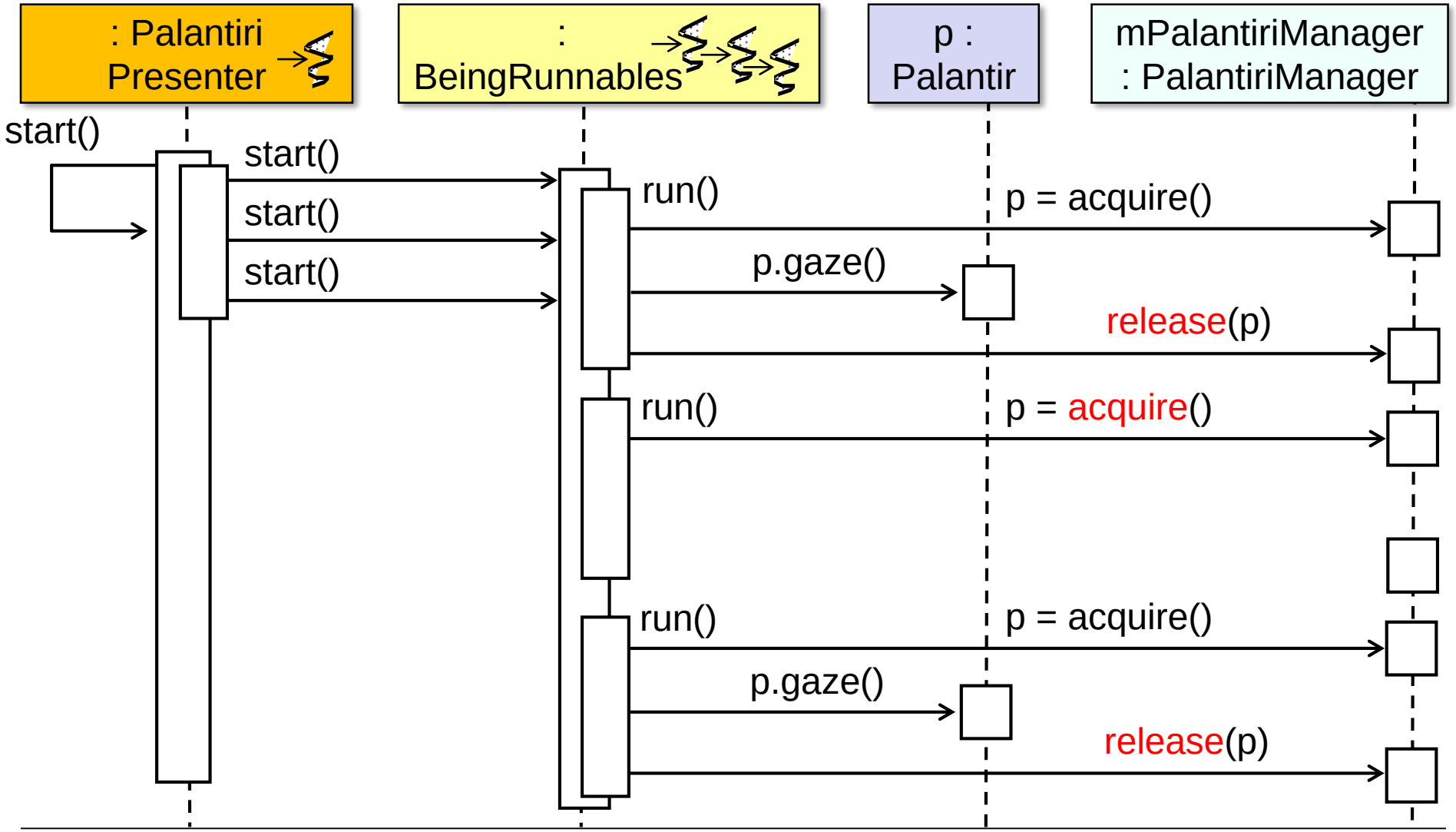

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