Mobile Application Development

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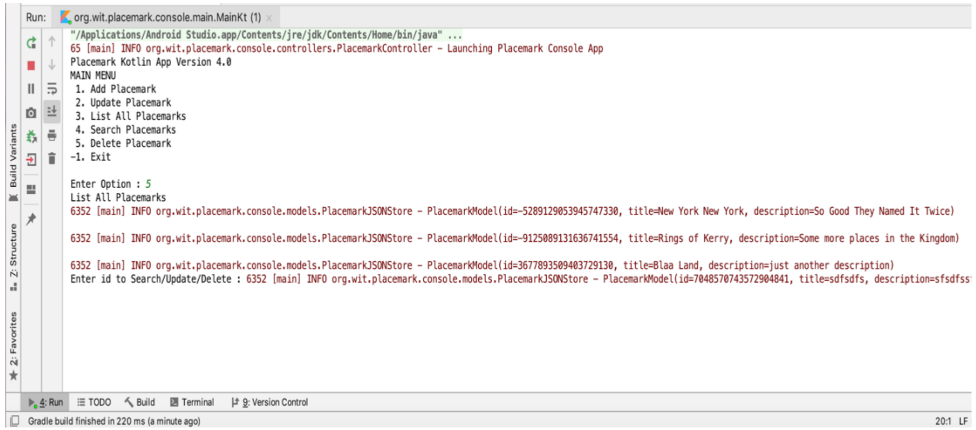
Placemark-Console Version 4.0



```
"/Applications/Android Studio.app/Contents/jre/jdk/Contents/Home/bin/java" ...
65 [main] INFO org.wit.placemark.console.controllers.PlacemarkController - Launching Placemark Console App
Placemark Kotlin App Version 4.0
MAIN MENU
 1. Add Placemark
 2. Update Placemark
 3. List All Placemarks
 4. Search Placemarks
 5. Delete Placemark
-1. Exit

Enter Option : 5
List All Placemarks
6352 [main] INFO org.wit.placemark.console.models.PlacemarkJSONStore - PlacemarkModel(id=-5289129053945747330, title=New York New York, description=So Good They Named It Twice)

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Enter id to Search/Update/Delete : 6352 [main] INFO org.wit.placemark.console.models.PlacemarkJSONStore - PlacemarkModel(id=7048570743572904841, title=sdfsdfs, description=sfsdfss
```

Features Covered (from Part 1)

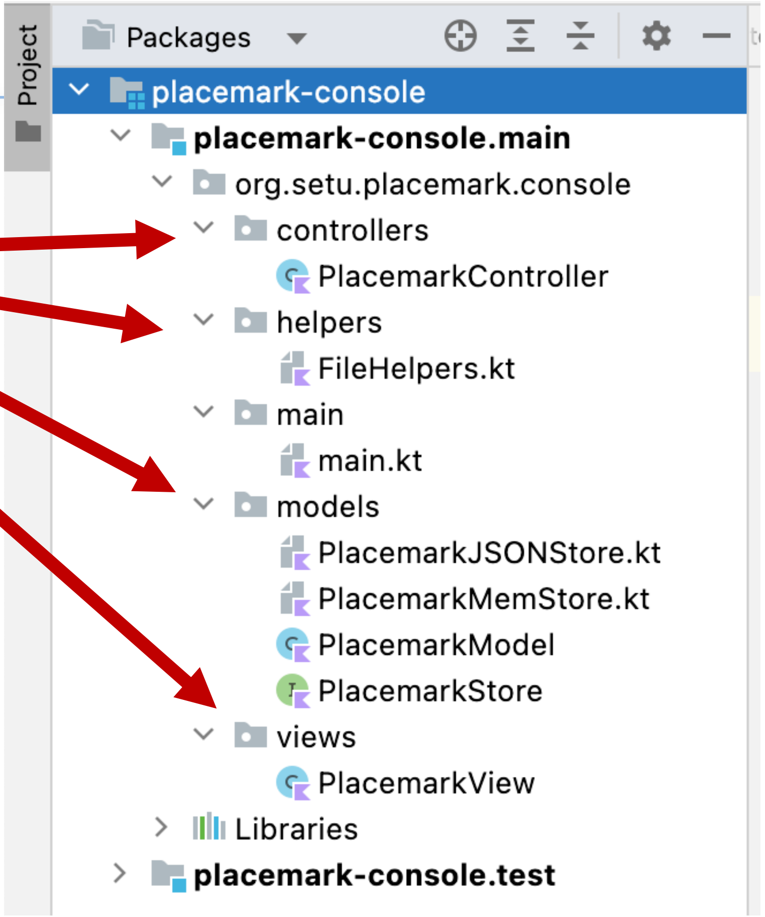
- Basic Types
- Local Variables (val & var)
- Functions
- Control Flow (if, when, for, while)
- Strings & String Templates
- Ranges (and the *in* operator)
- Type Checks & Casts
- Null Safety
- Comments

