Java Review

JDK vs JRE vs JVM

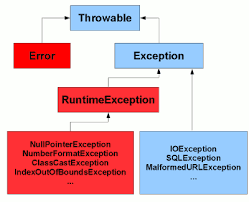
* JDK (Java Development kit)
  + Contains a compiler
    - Turns Human readable .java files into bytecode .class files
* JRE (Java Runtime Environment)
  + Where a Java program executes
  + Run .class files
  + What you need to run a Java Application
* JVM (Java Virtual Machine)
  + A virtualized machine
  + Virtual processers and registers
    - Performs calculations for your Java Application

Key Java Features

* WORA (write once run anywhere)
  + Consistency across different hardware
    - Makes it popular for phone apps
* Static and strongly typed language
  + Static variables must be given a type
  + Strong: you cannot coerce a variable into another type
* Multi-threaded
* Massive standard library
* Java is 100% pass by value

Exception Handling

* Exceptions are objects that are thrown
  + Should be handled by a program
* Errors are objects that can be thrown too
  + Errors are catastrophic failures that you should not try to handle
* They occur when a piece of code does not execute the way we want it to
* Two main types of exceptions
  + Checked/ compile time
    - Require that you have code that handles them in case they are thrown
      * SQLException
      * IOException
  + Unchecked
    - Do not require that you have code to handle them when they are thrown
      * IndexOutOfBounds
      * NullPointer
* Exceptions hierarchy



Scopes in Java

* Static/class scope
  + This variable or method is attached to the class itself rather than an instance of the class
* Instance
  + This variable is created once per object
  + Each time an object of this class is instantiated
* Method
  + Variables that are passed in as the parameters to a method
* Local
  + Variables declared within a method

Access Modifiers

* Access modifiers limit where you can see a variable
  + They do nothing about where the variable actually exist
  + Access modifiers are valid only on instance and static variables/methods
* Public
  + This variable can be seen anywhere
* Protected
  + This variable can be seen in this package + any class that inherits from it
* Default
  + This variable can only be seen in this package
* Private
  + This variable can only be seen within this class

Main Method

* All Java applications start with the main method
  + Public static void main(String [] args)

Stack vs Heap

* Java has a call stack
  + Every time you call a method that method gets added to the stack to execute.
* Java has heap memory
  + Every object when it is created is allocated a spot of memory in the heap

String pool

* Strings are immutable in Java
  + Once created they cannot be changed
  + Strings of the same value share the same object in memory
    - Optimize the amount of memory we consume
    - Strings are really inefficient for modifying/ performing operations on
* StringBuilder is the mutable version of String
  + Much faster to edit than a String

Important Java Keywords

* Final
  + Make a variable unchangeable
  + Make a method un-overridable
  + Make a class un-inheritable
* Access modifiers
  + Private
  + Protected
  + Public
* Static
  + Makes a filed or method class scoped

Covariant return types

* When you override a method you need to match parent’s method signature\*
  + You can specify a more specific return if you want
* Animal getAnimal(String petName)
  + Valid override Dog getAnimal(String petName);
    - Allowed because a Dog is a more specific animal and can do anything an Animal can do