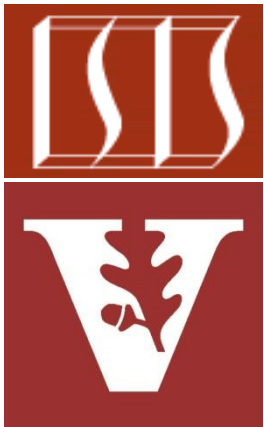# Mediating Access to Shared Resources via Java Semaphore

Douglas C. Schmidt
d.schmidt@vanderbilt.edu
www.dre.vanderbilt.edu/~schmidt

**Institute for Software
Integrated Systems
Vanderbilt University
Nashville, Tennessee, USA**

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
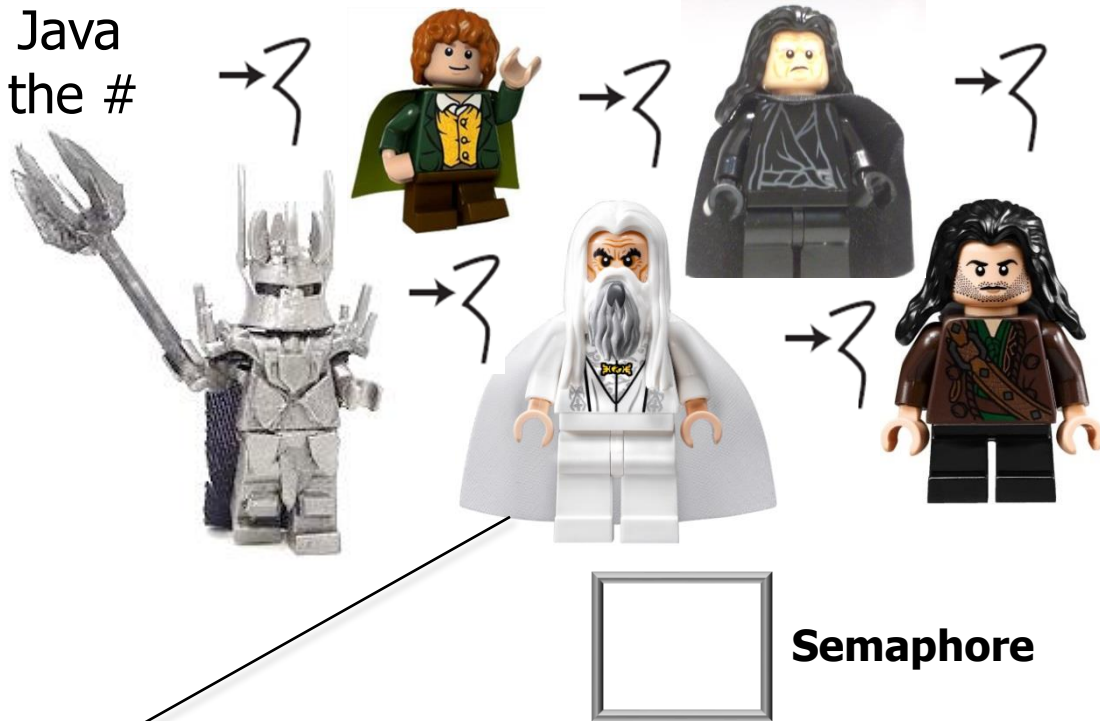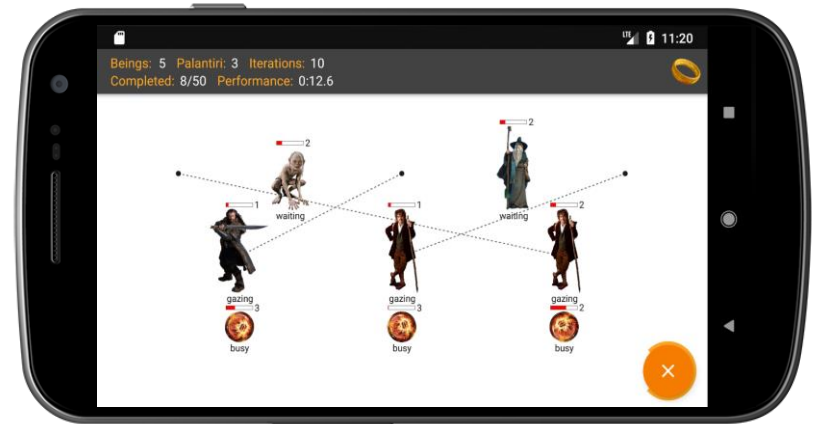 - Mediate access to a limited # of shared resources

Semaphore
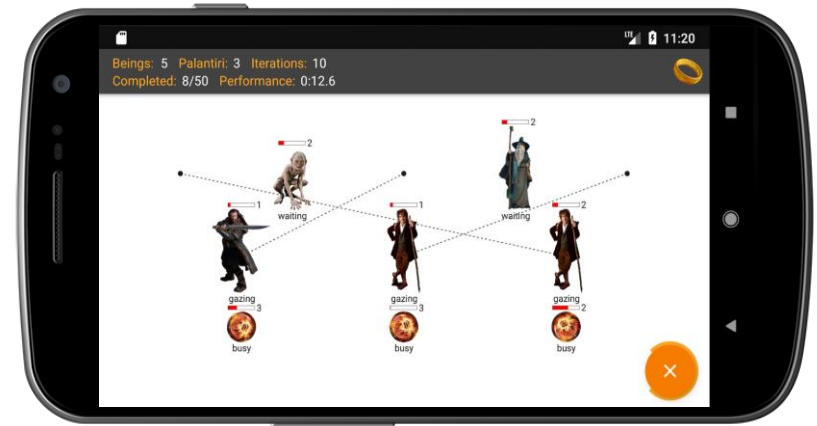
Applying a Java Semaphore to Mediate Access

Applying a Java Semaphore to Mediate Access

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

Semaphore

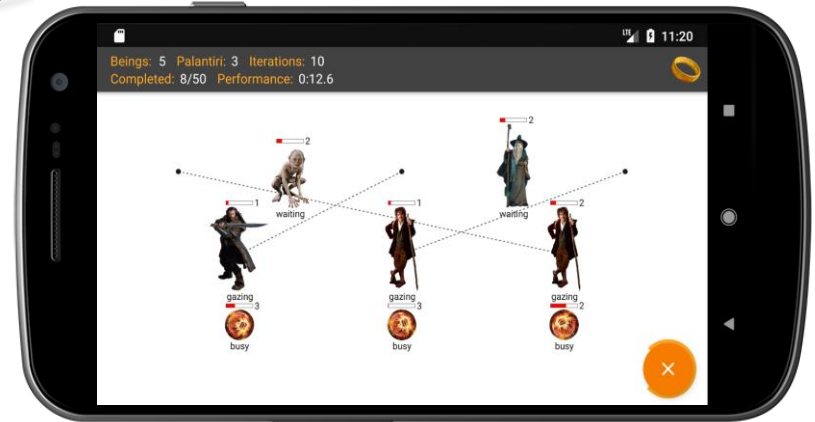*Each being is implemented to run in a separate thread*

See en.wikipedia.org/wiki/Palantir

Applying a Java Semaphore to Mediate Access

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  - The app can be configured to restrict the # of being threads that concurrently gaze into palantiri

Semaphore

e.g., limit to two palantiri on a quad-core device to ensure system responsiveness
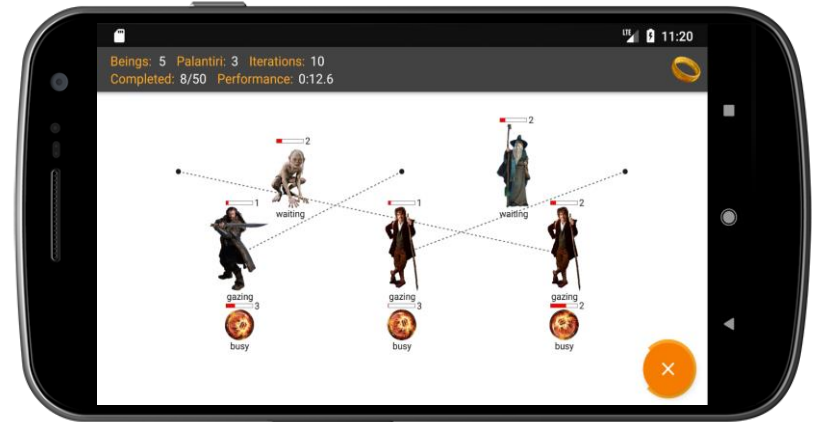
5