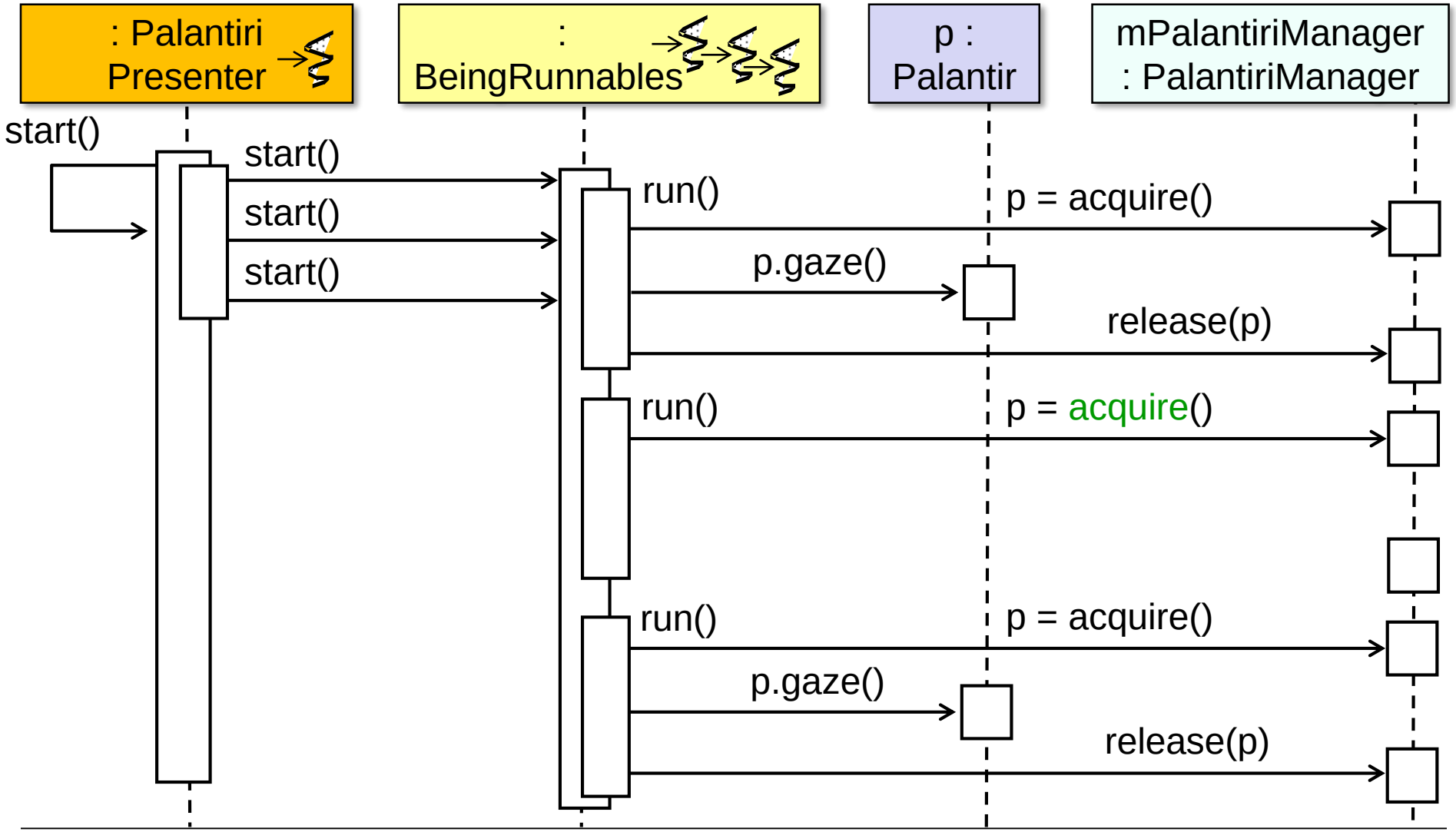

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