Features Covered (from Part 2)

- Writing Classes (properties and fields)
- Data Classes (just for data)
- Collections: Arrays and Collections
- Collections: *in* operator and lambdas
- Arguments (default and named)

Project Structure

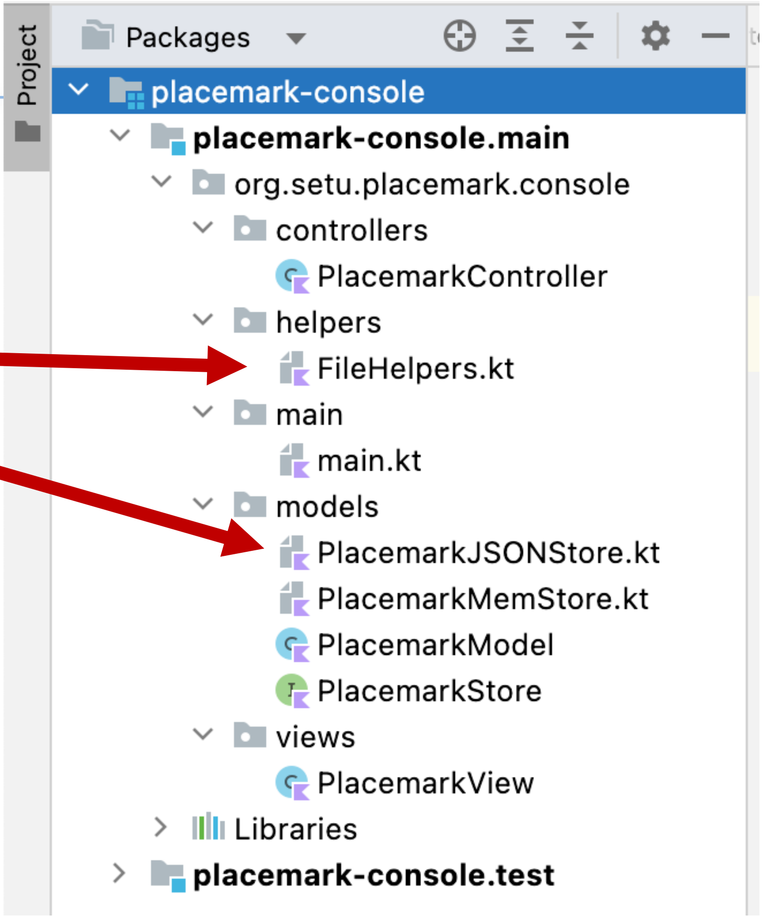
- Again, more complex
  - Multiple packages



```
placemark-console
  placemark-console.main
    org.setu.placemark.console
      controllers
        PlacemarkController
      helpers
        FileHelpers.kt
      main
        main.kt
      models
        PlacemarkJSONStore.kt
        PlacemarkMemStore.kt
        PlacemarkModel
        PlacemarkStore
      views
        PlacemarkView
    Libraries
  placemark-console.test
```