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Semaphore

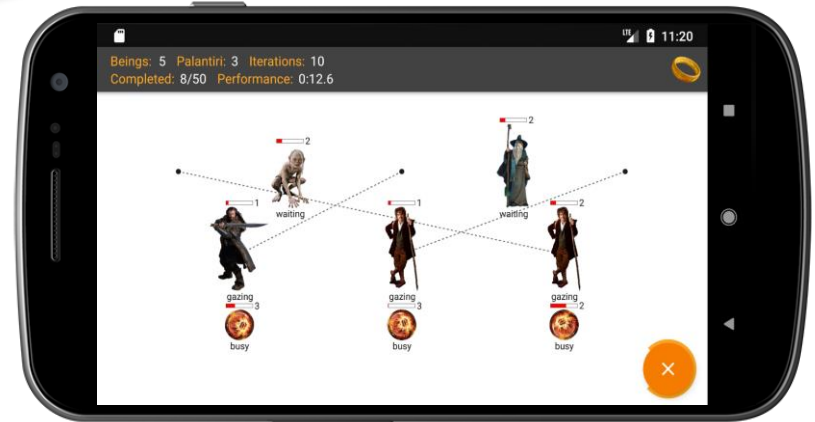*Acquiring a permit atomically decrements the permit count*

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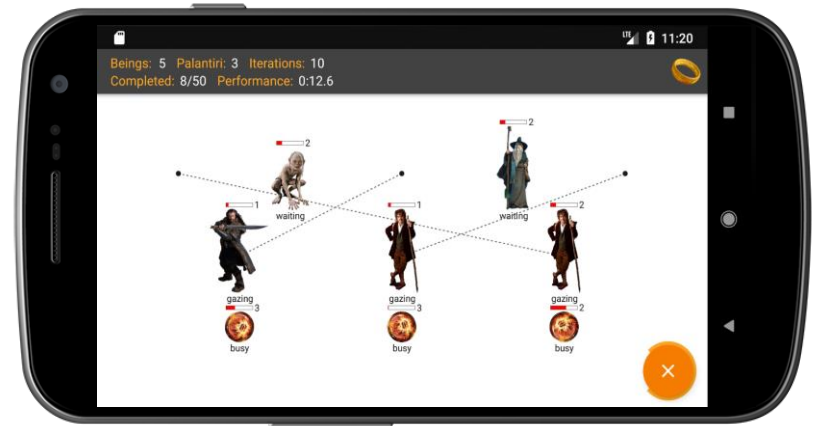
0 **Semaphore**

All available permits are now in use

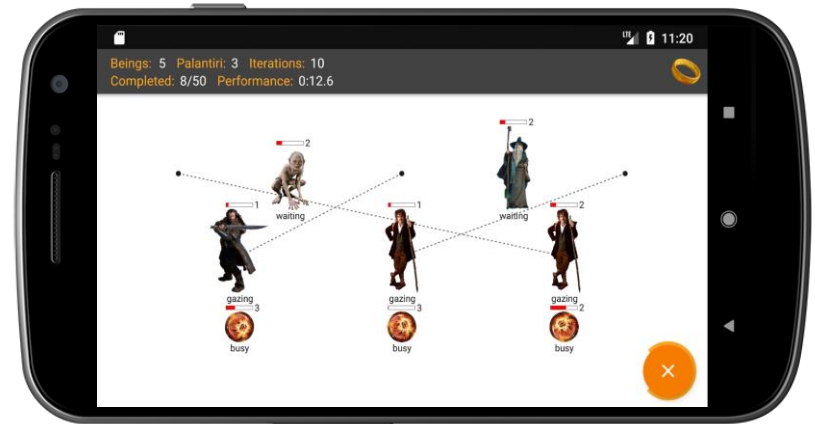# Applying a Java Semaphore to Mediate Access

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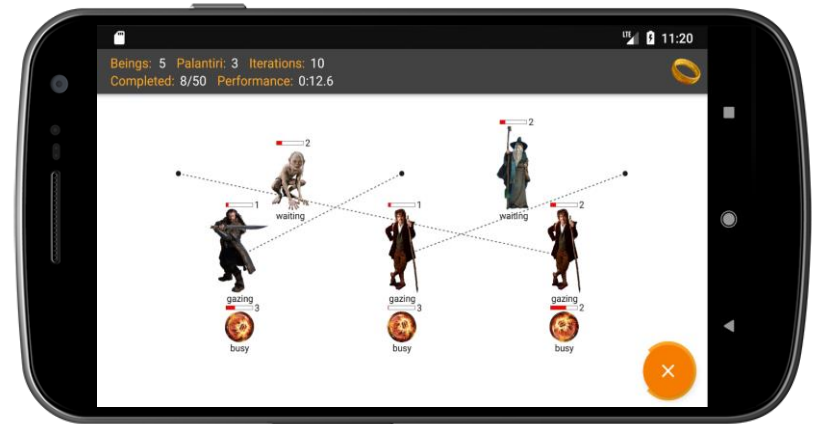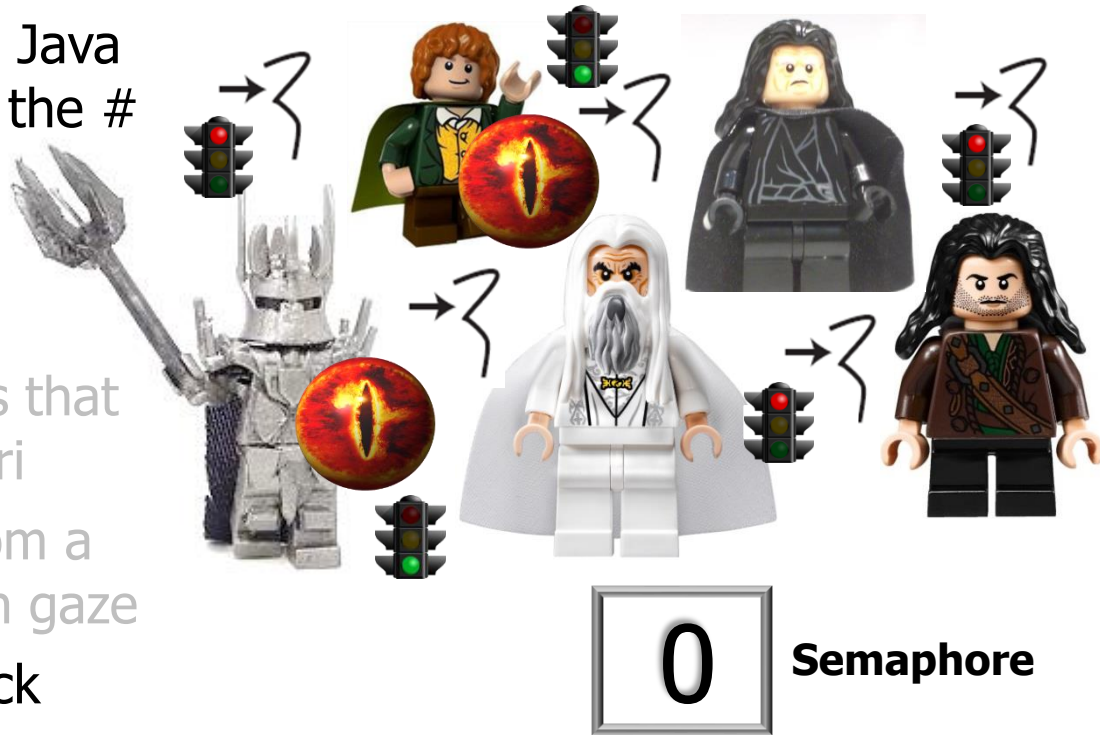- Other being threads must block until a permit is available
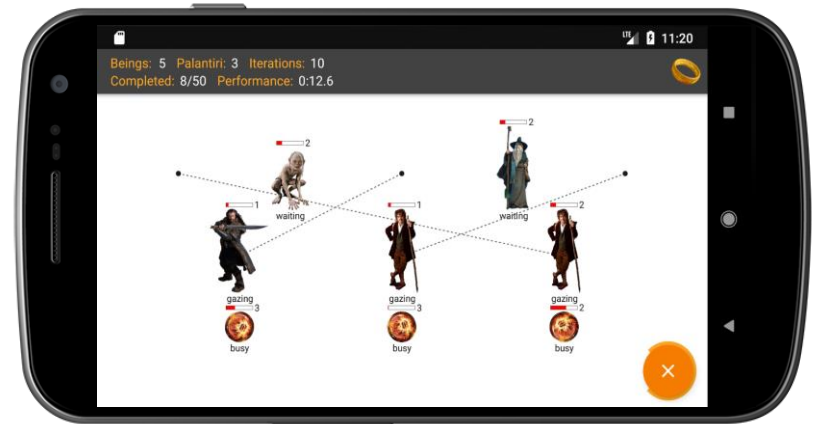
Semaphore