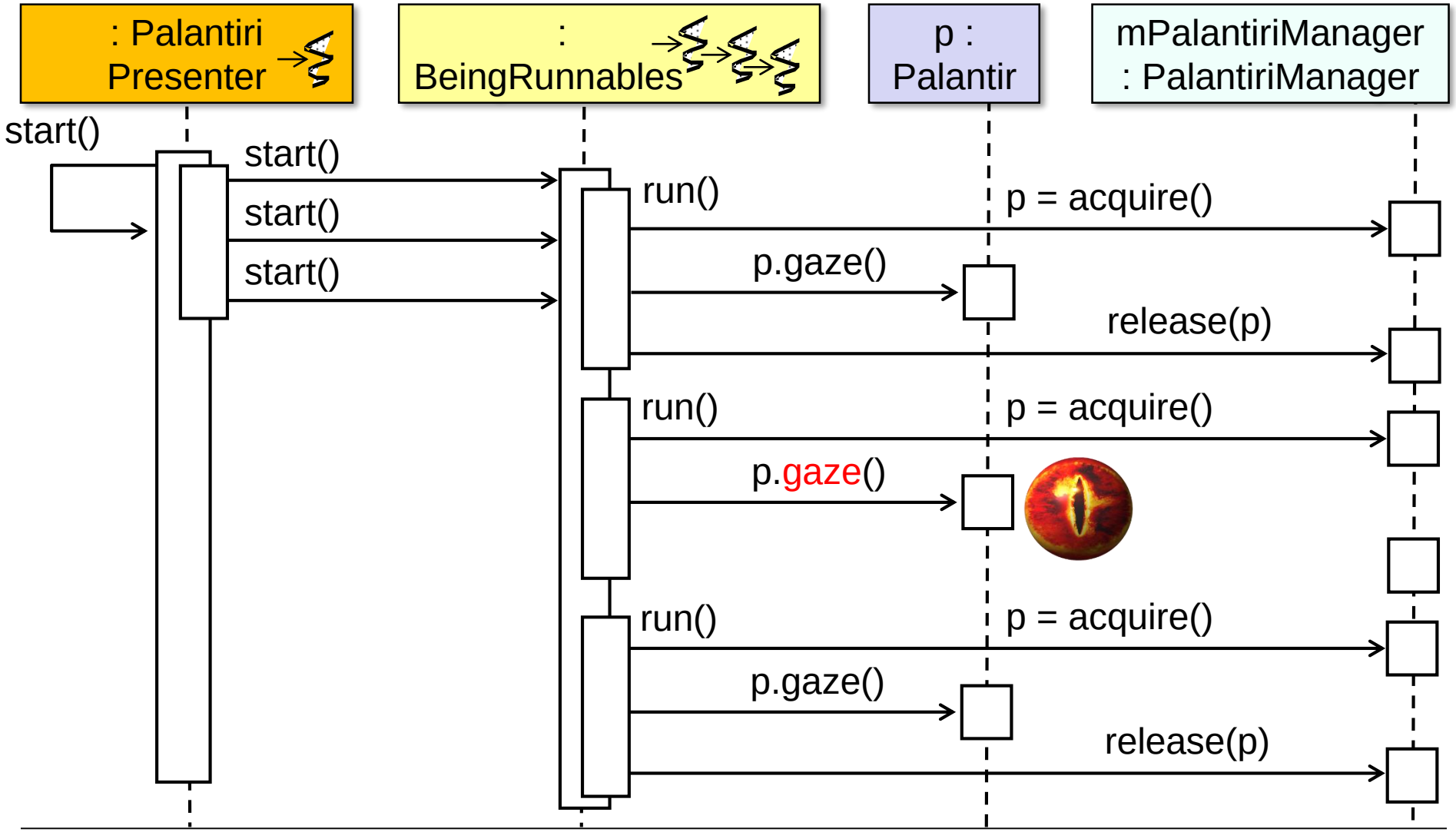

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