Improving Code Quality With Static Analysis

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What Do I Mean By Code Quality?

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- Code should be well formatted
- Code should be free of code smells

Formatting Code With KtLint

An anti-bikeshedding Kotlin linter with built-in formatter.[1]

[1] https://ktlint.github.io/

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- More: https://github.com/pinterest/ktlint#standard-rules

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- Create a source of truth that everyone agrees on and no one can argue with
- Allows us to focus on the substance of code reviews instead of styling

Adding KtLint To Our Projects[2]

```
// App module build.gradle
import org.jlleitschuh.gradle.ktlint.reporter.ReporterType
apply plugin: 'org.jlleitschuh.gradle.ktlint'

ktlint {
    version = "0.35.0"
    android = true
    enableExperimentalRules = true
    reporters = [ReporterType.PLAIN]
    additionalEditorconfigFile = file("../.editorConfig")
}
```

[2] https://github.com/JLLeitschuh/ktlint-gradle

Two Helpful Gradle Tasks

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- `./gradlew ktlintCheck`

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- `./gradlew ktlintCheck`
- `./gradlew ktlintFormat`

KtLint Example

```
// Long line, no spacing
data class Test(val name:String,val age:Int,val location:String,val isRegistered:Boolean,val test:String)

// Gets formatted into
data class Test(
    val name: String,
    val age: Int,
    val location: String,
    val isRegistered: Boolean,
    val test: String
)


// Error output:
Test.kt:3:1: Exceeded max line length (100) (cannot be auto-corrected)
Test.kt:3:17: Parameter should be on a separate line (unless all parameters can fit a single line)
Test.kt:3:26: Missing spacing after ":"
```

Auto Format With Git Hook[3]

Remembering to reformat our code can be difficult. Leveraging git hooks allows us to automate it and not think about it.

```
// .git/hooks/pre-commit
CHANGED_FILES="$(git --no-pager diff --name-status --no-color --cached | awk '$1 != "D" && $2 ~ /\.kts|\.kt/ { print $2}')"

./gradlew --quiet ktlintFormat -PinternalKtlintGitFilter="$CHANGED_FILES"

echo "$CHANGED_FILES" | while read -r file; do
    if [ -f $file ]; then
        git add $file
    fi
done
```

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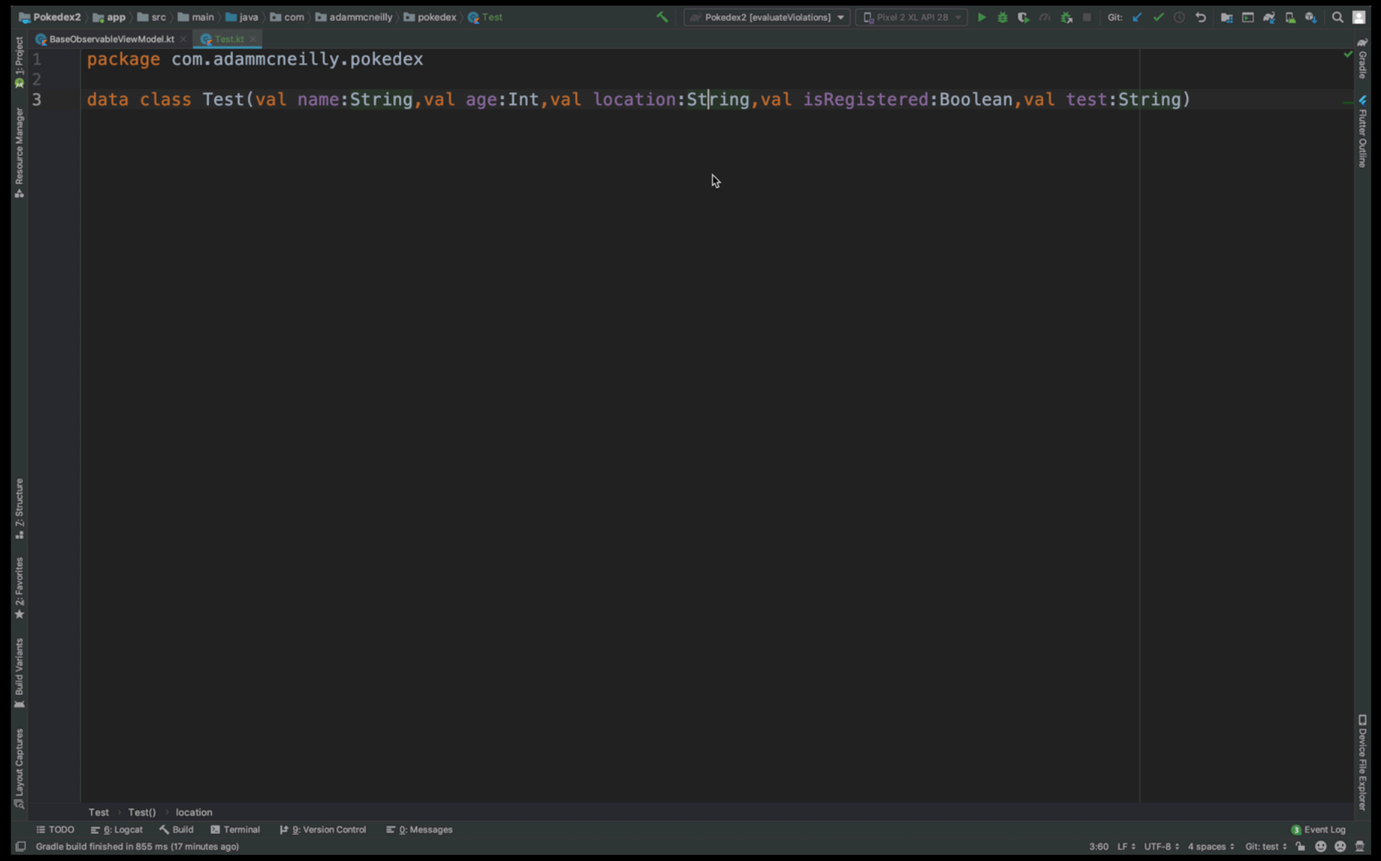
[3] https://github.com/AdamMc331/PokeDex/blob/master/scripts/git-hooks/pre-commit.sh