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  - When a being thread is done it gazing it releases the semaphore
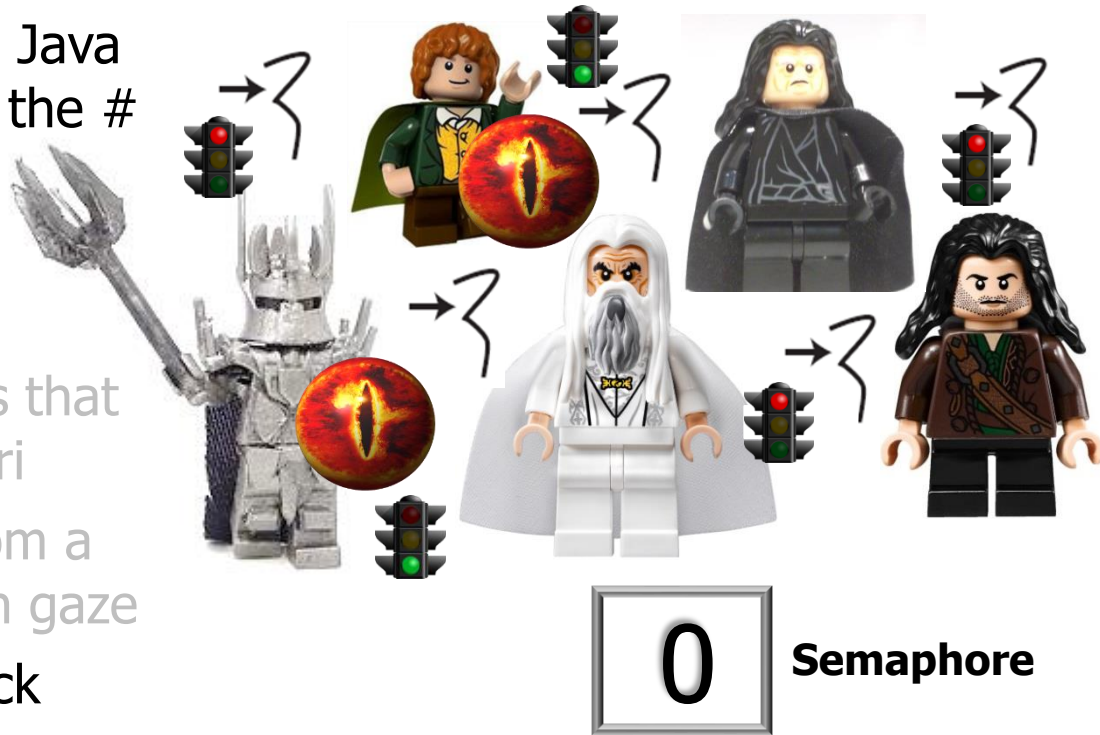
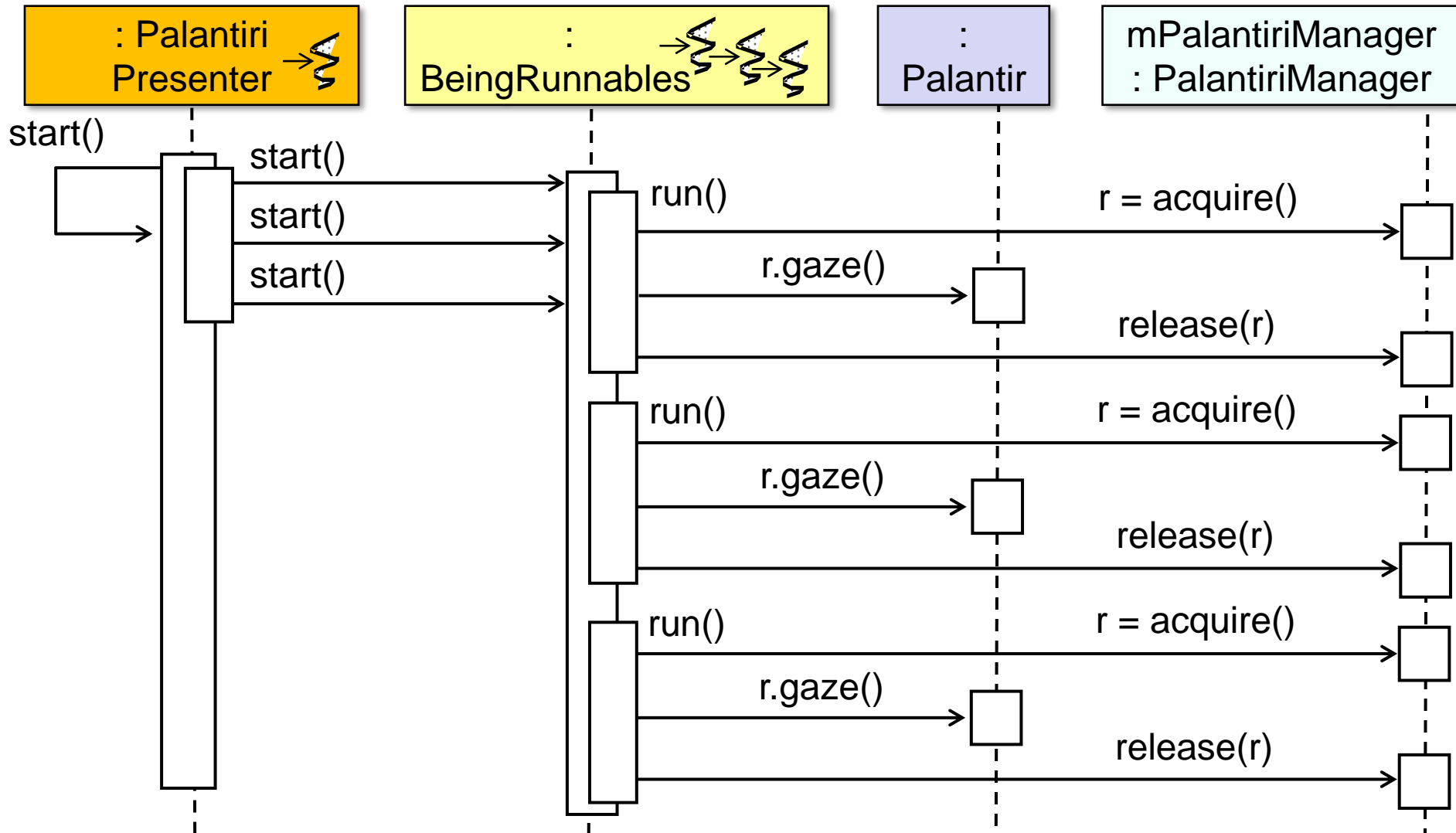**Semaphore**