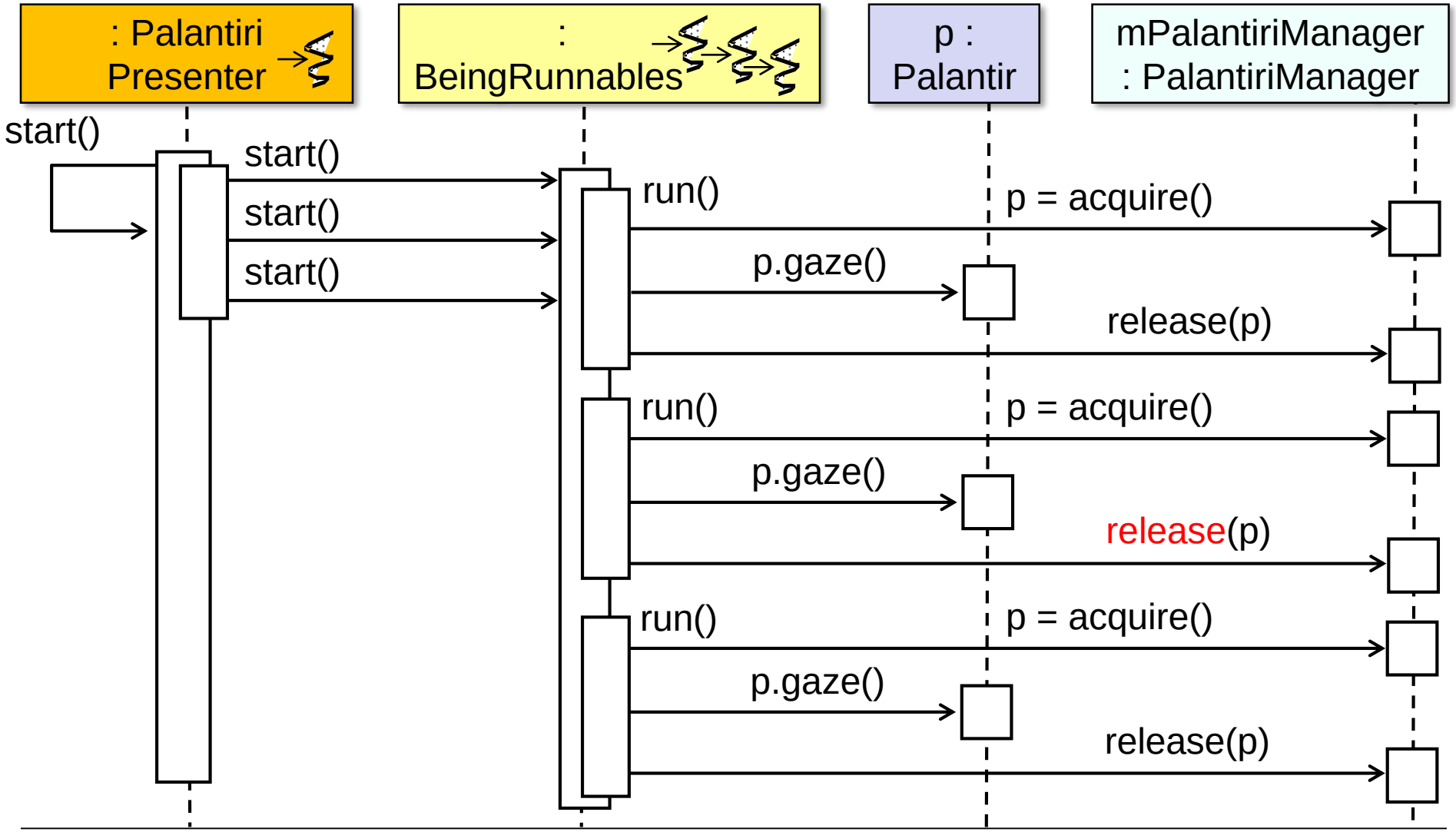

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