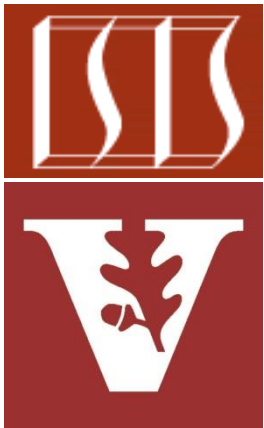


Android & Java Frameworks: Key Characteristics



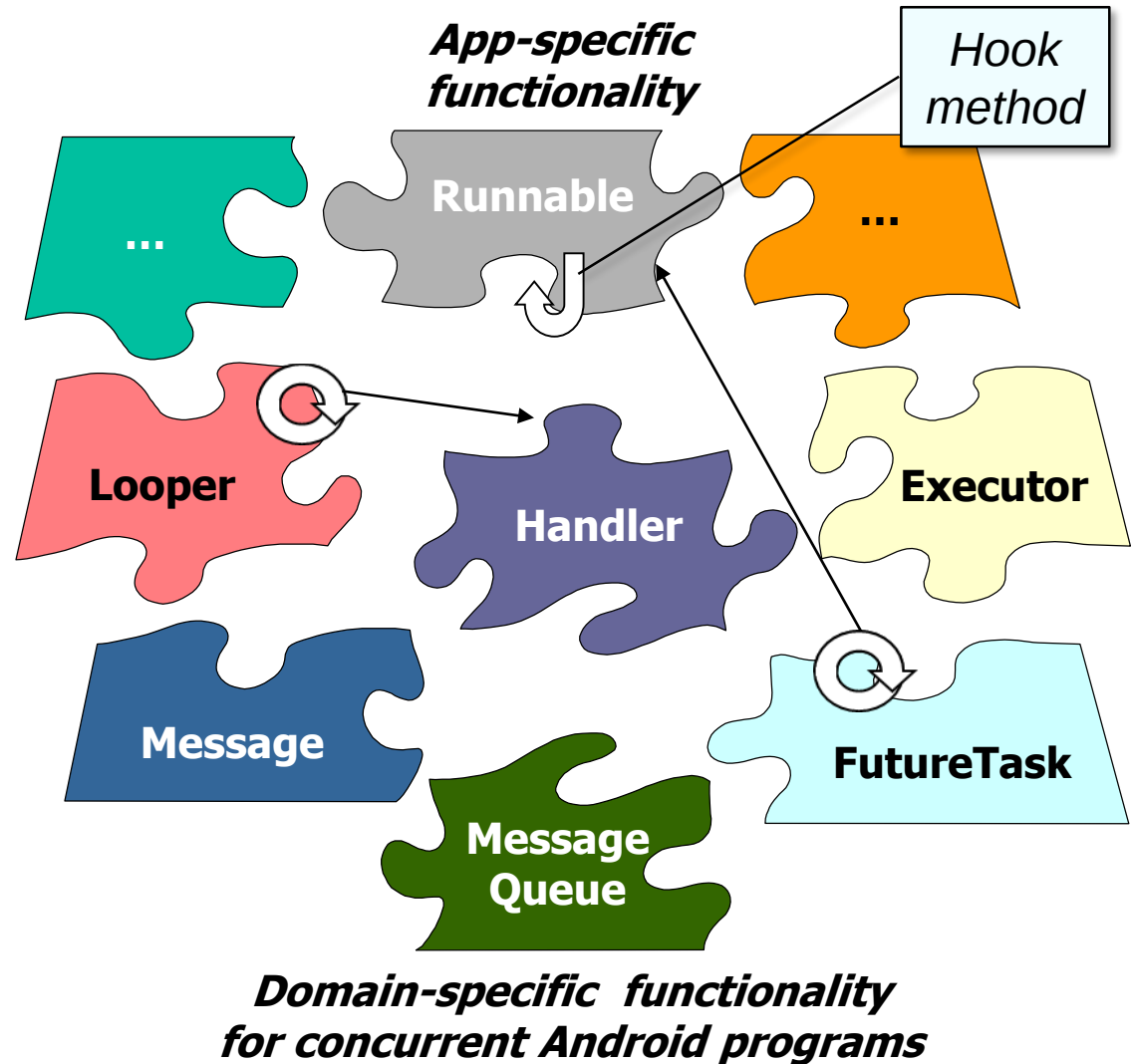
Douglas C. Schmidt
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**Institute for Software
Integrated Systems
Vanderbilt University
Nashville, Tennessee, USA**



Learning Objectives in this Part of the Lesson

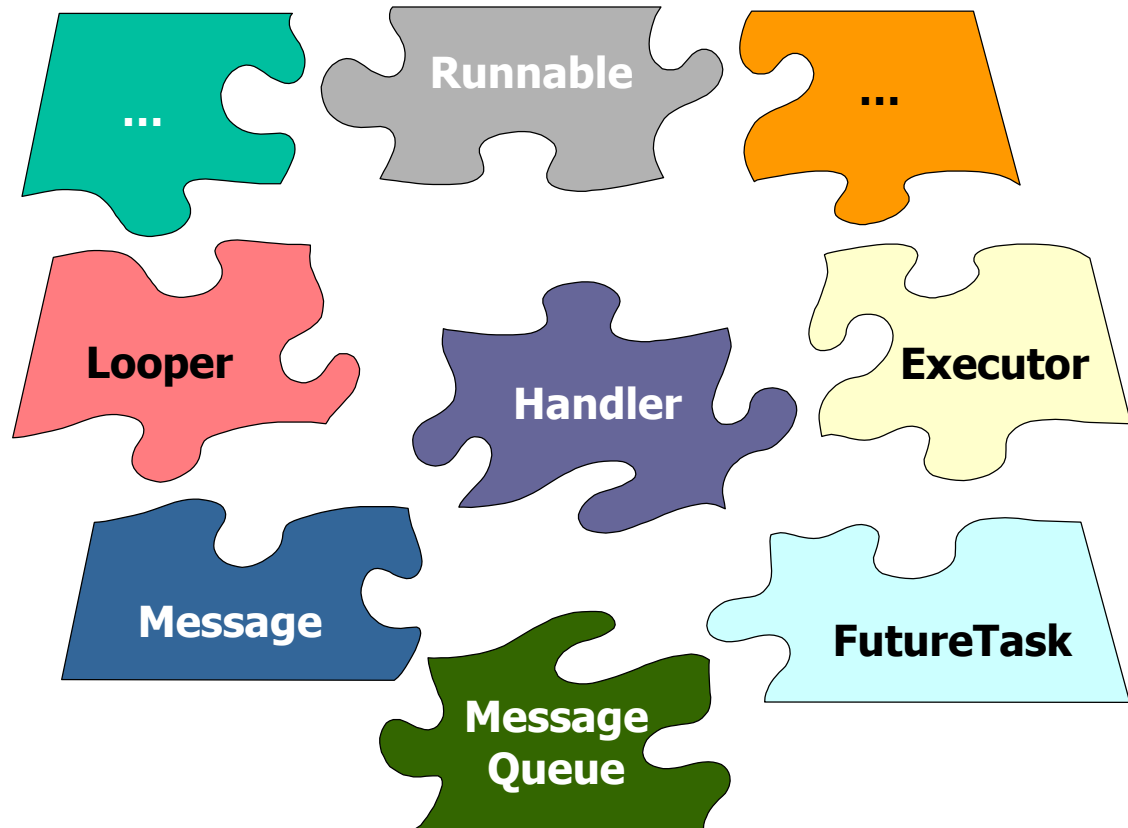
- Understand how software frameworks are used in Android & Java
- Identify key characteristics of Android frameworks