Applying a Java Semaphore to Mediate Access

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0 **Semaphore**

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
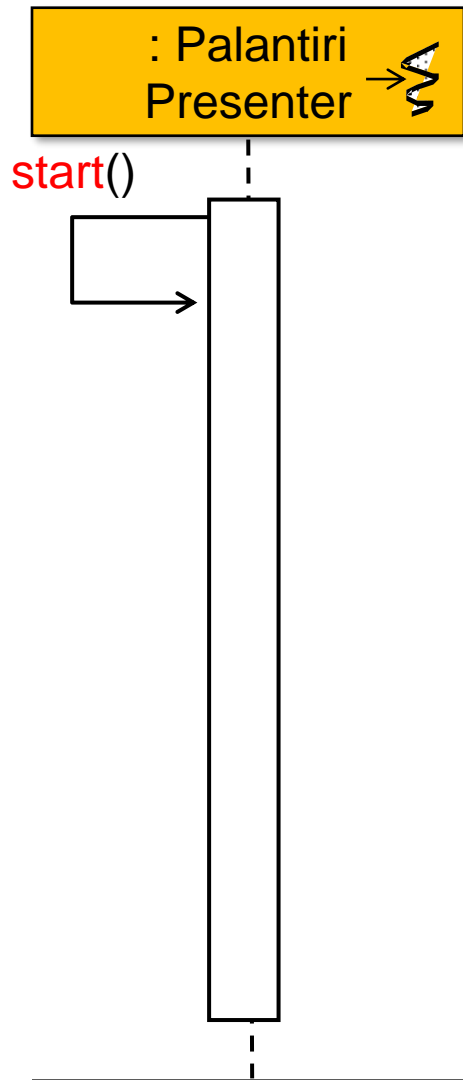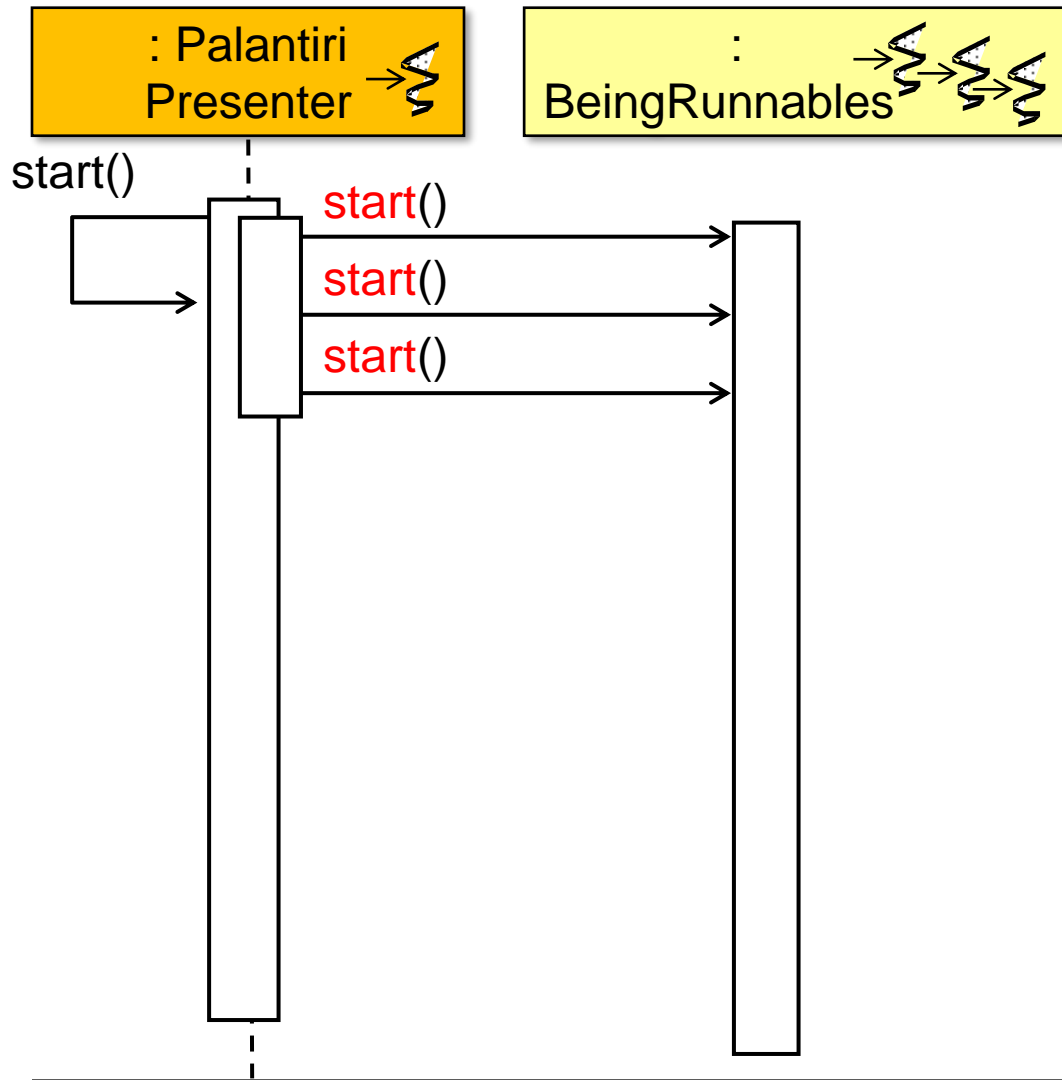
Applying a Java Semaphore to Mediate Access

- UML sequence diagram for this app

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start()