Project Structure

- Again, more complex
  - Multiple packages
  - Helper File & JSON Support



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        PlacemarkView
    Libraries
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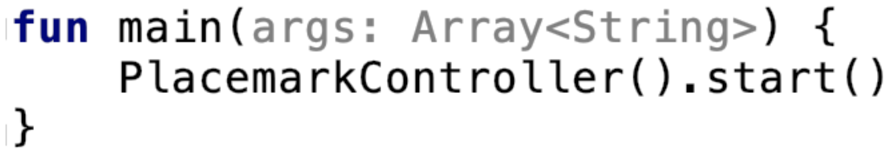
```

main.kt

- Codebase in main file substantially Reduced
  - **fun main**
  - Single line of code

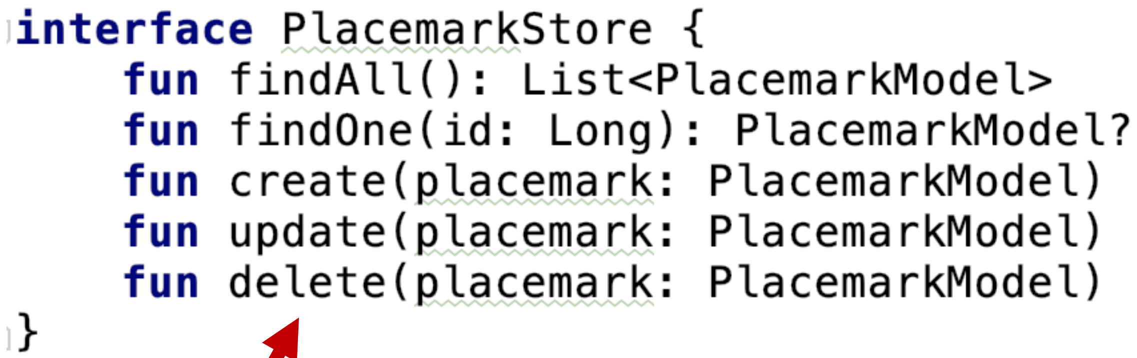


```
fun main(args: Array<String>) {
    PlacemarkController().start()
}
```

Classes & Interfaces

Placemark-Console Version 4.0

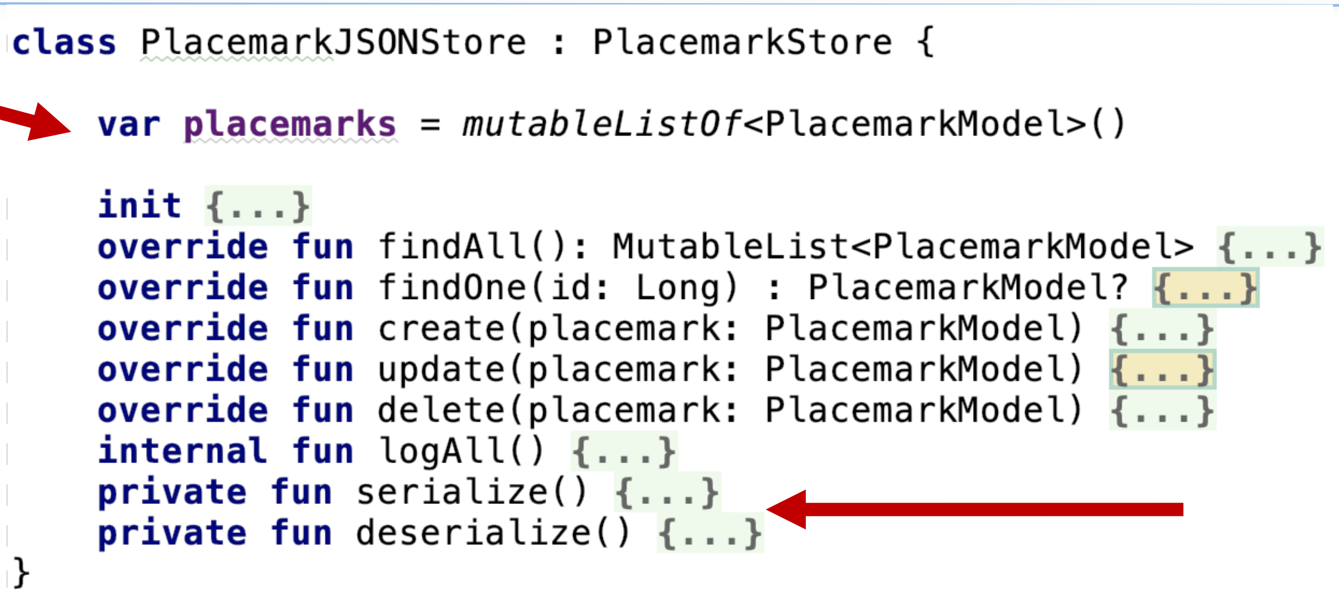
Interface **`PlacemarkStore`**