KtLint Sample



Avoid Code Smells With Detekt[4]

[4] https://arturbosch.github.io/detekt/

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Avoid Code Smells With Detekt[4]

- Avoid complex methods
- Enforce method counts in classes
- Limit lines of code in a class/method
- Prevent magic numbers

---

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- Magic numbers, deeply nested methods, and other code smells can be causes of bugs and make them difficult to resolve
- These sorts of code smells are difficult to *detekt*[5] in a code review

---

[5] I'm sorry...

Adding Detekt To Our Projects

```
// App module build.gradle
detekt {
    filters = ".*/resources/.*,.*/build/.*"
    baseline = file("my-detekt-baseline.xml")
    config = rootProject.files('detekt-config.yml')
}
```

Detekt Is Highly Configurable[6]

```
// detekt-config.yml
complexity: // Rule Set
  active: true
  ComplexMethod: // Rule
    active: true
    threshold: 10
    ignoreSingleWhenExpression: false
    ignoreSimpleWhenEntries: false
  LongParameterList: // Rule
    active: true
    threshold: 6
    ignoreDefaultParameters: false
  NestedBlockDepth: // Rule
    active: true
    threshold: 4
```

---

[6] https://github.com/arturbosch/detekt/blob/master/detekt-cli/src/main/resources/default-detekt-config.yml

Detekt Is Highly Configurable[7]

```
// detekt-config.yml
complexity:
  active: true
  TooManyFunctions:
    active: true
    thresholdInFiles: 11
    thresholdInClasses: 11
    thresholdInInterfaces: 11
    thresholdInObjects: 11
    thresholdInEnums: 11
    ignoreDeprecated: false
    ignorePrivate: false
    ignoreOverridden: false
```

---

[7] https://github.com/arturbosch/detekt/blob/master/detekt-cli/src/main/resources/default-detekt-config.yml

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- `./gradlew detektGenerateConfig`

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- `./gradlew detektGenerateConfig`
- `./gradlew detektBaseline`
- `./gradlew detekt`

Console Output Example

```
Type.kt - 20min debt
   ComplexMethod - 20/10 - [getColorRes] at Type.kt:9:5

PokemonListViewModel.kt - 20min debt
   TooGenericExceptionCaught - [error] at PokemonListViewModel.kt:52:26
```

HTML Report Output Example

detekt report

Metrics

- number of kt files: 27
- number of packages: 10
- number of classes: 31
- number of functions: 55
- number of properties: 59

Findings

complexity

ComplexMethod Prefer splitting up complex methods into smaller, easier to understand methods.

- `/Users/adammcneilly/AndroidStudioProjects/Pokedex2/app/src/main/java/com/adammcneilly/pokedex/models/Type.kt:9:5`
  The function getColorRes appears to be too complex.

exceptions

TooGenericExceptionCaught Caught exception is too generic. Prefer catching specific exceptions to the case that is currently handled.

- `/Users/adammcneilly/AndroidStudioProjects/Pokedex2/app/src/main/java/com/adammcneilly/pokedex/pokemonlist/PokemonListViewModel.kt:52:26`
  Caught exception is too generic. Prefer catching specific exceptions to the case that is currently handled.

Novoda Gradle Static Analysis Plugin[8]

```
// ./gradlew evaluateViolations
// Will run all the tools below

staticAnalysis {
    penalty {
        maxErrors = 0
        maxWarnings = 0
    }

    ktlint { }
    detekt { }
    lintOptions { }
    ... { }
}
```

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[8] https://github.com/novoda/gradle-static-analysis-plugin

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- Pre push hook
- Make your build task depend on it

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Some Best Practices

I just added these tools, my build failed, what do I do?

- Fix it!
- Modify the threshold for the relevant error
- Suppress this individual case
- Turn off this rule or rule set

Thank You!

Sample app: https://github.com/adammc331/pokedex
Slides: bit.ly/NYAndroid-StaticAnalysis