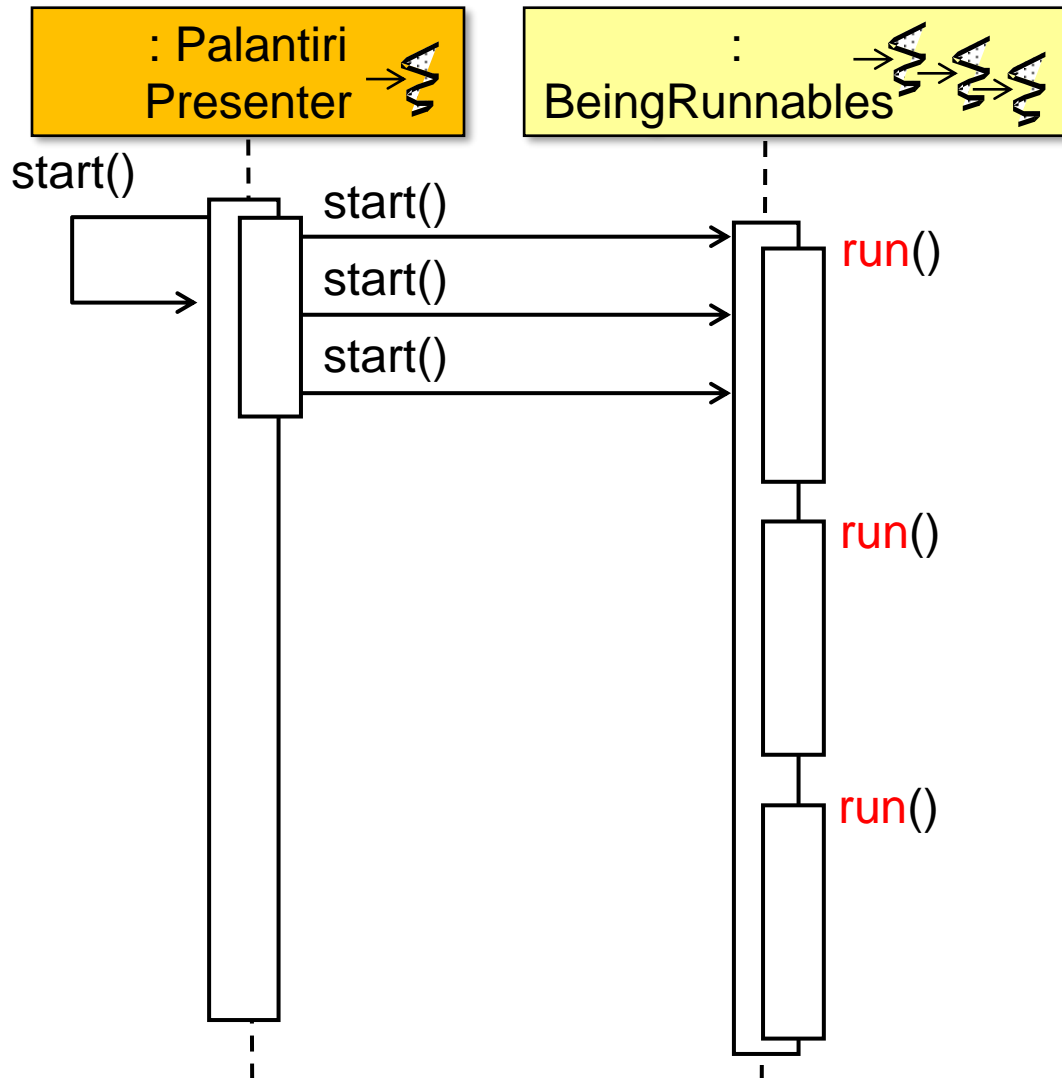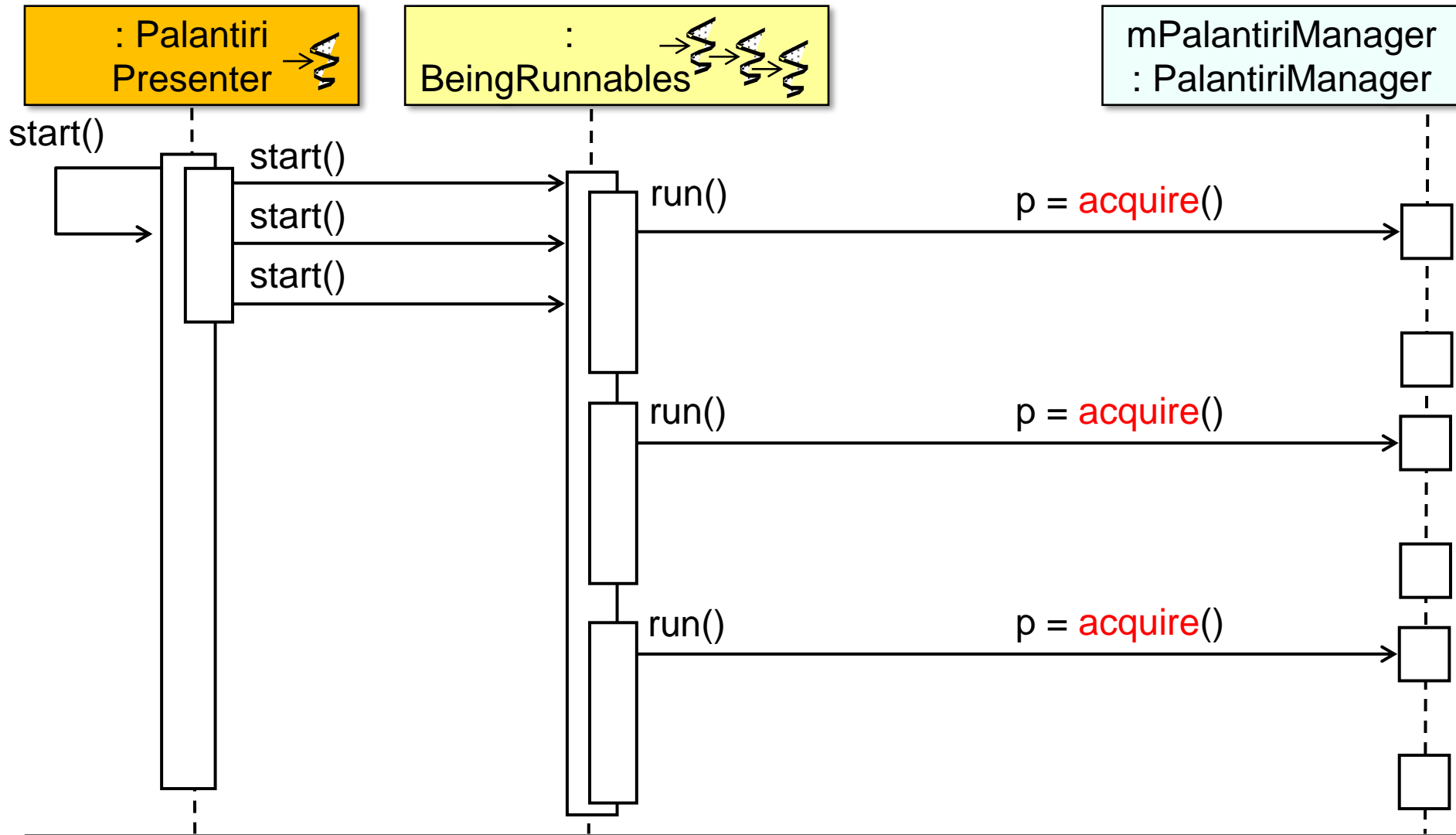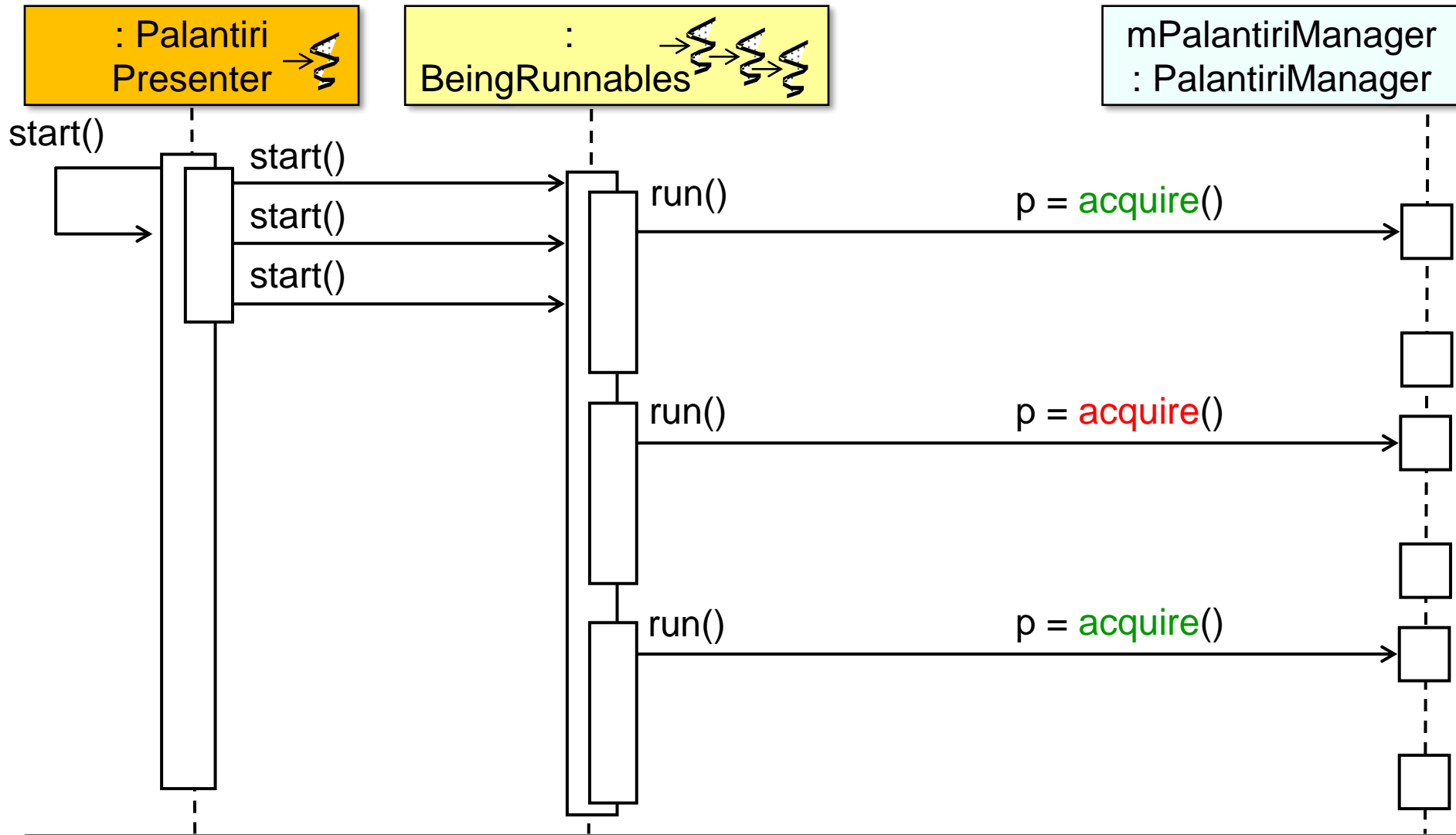