```
interface PlacemarkStore {
    fun findAll(): List<PlacemarkModel>
    fun findOne(id: Long): PlacemarkModel?
    fun create(placemark: PlacemarkModel)
    fun update(placemark: PlacemarkModel)
    fun delete(placemark: PlacemarkModel)
}
```

- Additional **`delete`** function to allow for full CRUD support in implemented classes

Class **`PlacemarkJSONStore`**



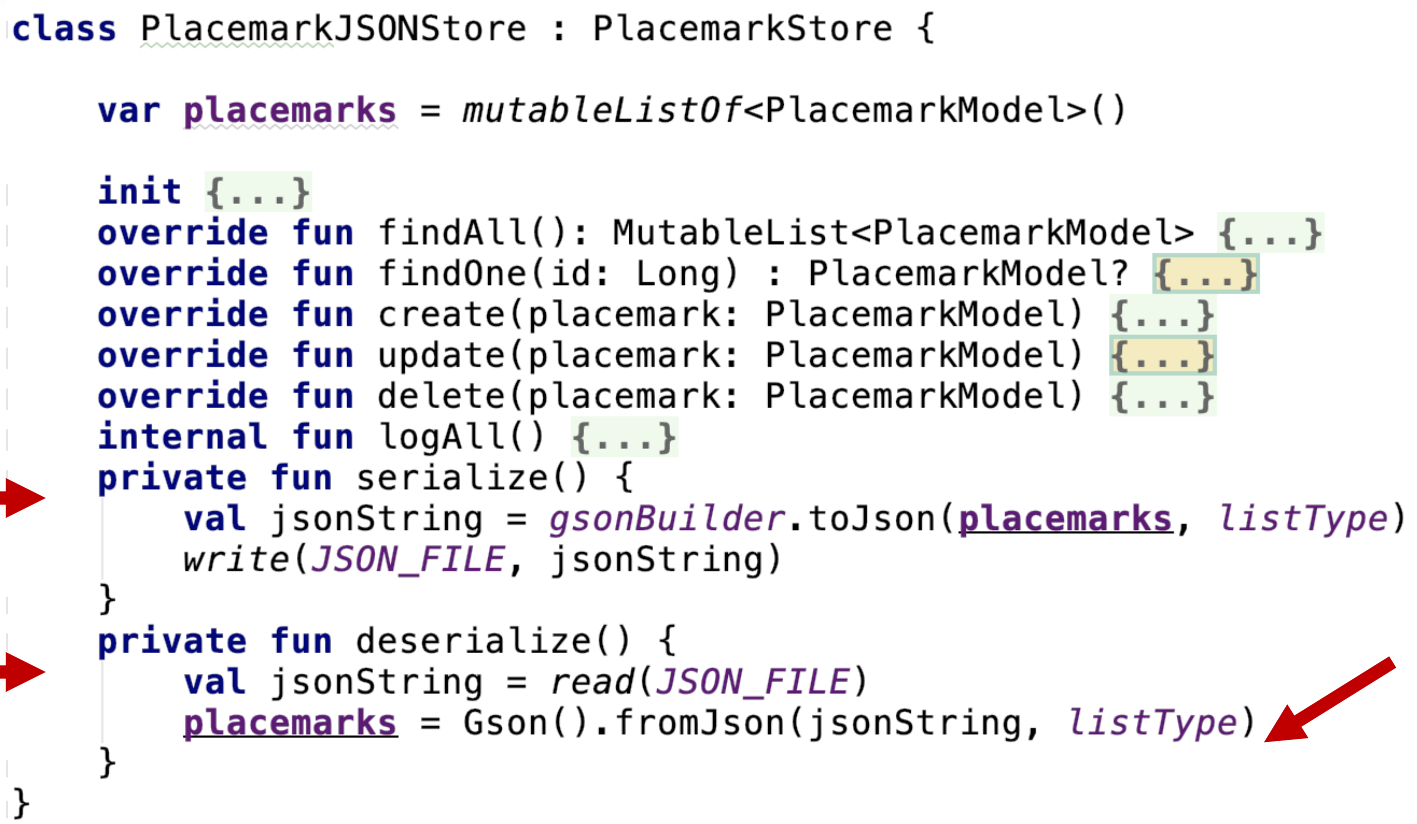
```
class PlacemarkJSONStore : PlacemarkStore {