Key Characteristics of Android Frameworks

Key Characteristics of Android Frameworks

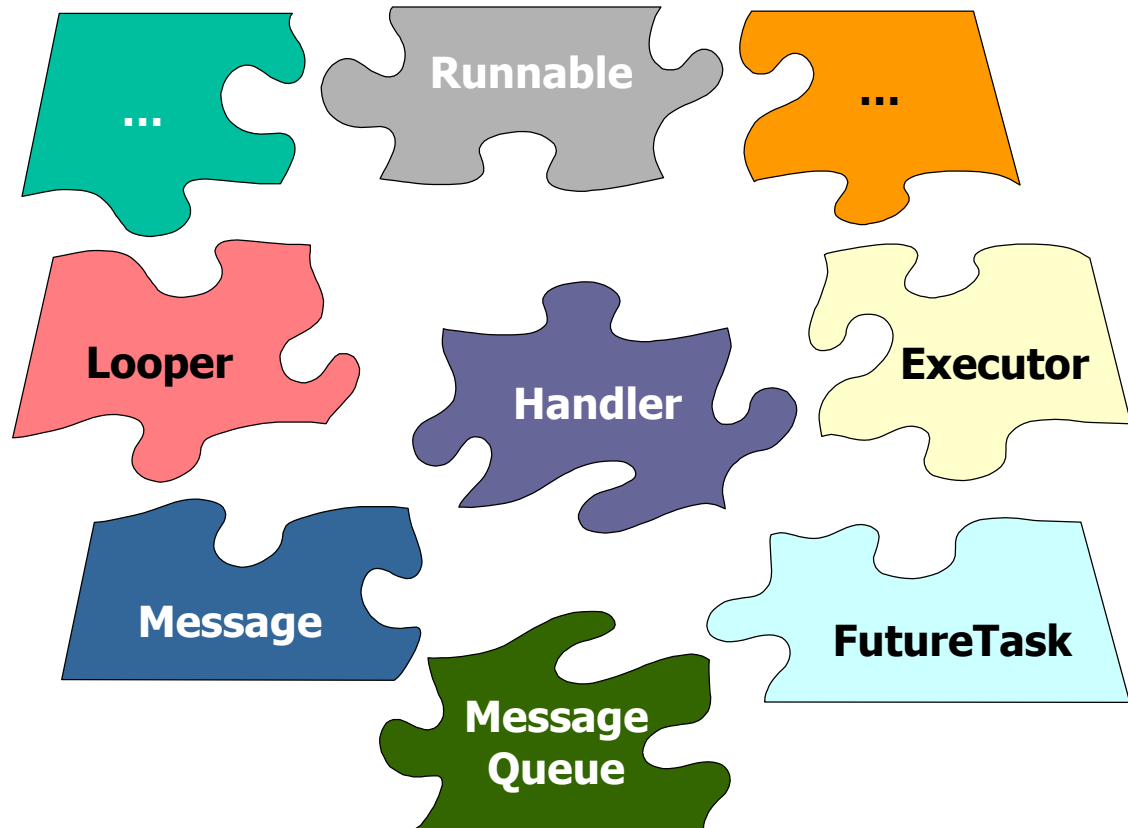
- Android frameworks (like all frameworks) have three key characteristics



See www.dre.vanderbilt.edu/~schmidt/PDF/Queue-04.pdf

Key Characteristics of Android Frameworks

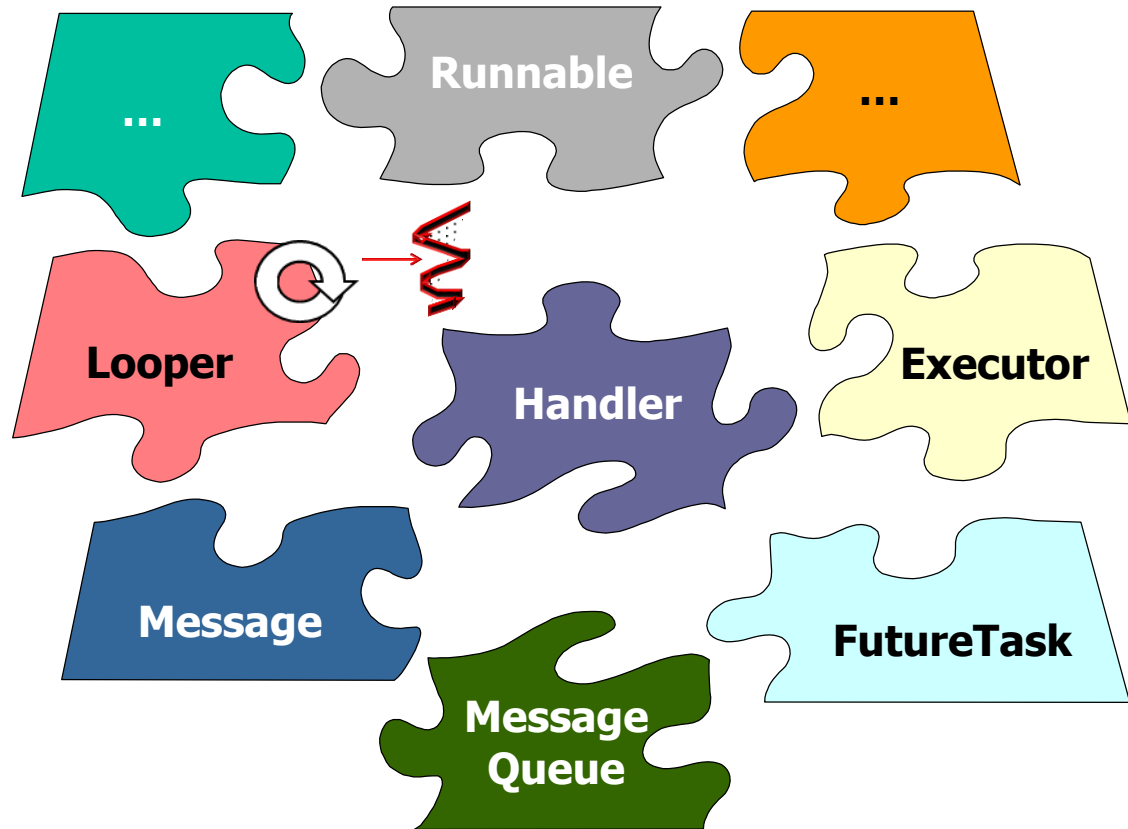
- Android frameworks (like all frameworks) have three key characteristics
 - Exhibit “inversion of control” (IoC) via callbacks



See en.wikipedia.org/wiki/Inversion_of_control & [en.wikipedia.org/wiki/Callback_\(computer_programming\)](https://en.wikipedia.org/wiki/Callback_(computer_programming))

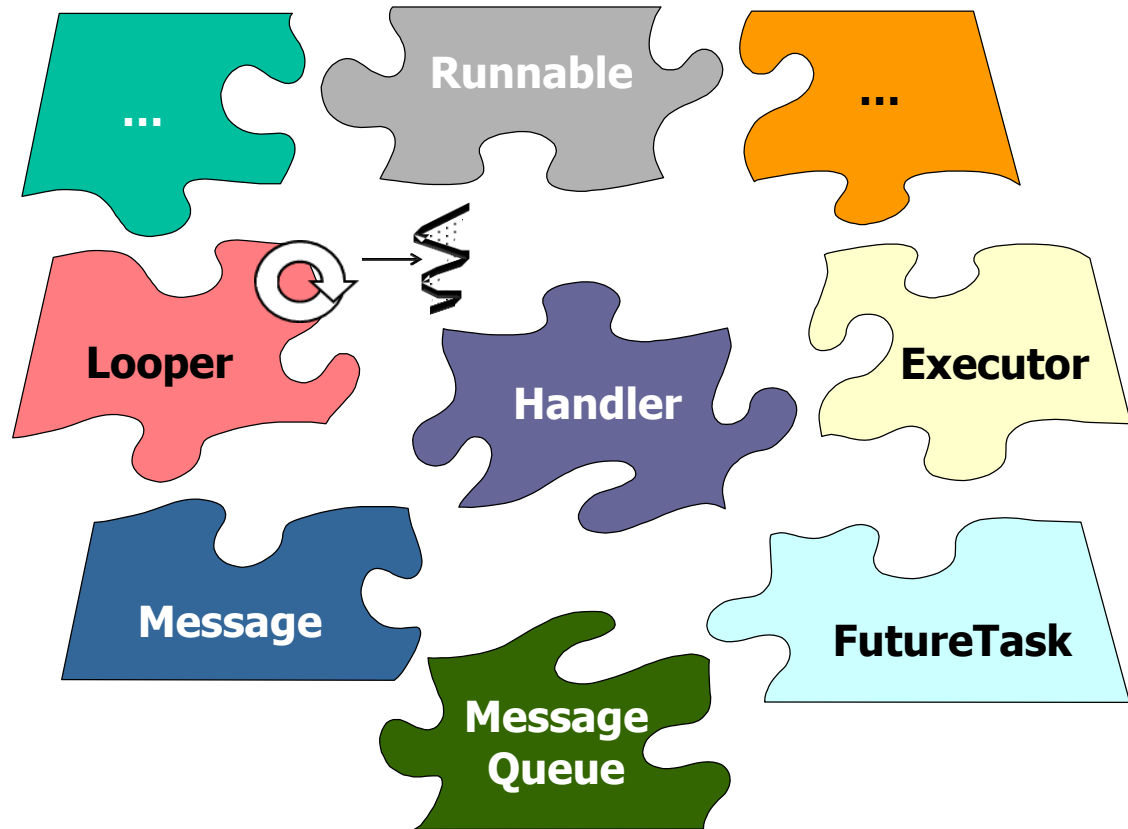
Key Characteristics of Android Frameworks