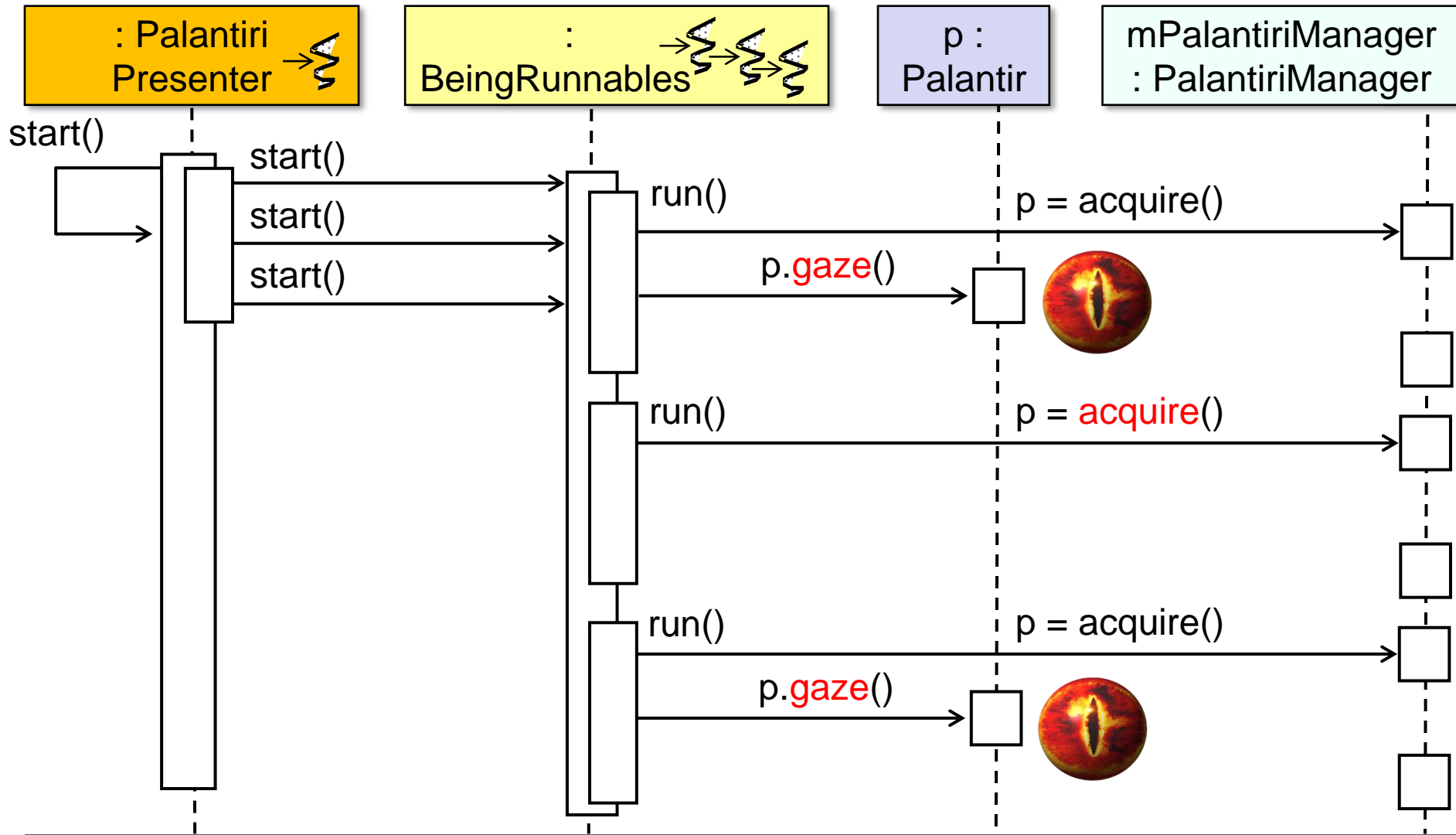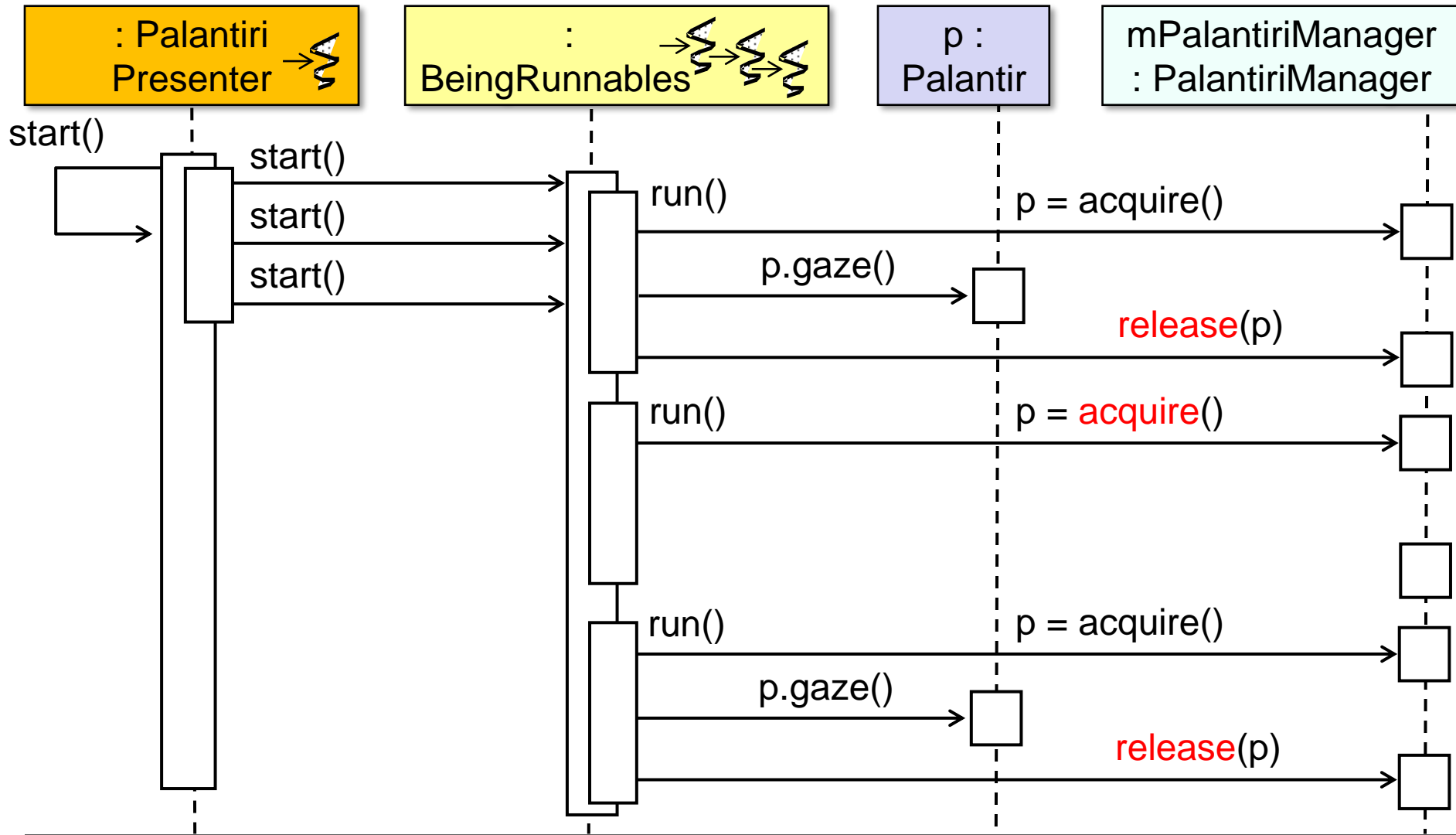# Applying a Java Semaphore to Mediate Access