    var placemarks = mutableListOf<PlacemarkModel>()

    init {...}
    override fun findAll(): MutableList<PlacemarkModel> {...}
    override fun findOne(id: Long) : PlacemarkModel? {...}
    override fun create(placemark: PlacemarkModel) {...}
    override fun update(placemark: PlacemarkModel) {...}
    override fun delete(placemark: PlacemarkModel) {...}
    internal fun logAll() {...}
    private fun serialize() {...}
    private fun deserialize() {...}
}
```

- Implements **`PlacemarkStore`** – allows for Placemark objects to be stored in JSON file using **`serialize()`** and **`deserialize()`**

Class `PlacemarkJSONStore`



```
class PlacemarkJSONStore : PlacemarkStore {

    var placemarks = mutableListOf<PlacemarkModel>()

    init {...}
    override fun findAll(): MutableList<PlacemarkModel> {...}
    override fun findOne(id: Long) : PlacemarkModel? {...}
    override fun create(placemark: PlacemarkModel) {...}
    override fun update(placemark: PlacemarkModel) {...}
    override fun delete(placemark: PlacemarkModel) {...}
    internal fun logAll() {...}
    private fun serialize() {
        val jsonString = gsonBuilder.toJson(placemarks, listType)
        write(JSON_FILE, jsonString)
    }
    private fun deserialize() {
        val jsonString = read(JSON_FILE)
        placemarks = Gson().fromJson(jsonString, listType)
    }
}
```

FileHelpers.kt

```kotlin
fun write( fileName: String, data: String) {

    val file = File(fileName)
    try {
        val outputStreamWriter = OutputStreamWriter(FileOutputStream(file))
        outputStreamWriter.write(data)
        outputStreamWriter.close()
    } catch (e: Exception) {
        logger.error { "Cannot read file: " + e.toString() }
    }
}
```

- Main purpose to write out a stream of data to a file
- Data stored in JSON format

FileHelpers.kt

```kotlin
fun read(fileName: String): String {
    val file = File(fileName)
    var str = ""
    try {
        val inputStreamReader = InputStreamReader(FileInputStream(file))
        if (inputStreamReader != null) {
            val bufferedReader = BufferedReader(inputStreamReader)
            val partialStr = StringBuilder()
            var done = false
            while (!done) {
                var line = bufferedReader.readLine()
                done = (line == null);
                if (line != null) partialStr.append(line);
            }
            inputStreamReader.close()
            str = partialStr.toString()
        }
    } catch (e: FileNotFoundException) {...} catch (e: IOException) {...}
    return str
}
```

- Main purpose to read in a stream of data from a file (more later)

The Serialization Mechanism

Placemark-Console Version 4.0

The Serialization Mechanism

1. App is launched and a **`PlacemarkController`** object is created and started via .**`start()`**