- Android frameworks (like all frameworks) have three key characteristics
 - Exhibit “inversion of control” (IoC) via callbacks, e.g.
 - Framework controls the main execution thread



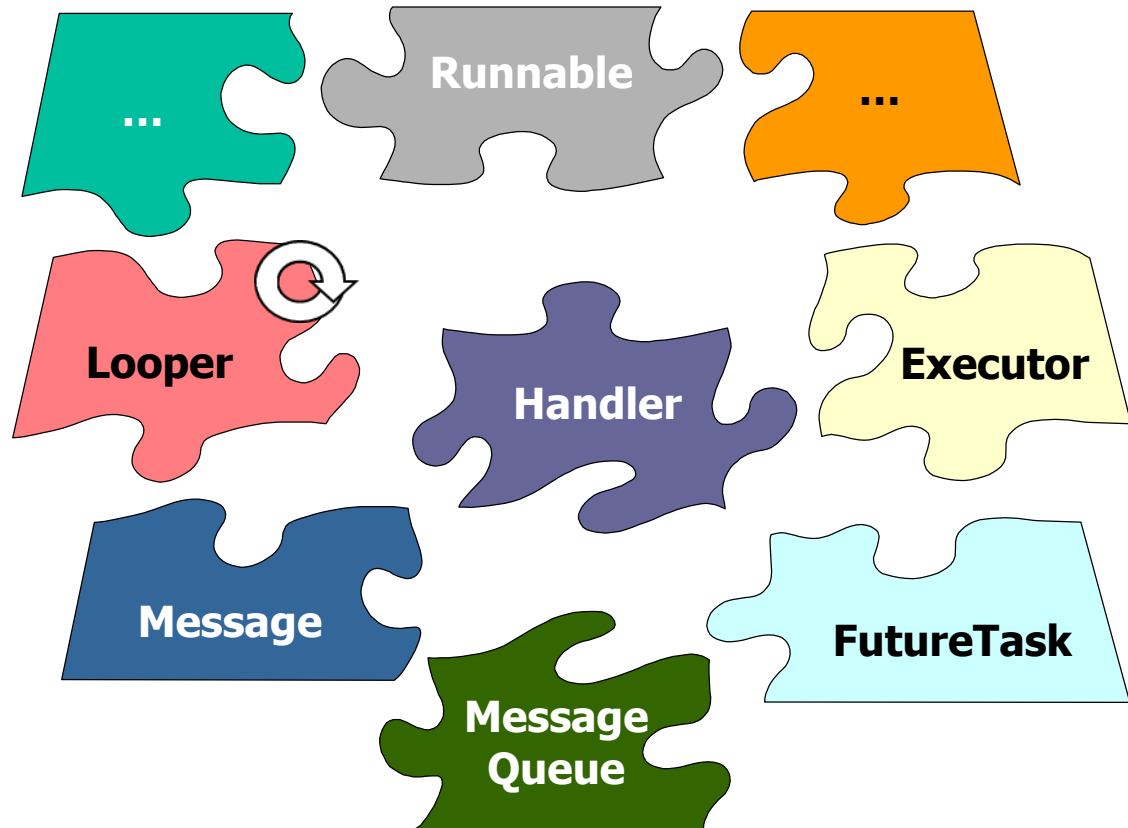
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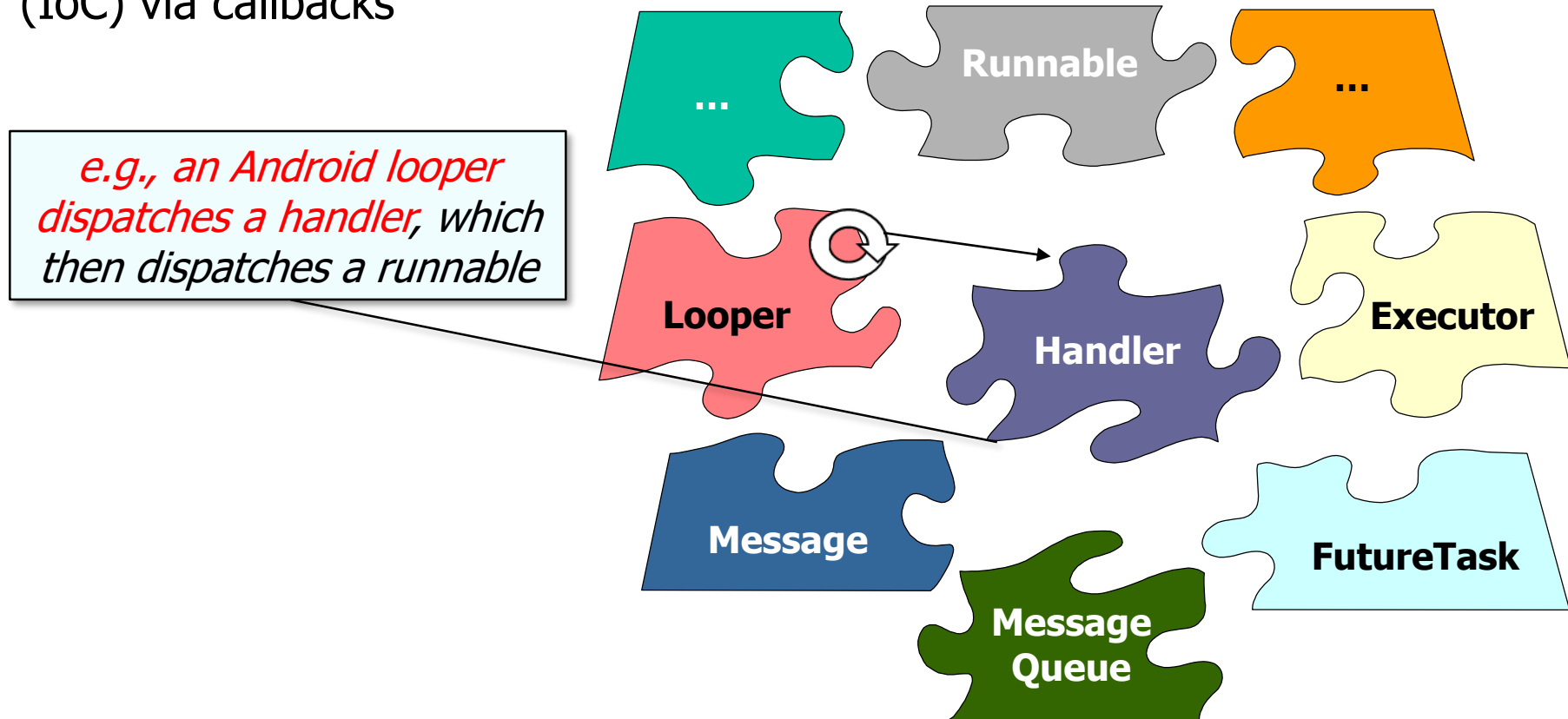
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 - Exhibit “inversion of control” (IoC) via callbacks, e.g.
 - Framework controls the main execution thread
 - Decides how & when to run app code
 - IoC is often called the “Hollywood Principle”