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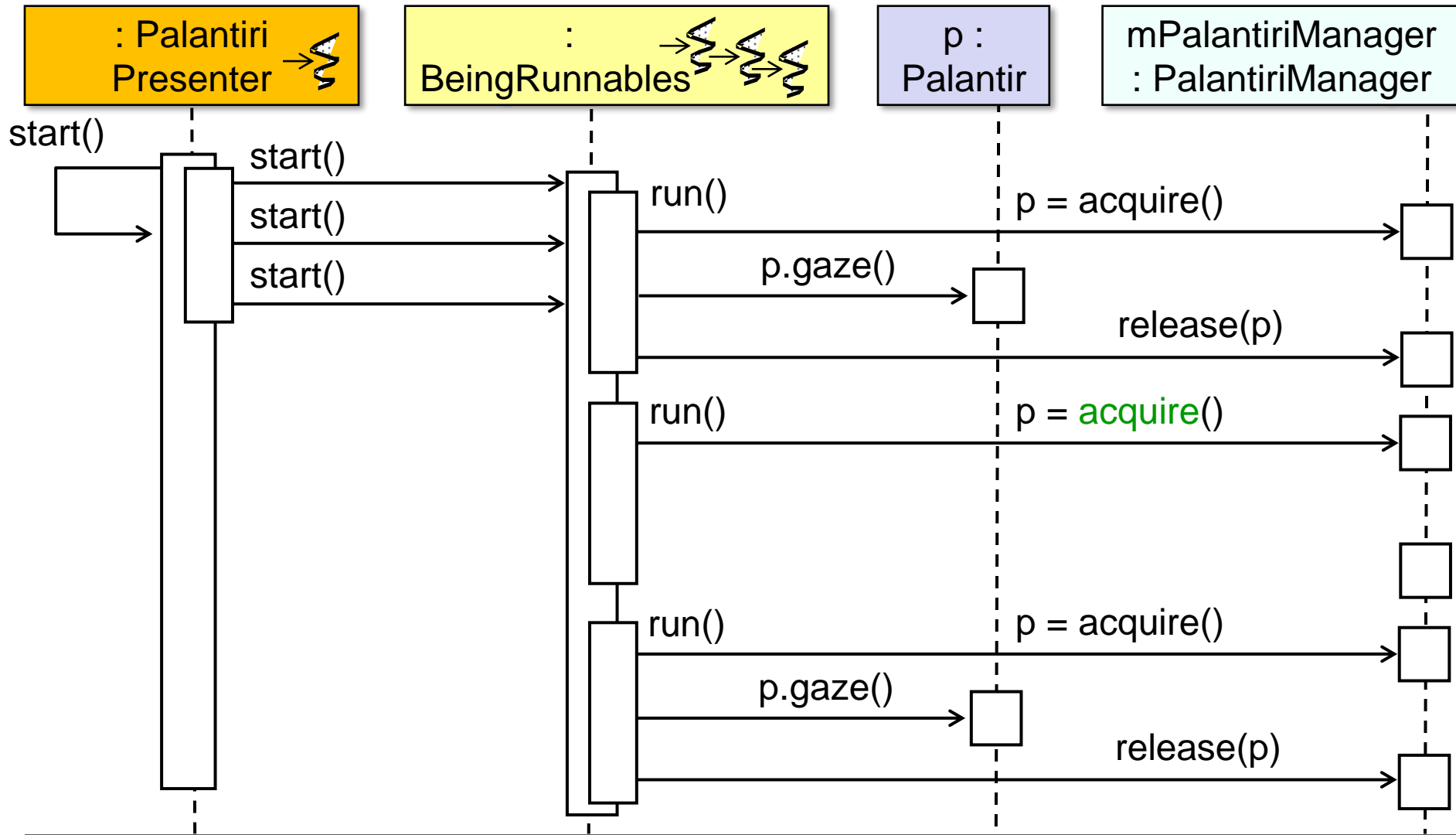- UML sequence diagram for this app