```
fun main(args: Array<String>) {
    PlacemarkController().start()
}
```

2. The **`PlacemarkController`** creates a **`PlacemarkJSONStore`** object

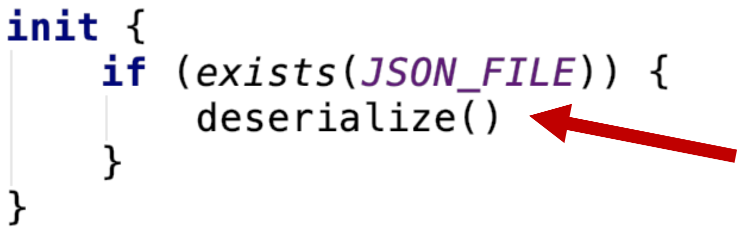
```
val placemarks = PlacemarkJSONStore()
```

which in turn creates it's own internal list of **`Placemark`** objects for the app

```
var placemarks = mutableListOf<PlacemarkModel>()
```

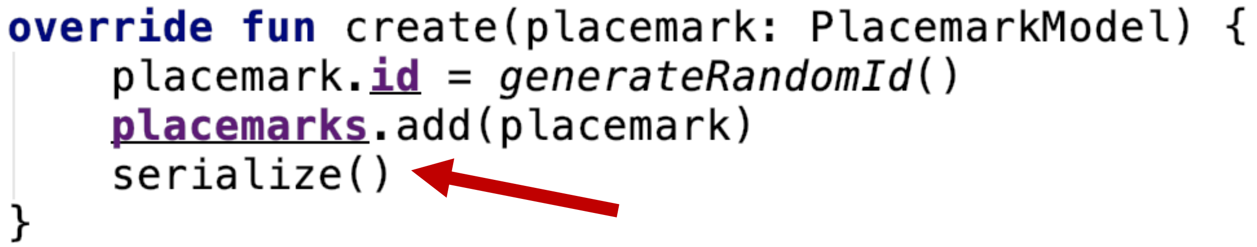
The Serialization Mechanism

3. If a file already exists, ***placemarks*** is populated with the data from the file via **deserialize()**



```
init {
    if (exists(JSON_FILE)) {
        deserialize()
    }
}
```

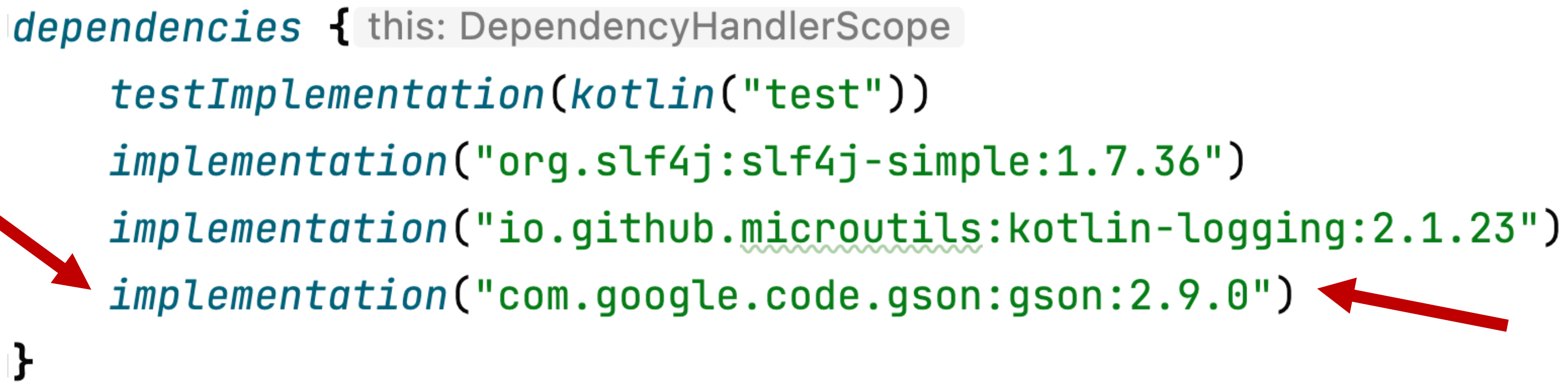
4. Otherwise the data is written to file every time a new **Placemark** is created, updated or deleted with **serialize()**



