Fundamental Programming Concepts Review

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Closure, Lambda

Example	Groovy	Java
Function as variable	m.Concept50.times	j.Concept50.times

Return a function	m.Concept50.acc
	m.Concept50Test.returnFunction()
		j.Concept50.acc(Number)
		j.Concept50.acc2(Number)

Function as parameter	m.Concept50.doSomethingUseful m.Concept50Test.closureAsParameter()	j.Concept50.doSomethingUseful j.Concept50Test.closureAsParameter()
Currying	m.Concept50Test.partialFunction()	j.Concept50Test.partialFunction()
Method Pointer	m.Concept50Test.methodPointer()	j.Concept50Test.methodPointerAKAmethodReference()

Multiple Inheritance

- Diamond Problem
- Groovy
  - m.Concept110_2
- Java
  - j.Concept110_3
- Diamond Problem Revisited
  - Groovy
    - m.Concept110_4
  - Java
    - j.Concept110_5

Duck Typing

- m.Concept10

Double Dispatch

- m.Concept20
- j.Concept20

Invariant, Covariant, & Contravariant

- j.Concept30
- j.Concept30Test

Memoization

- m.Concept40
- m.Concept40Test
- m.concept40Improve
- m.concept40ImproveTest

Tail Recursion

- Before
  - m.Concept60
  - m.Concept60Test.fac2Large()
- After
  - Concept60Improve
  - m.Concept60ImproveTest.facLarge()

Null

- Yoda
  - j.Concept90_1.yoda
- Elvis
  - j.Concept90_2Test.say
  - m.Concept90_2Test.say
- Safe Navigation
  - j.Concept90_2Test.givenLineItemGetProductTypeDescription()
  - m.Concept90_2Test.givenLineItemGetProductTypeDescription()
- Guava Optional
  - j.Concept90_3.print
- Others

Equality

- Reference vs Object
  - j.Concept100Test
  - m.Concept100Test

Fluent API, Command Chaining

- m.Concept70
  - Using static imports
  - Return this

Domain Specific Language (DSL)

- m.Concept80

Others (in no particular order)

- Ranges
- Pattern Matching
- Extension Methods
- Partial Classes
- Overloading and Overriding
- Reference, optional, default parameters
- Indexers
- Operator overloading
- Value types
- Etc.

References

- Groovy In Action
- Effective Java
- Contravariance is the Dual of Covariance (https://www.infoq.com/presentations/covariance-contravariance-joy-of-coding-2014)