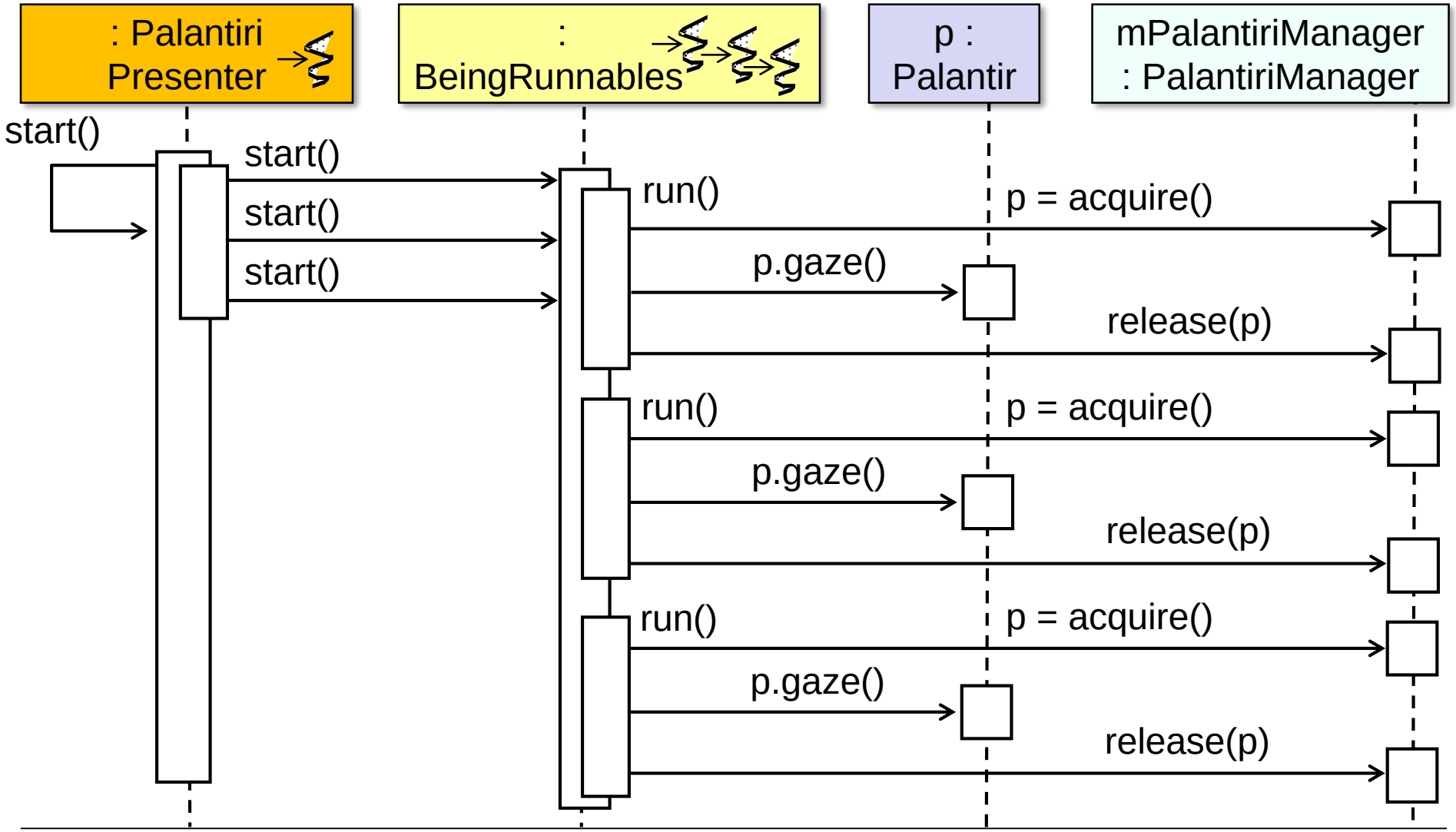

End of Java Semaphore: Mediating Access to Shared Resources