See www.dre.vanderbilt.edu/~schmidt/hollywood-principle.txt

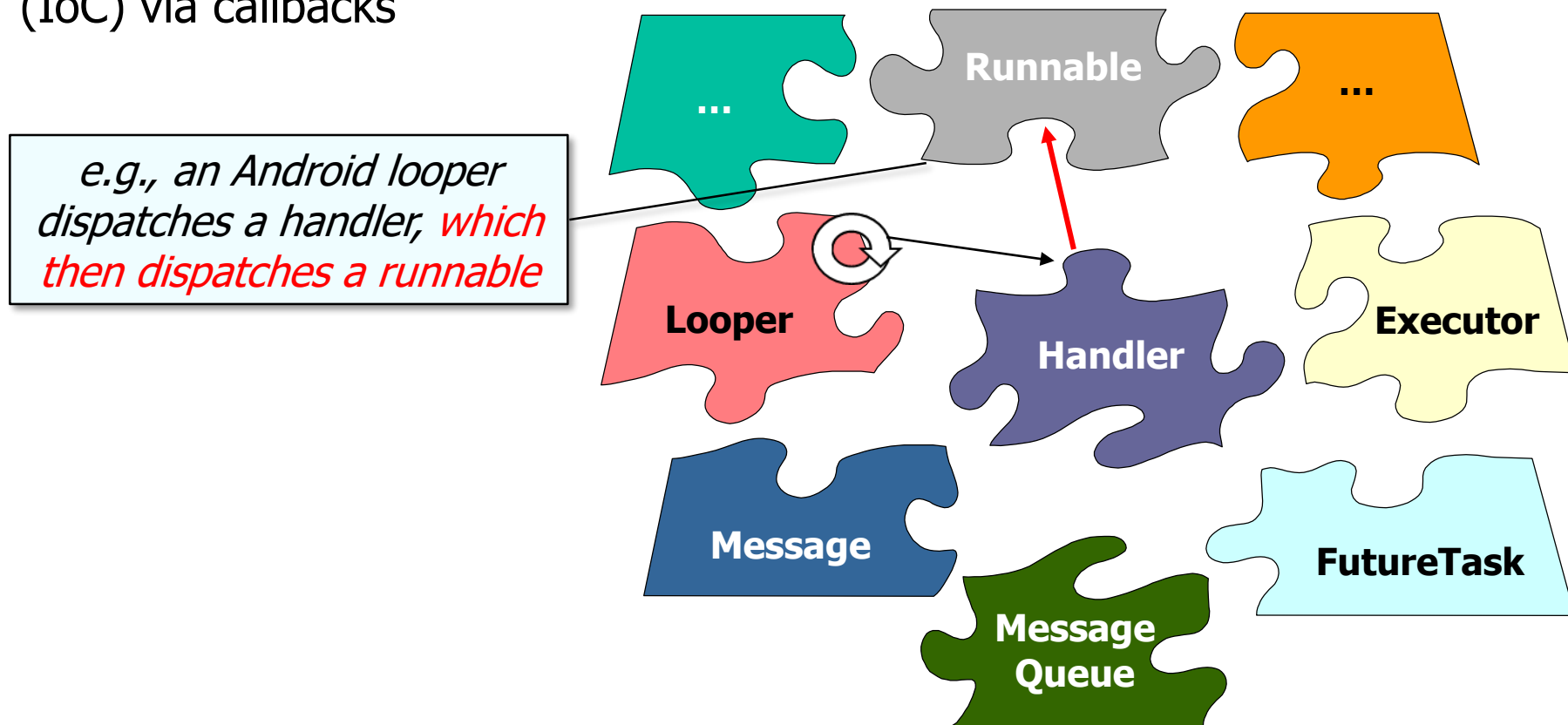
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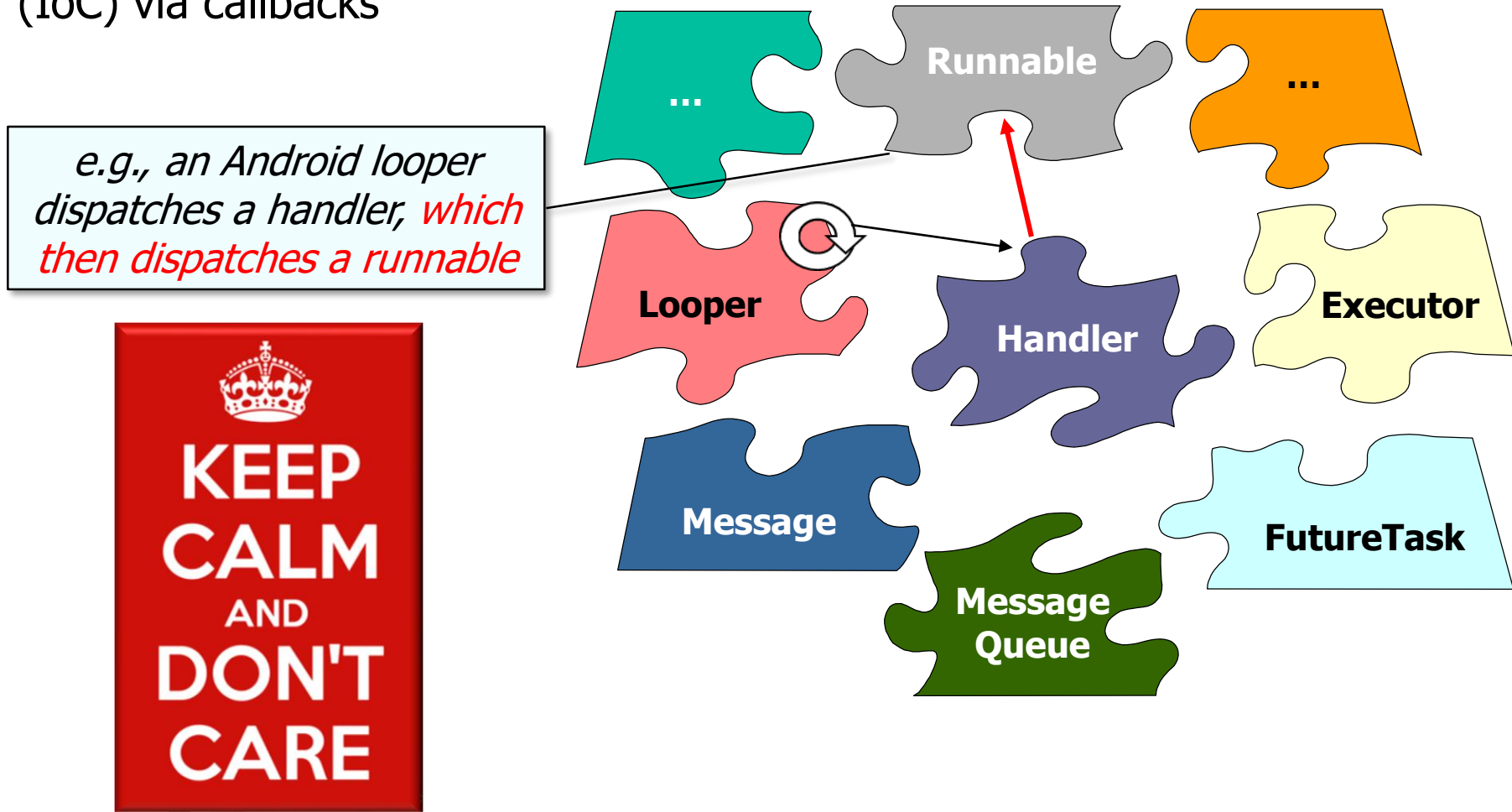
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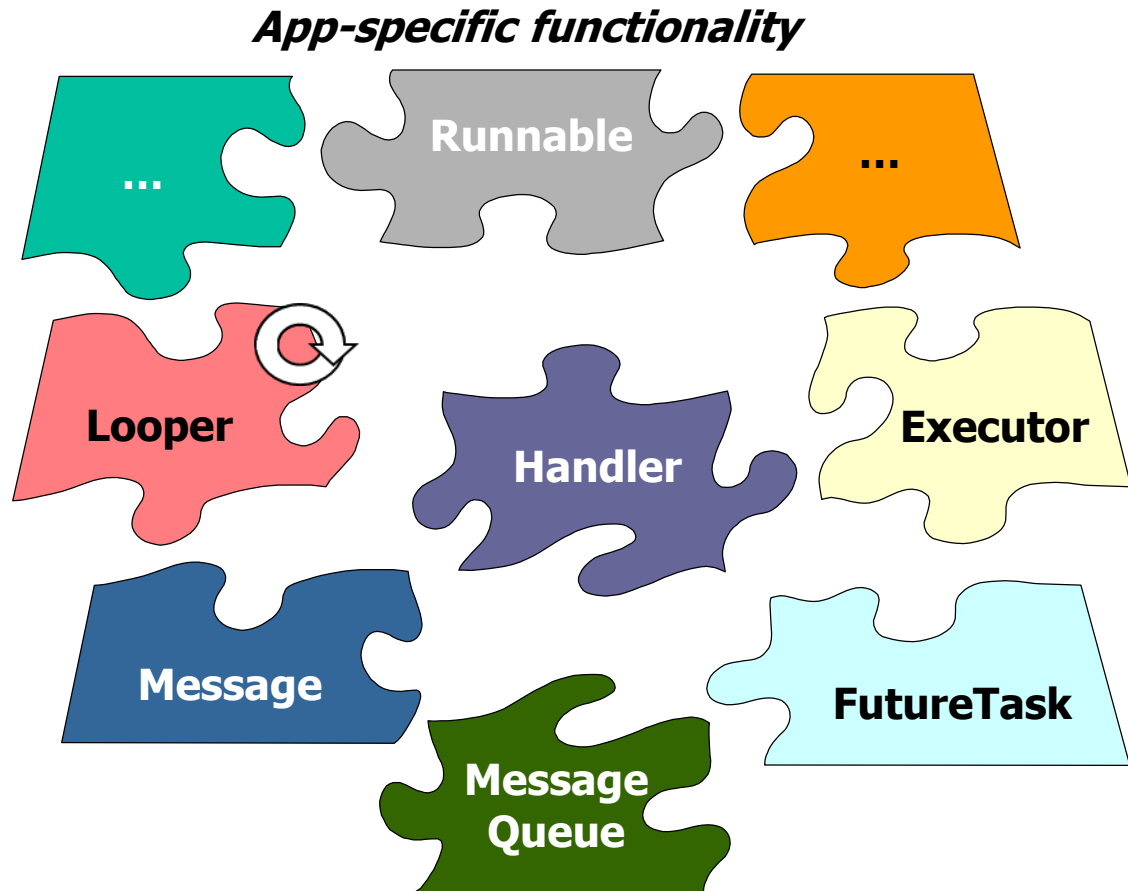
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The runnable dispatched via IoC doesn't know/care how/why it was called back