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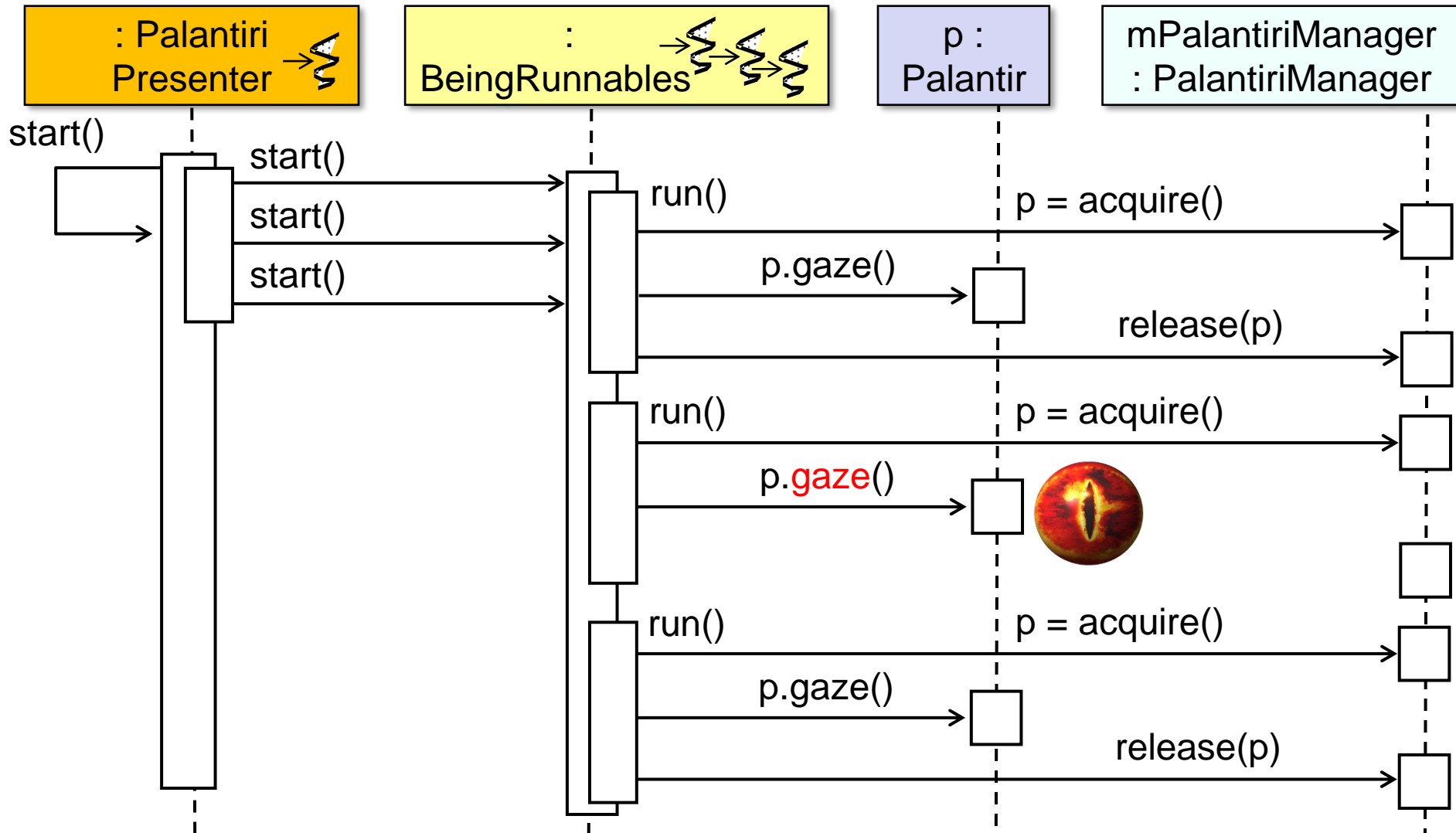
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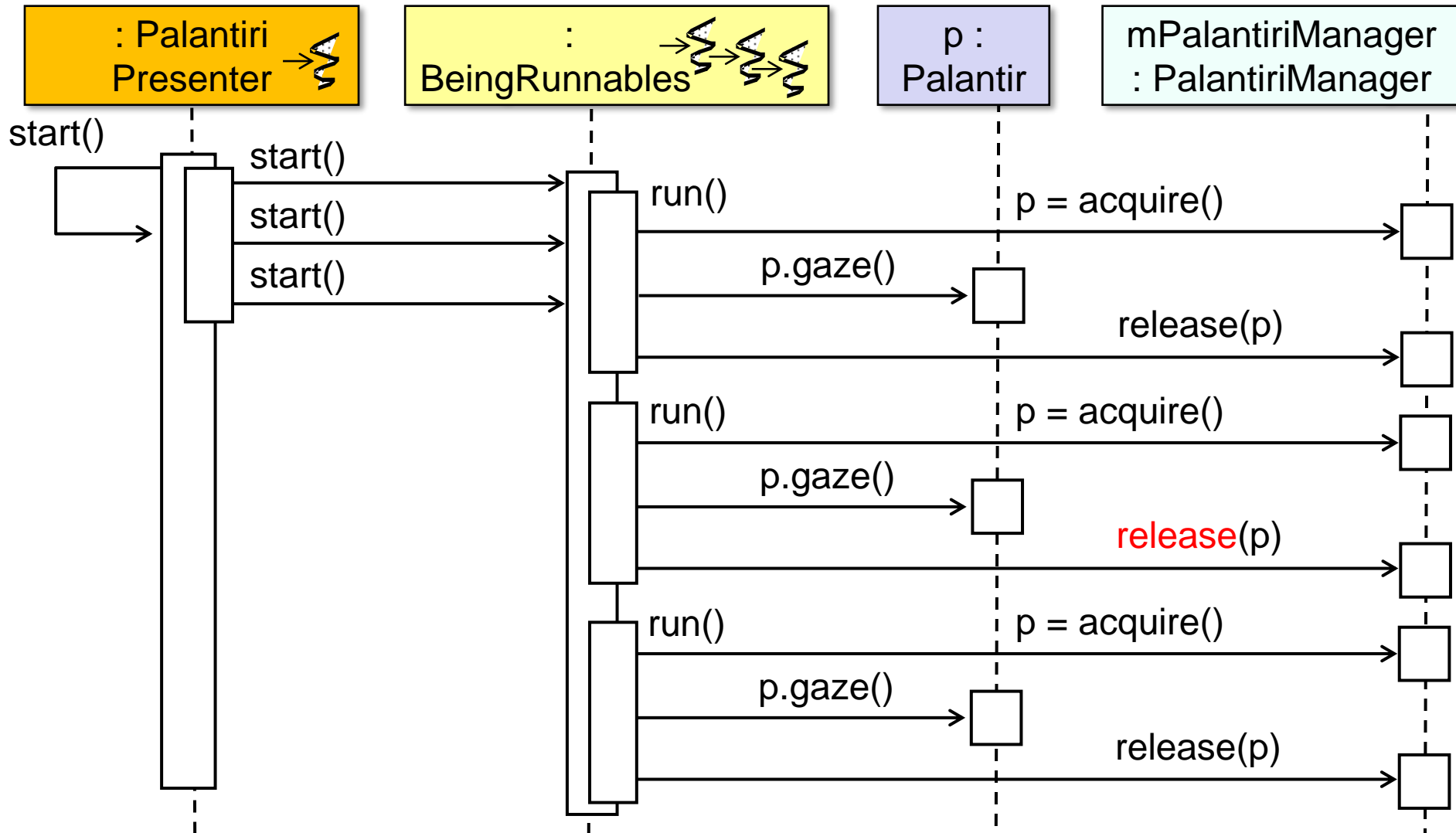
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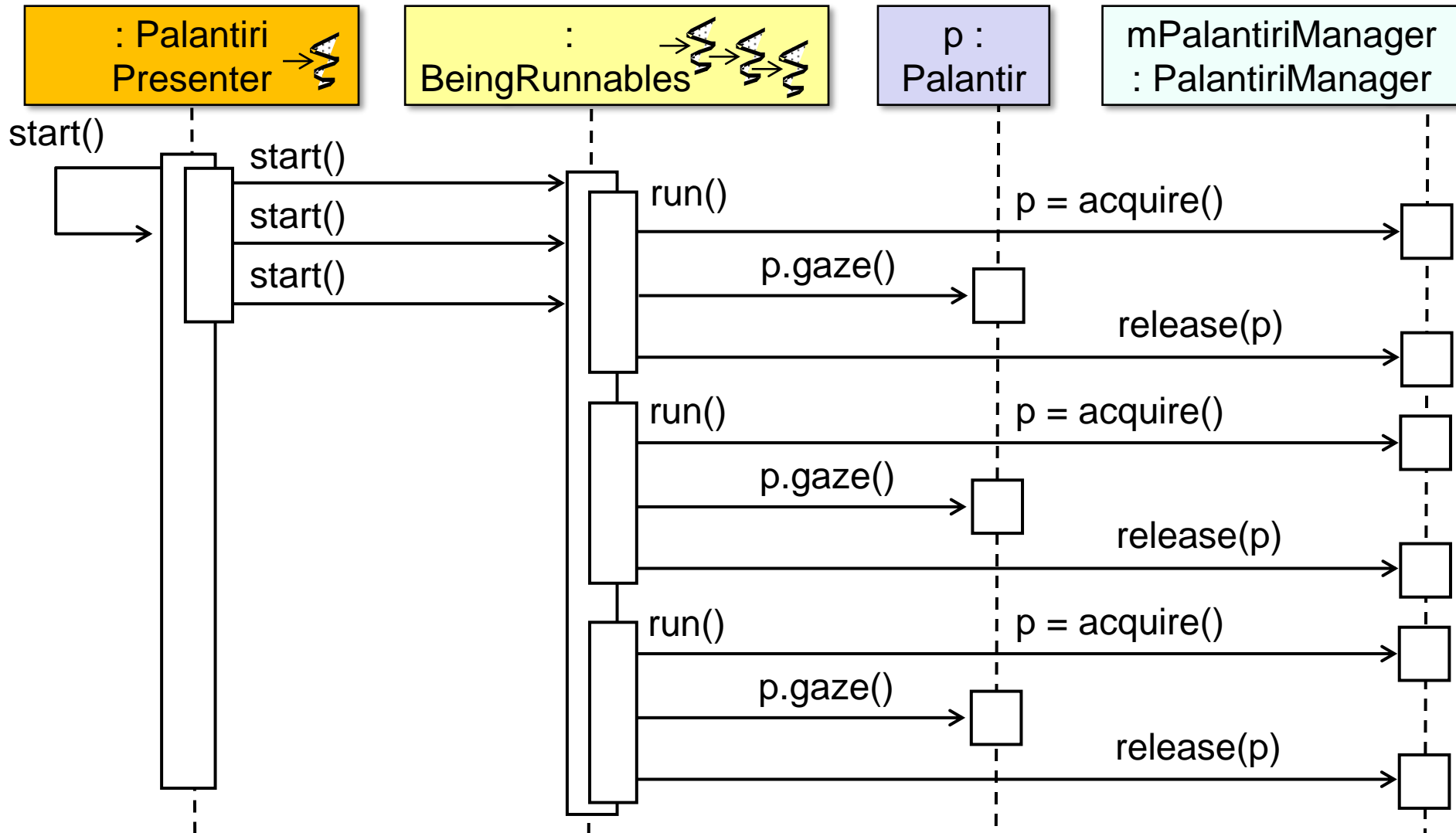
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End of Mediating Access to Shared Resources via Java Semaphore