```
override fun create(placemark: PlacemarkModel) {
    placemark.id = generateRandomId()
    placemarks.add(placemark)
    serialize()
}
```

The Serialization Mechanism – Using Gson

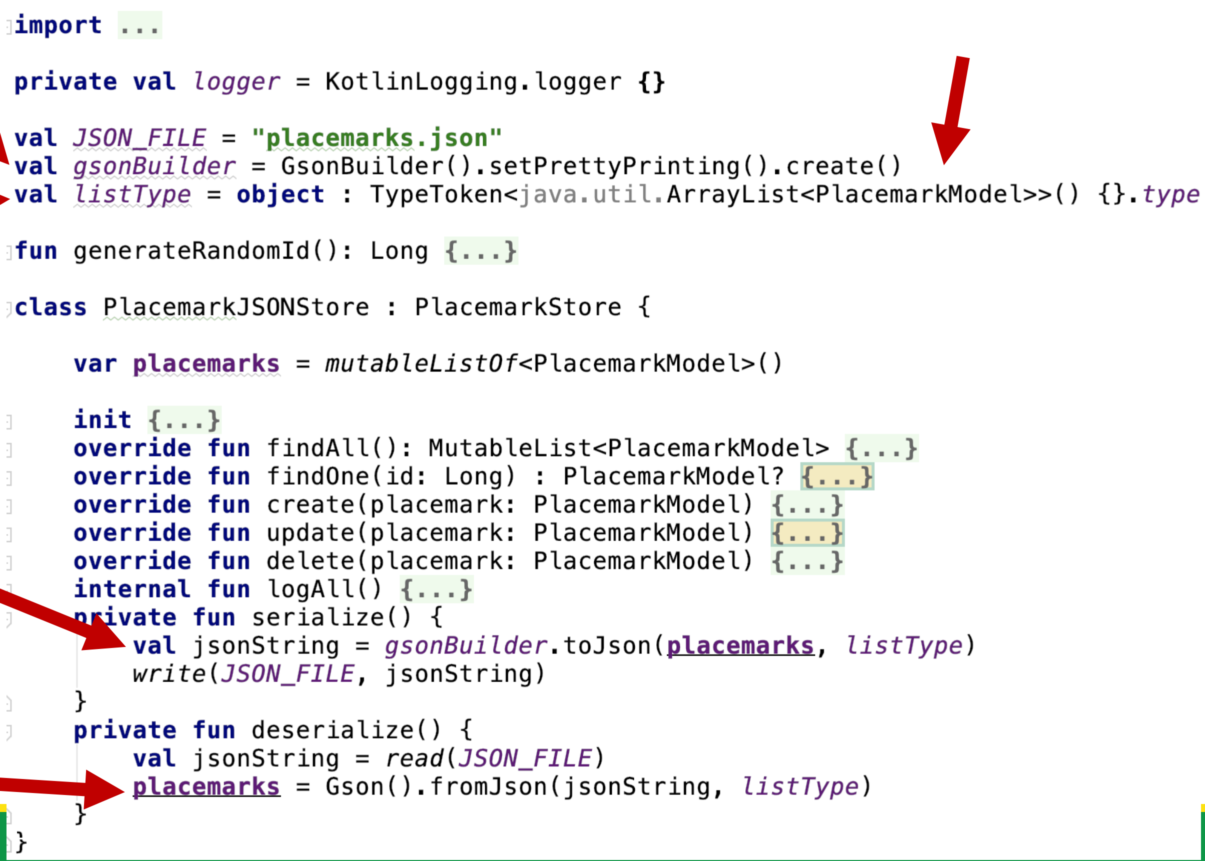
- Add necessary library to our dependencies