Key Characteristics of Android Frameworks

- Android frameworks (like all frameworks) have three key characteristics
 - Exhibit “inversion of control” (IoC) via callbacks
 - Integrated domain-specific structure & functionality

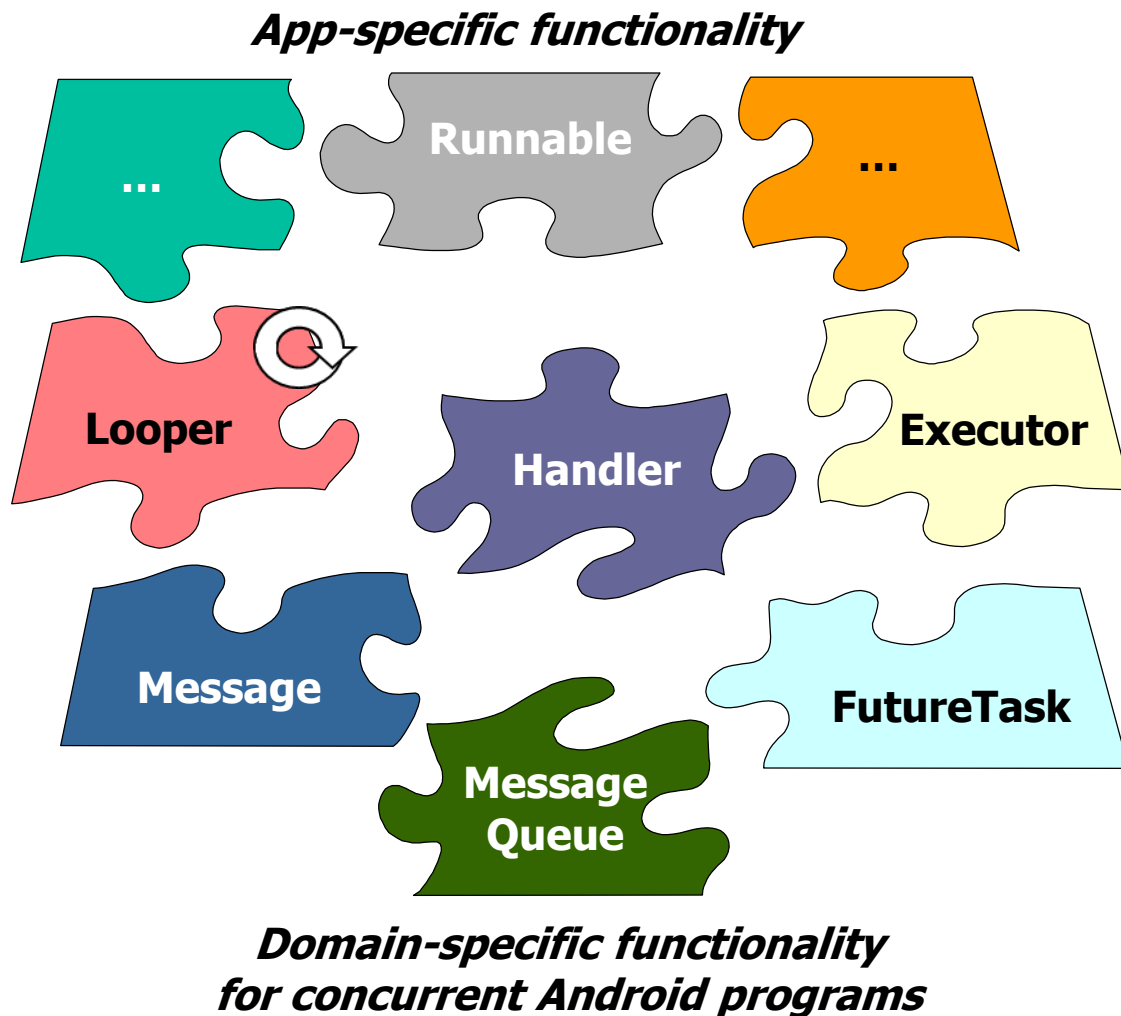


***Domain-specific functionality
for concurrent Android programs***

See en.wikipedia.org/wiki/Domain-driven_design

Key Characteristics of Android Frameworks

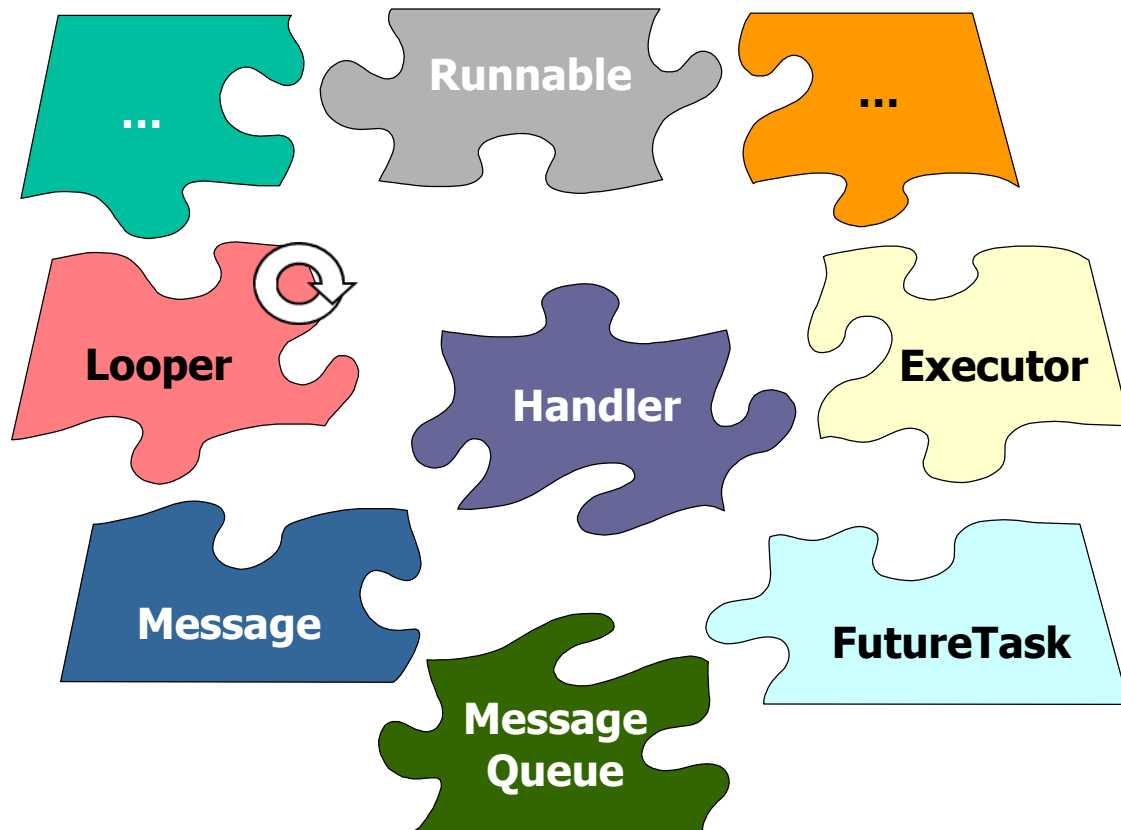
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 - e.g., provide capabilities that can be reused in one or more domain(s)



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App-specific functionality



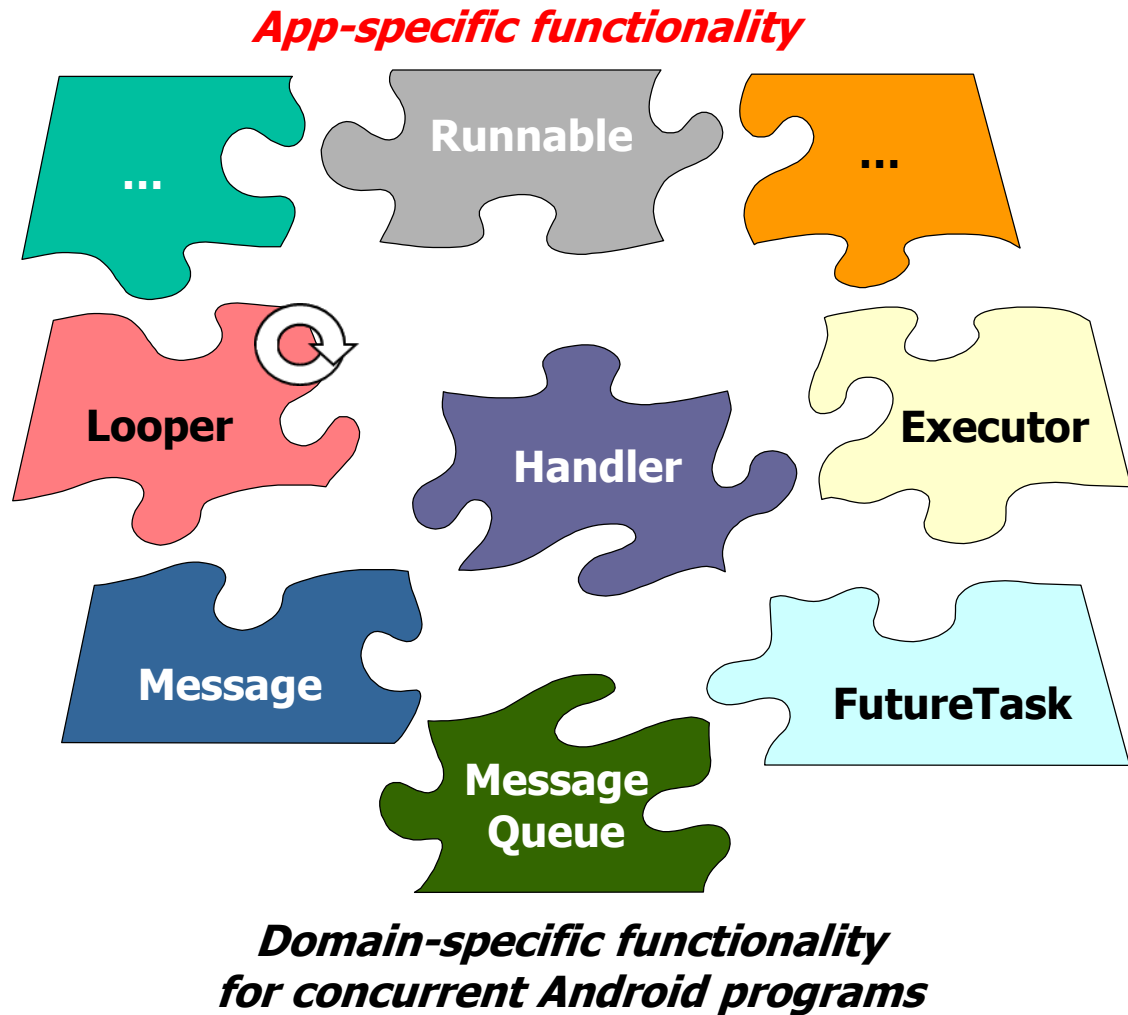
Domain-specific functionality for concurrent Android programs



