

Improving Code Quality With Static Analysis

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What Do I Mean By Code Quality?

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- Code should be free of code smells

Formatting Code With KtLint

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

"Bikeshedding" is a term used to describe wasting time on trivial details.

¹ <https://ktlint.github.io/>

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- No wildcard imports
- Consistent spacing
- No empty class bodies
- 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

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```
// App module build.gradle
```

```
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)
```

```
// 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 ":"
```

```
// Gets formatted into
```

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    val name: String,
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)
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Remembering To Format Code Is Hard

Auto Format With Git Hook³

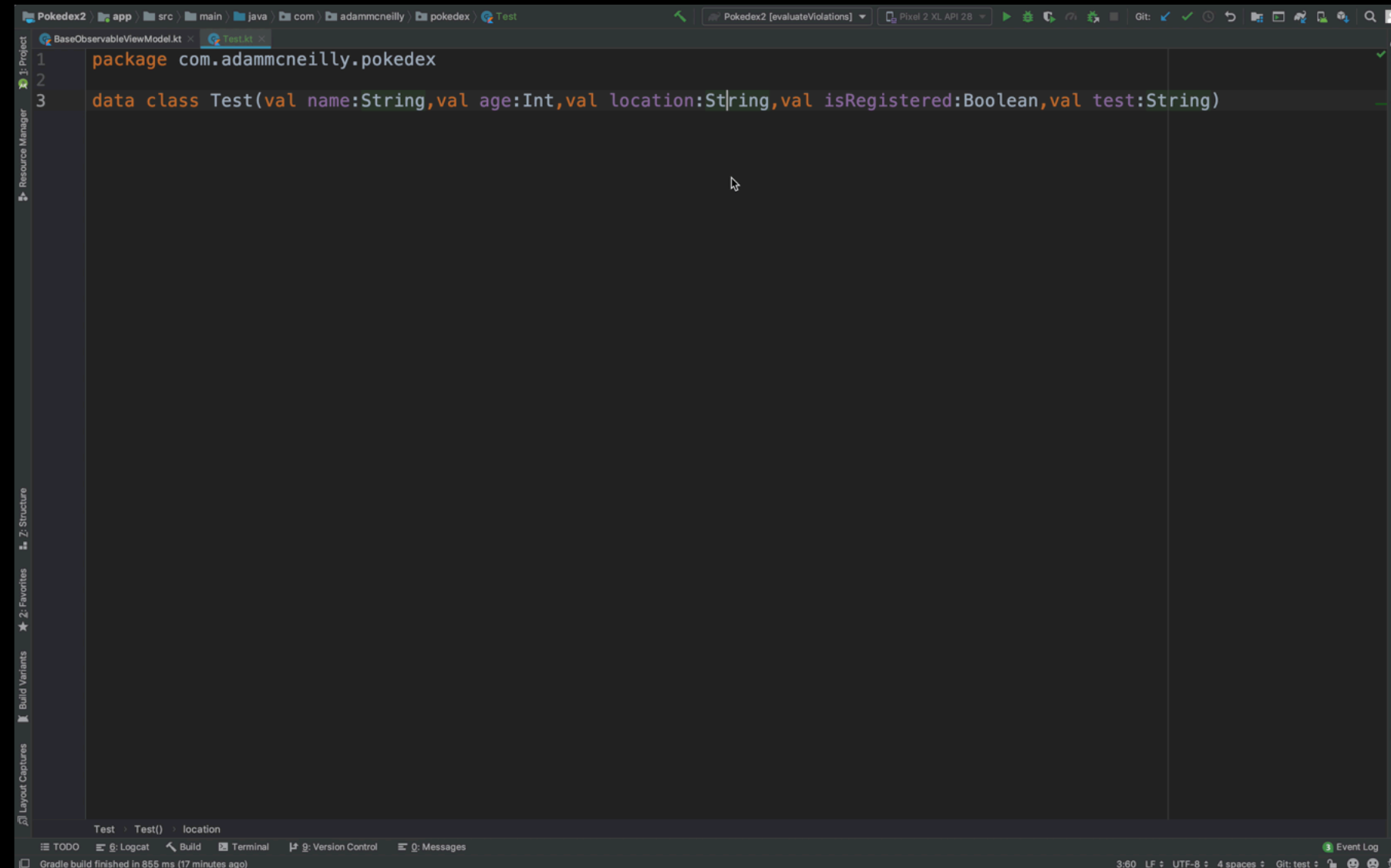
```
// .git/hooks/pre-commit
CHANGED_FILES="$(git --no-pager diff --name-status --no-color --cached | awk '$1 != "D" && $2 ~ /\.kts|\.kt/ { print $2}')"

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

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

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

KtLint Sample



Avoid Code Smells With Detekt⁴

⁴ <https://arturbosch.github.io/detekt/>

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Avoid Code Smells With Detekt⁴

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

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- Large collections of code (classes, methods, or whatever else) are unmanageable
- 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 Configurable⁶

```
// 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 Configurable⁷

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

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 Plugin⁸

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

```
staticAnalysis {  
    penalty {  
        maxErrors = 0  
        maxWarnings = 0  
    }  
  
    ktlint { }  
    detekt { }  
    lintOptions { }  
    ... { }  
}
```

⁸ <https://github.com/novoda/gradle-static-analysis-plugin>

When Should I Run This Process?

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- As a step in CI flow

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- Pre push hook

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- As a step in CI flow
- Pre push hook
- Make your build task depend on it

Some Best Practices

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- Modify the threshold for the relevant error
- Suppress this individual case

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!

We're Hiring! <https://okcupid.com/careers>

Sample app: <https://github.com/adammc331/pokedex>

Slides: <http://bit.ly/NYAndroid-StaticAnalysis>