```
dependencies { this: DependencyHandlerScope
    testImplementation(kotlin("test"))
    implementation("org.slf4j:slf4j-simple:1.7.36")
    implementation("io.github.microutils:kotlin-logging:2.1.23")
    implementation("com.google.code.gson:gson:2.9.0")
}
```

The Serialization Mechanism – Using Gson

- Create a GsonBuilder
- Define Object Type for Builder
- Convert list of ***placemarks*** to JSON
- Convert JSON to list of ***placemarks***



```
import ...

private val logger = KotlinLogging.logger {}

val JSON_FILE = "placemarks.json"
val gsonBuilder = GsonBuilder().setPrettyPrinting().create()
val listType = object : TypeToken<java.util.ArrayList<PlacemarkModel>>() {}.type

fun generateRandomId(): Long {...}

class PlacemarkJSONStore : PlacemarkStore {

    var placemarks = mutableListOf<PlacemarkModel>()

    init {...}
    override fun findAll(): MutableList<PlacemarkModel> {...}
    override fun findOne(id: Long) : PlacemarkModel? {...}
    override fun create(placemark: PlacemarkModel) {...}
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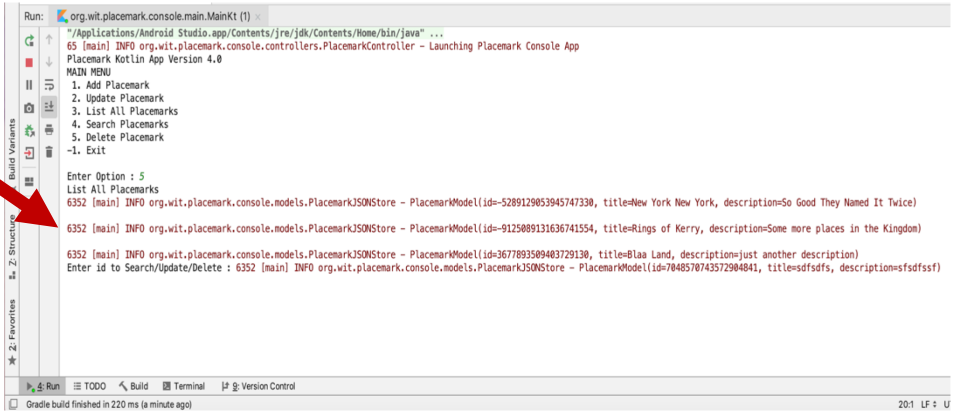
    internal fun logAll() {...}
    private fun serialize() {
        val jsonString = gsonBuilder.toJson(placemarks, listType)
        write(JSON_FILE, jsonString)
    }
    private fun deserialize() {
        val jsonString = read(JSON_FILE)
        placemarks = Gson().fromJson(jsonString, listType)
    }
}
```

The Serialization Mechanism – Using Gson

```
[
  {
    "id": -5289129053945747330,
    "title": "New York New York",
    "description": "So Good They Named It Twice"
  },
  {
    "id": -9125089131636741554,
    "title": "Rings of Kerry",
    "description": "Some more places in the Kingdom"
  },
  {
    "id": 3677893509403729130,
    "title": "Blaa Land",
    "description": "just another description"
  },
  {
    "id": 7048570743572904841,
    "title": "sdfsdfs",
    "description": "sfsdfssf"
  }
]
```

→*placemarks.json*



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```

References

Sources:

http://kotlinlang.org/docs/reference/basic-syntax.html
http://petersommerhoff.com/dev/kotlin/kotlin-for-java-devs/
https://www.programiz.com/kotlin-programming
https://medium.com/@napperley/kotlin-tutorial-5-basic-collections-3f114996692b

Thanks.