Android's frameworks focus on domains associated with mobile apps & services

Key Characteristics of Android Frameworks

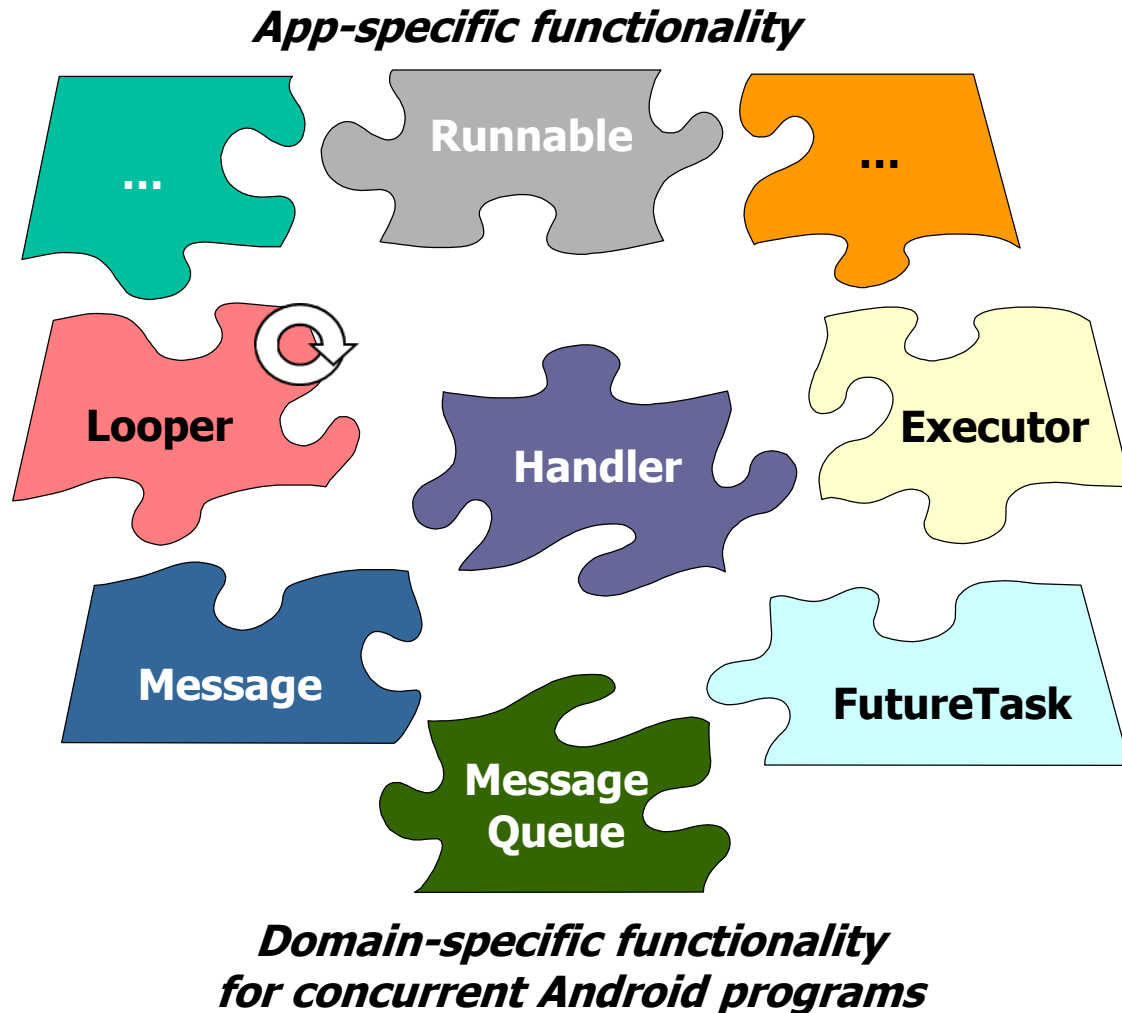
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App-specific functionality can reuse domain-specific framework components

Key Characteristics of Android Frameworks

- Android frameworks (like all frameworks) have three key characteristics
 - Exhibit “inversion of control” (IoC) via callbacks
 - Integrated domain-specific structure & functionality
 - Provide semi-complete (portions of) apps

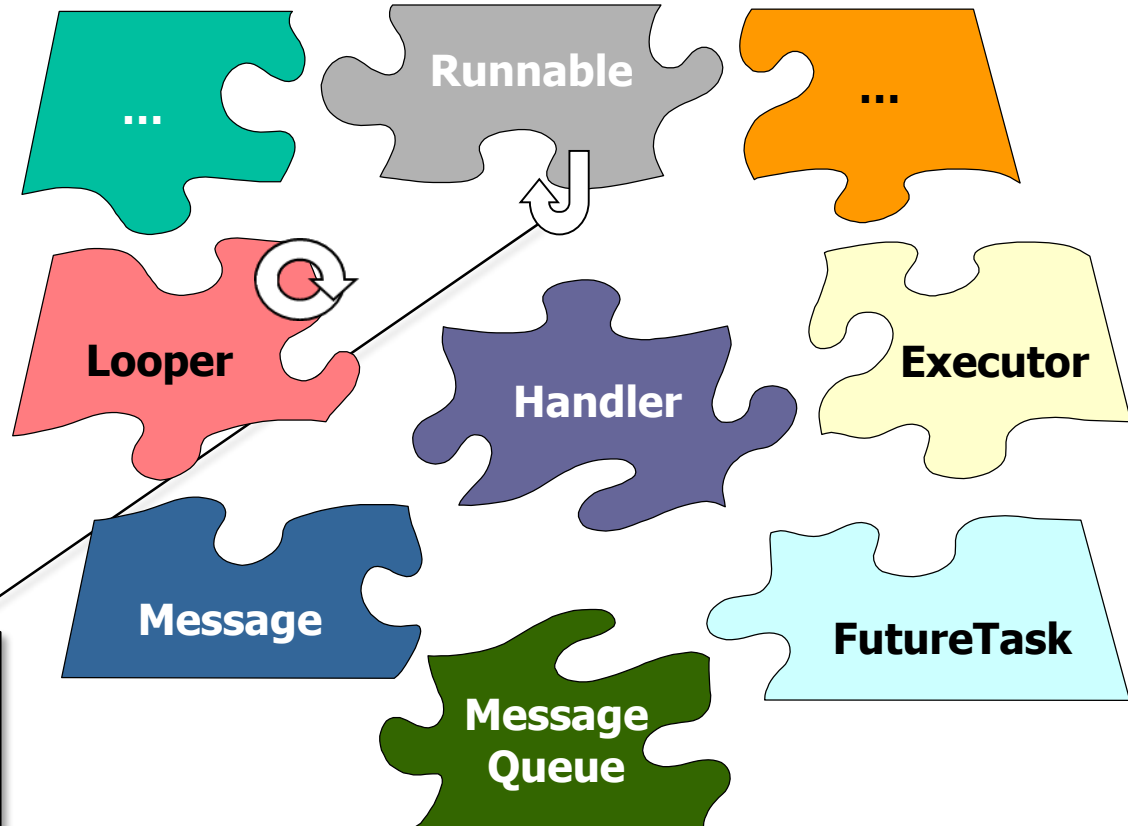


See www.laputan.org/drc/drc.html

Key Characteristics of Android Frameworks

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 - *Hook methods* plug app logic into the framework

App-specific functionality



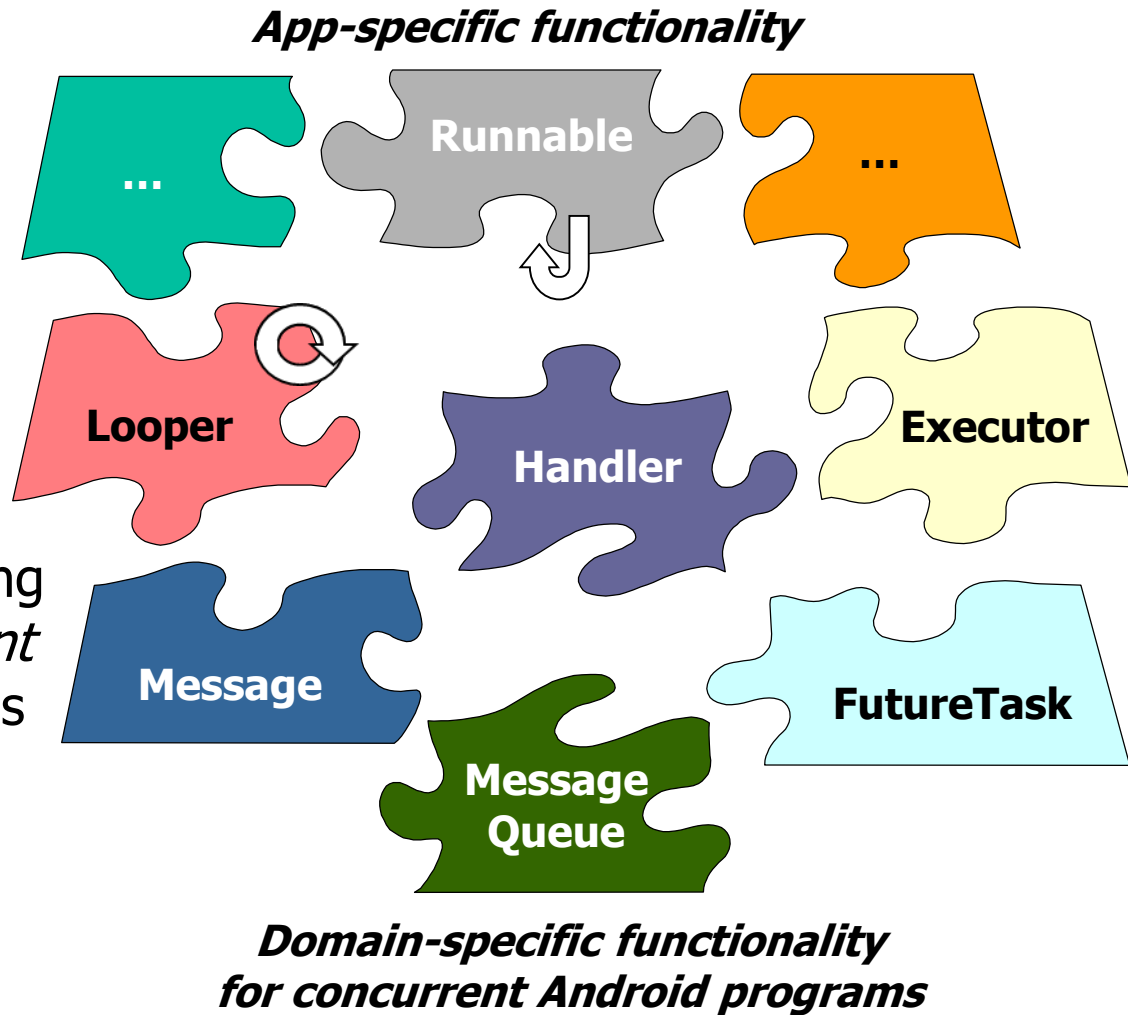
Hook methods implement patterns that customize reusable framework classes to run app-specific logic

Domain-specific functionality for concurrent Android programs

See wiki.c2.com/?HookMethod & codebetter.com/davelaribee/2008/06/16/hook-methods

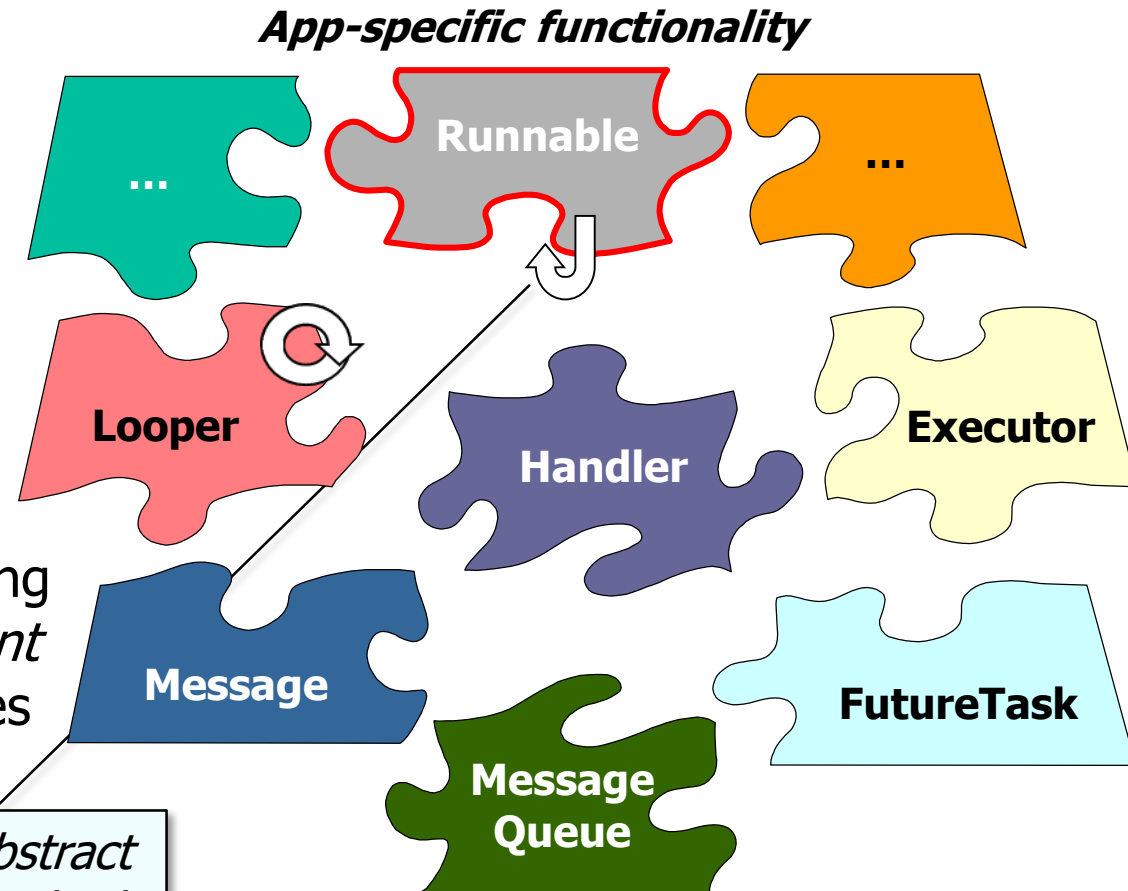
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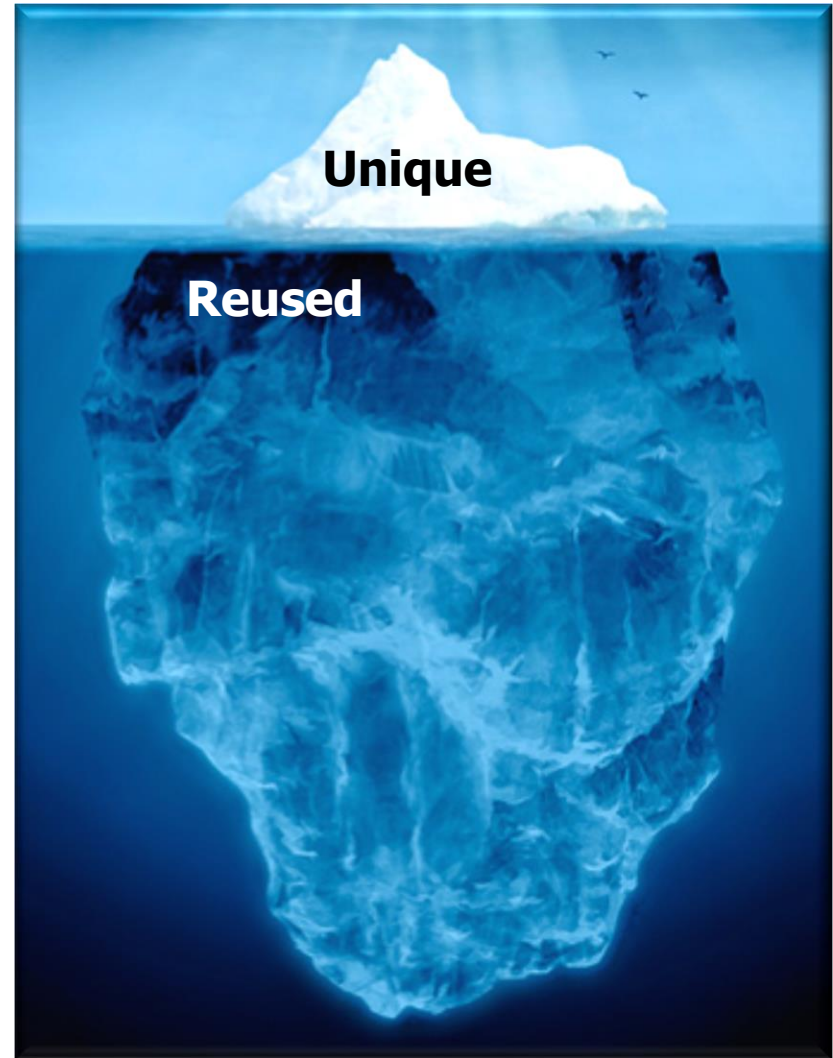


e.g., Runnable is a common abstract interface whose run() hook method supports many concrete variants

See developer.android.com/reference/java/lang/Runnable.html

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These three key characteristics enable much greater systematic reuse

End of Android & Java Frameworks: Key Characteristics