

Unlocking the Power of IntelliJ

Creating Plugins for Ultimate Productivity



Thessaloniki – Java Meetup
19 October 2023
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Agenda

- ▶ Introduction
- ▶ SDK Overview
- ▶ Plugin Development
- ▶ Hands-on / CodeTour
- ▶ Resources & QA
- ▶ Quiz

Introduction

▶ Platform Overview

▶ Required Experience

- IntelliJ Platform is not a product itself!
- Component-driven, JVM application
- Language agnostic – abstract implementations!
 - Full-text Editor
 - Syntax highlighting
 - Built in Fast Search using Indexes
 - Code Completion
 - Breakpoints and Debugging features
- Open Source!

Introduction

► Platform Overview

► Required Experience

The screenshot shows the GitHub repository for JetBrains IntelliJ Community. The repository is public and has 15.9k stars, 528 watchers, and 5k forks. It is managed by Mikhail Pytstin and the IntelliJ-monorepo team. The repository contains 2,584 branches and 1,090 tags. The main branch is master. The repository is licensed under Apache-2.0. The repository is a code editor and platform for IntelliJ IDEA Community Edition.

Repository Details:

- Repository: `intellij-community` (Public)
- Watch: 528
- Fork: 5k
- Star: 15.9k
- Branches: 2,584
- Tags: 1,090
- Commits: 421,606

Recent Commits:

Commit	Author	Message	Time
8d38973	Mikhail Pytstin and intellij-monorepo	move <code>TaskCancellation</code> to a separate module	4 hours ago
[inspections] IDEA-321711		Use optimized PsiElement	last month
KTNB-357		Fix the work of serialization plugin in IDE	2 weeks ago
[platform]		using new restarter on Linux (IDEA-321711)	3 weeks ago
[build scripts]		bumping the cross-platform launcher	6 hours ago
ML in SE		move embeddings to a separate module	2 weeks ago
Remove xml-serialization.md		and com.intellij.util.xml.serialization	last week
[Feedback] IDEA-331610		Replace old general feedback form	last week
Add format parameter		to ImageEditorManager	yesterday
[java-refactoring] IDEA-324451		IJ-CR-115002 Support for Java 11	48 minutes ago
Warnings fixed			8 hours ago
The "Incorrect service retrieving" inspection		clarified	2 days ago
IDEA-326151		update hash algo for icons	2 months ago

About:

- IntelliJ IDEA Community Edition & IntelliJ Platform
- jetbrains.com/idea
- Tags: `intellij`, `ide`, `code-editor`, `intellij-platform`, `intellij-community`
- Readme
- Apache-2.0 license
- Code of conduct
- Activity
- 15.9k stars
- 528 watching
- 5k forks
- Report repository

Releases:

- 1,090 tags

Introduction

► Platform Overview

► Required Experience

- **Java**, Kotlin and its standard and 3rd-party libraries
- Gradle or **Maven** as build system (Gradle is preferred)
- Swing for building user interfaces
- Java Concurrency Model (Threads, Executors, Locks)
- Experience with IntelliJ Platform-based IDE (e.g., IntelliJ IDEA)

SDK Overview

- ▶ **Actions**
 - Action = Code Implementation + Registration
- ▶ Virtual File System
 - Code Implementation determines the context and its functionality
- ▶ Project Model
 - Registration determines where an action appears in UI
- ▶ PSI
 - Callbacks from IntelliJ Platform in response to user gestures
- ▶ Editors

SDK Overview

- ▶ Actions
 - Encapsulation of all the activity of a Virtual File
- ▶ **Virtual File System**
 - A Virtual file, might be:
 - Normal File (on disk)
 - Decompiled File (in a lib/archive)
 - Remote File (on an HTTP server)
- ▶ Project Model
- ▶ PSI
- ▶ Editors
 - Why?
 - Universal API for working with files
 - Track File modifications - File versioning
 - Associate with persistent metadata - snapshot

SDK Overview

- ▶ Actions
 - Project | Source code, build instructions, libraries
- ▶ Virtual File System
 - Module | unit of functionality
- ▶ **Project Model**
 - Library | 3rd party compiled code
- ▶ PSI
 - SDK | For building the project
- ▶ Editors
 - Facet | Set of configuration

SDK Overview

- ▶ Actions
- ▶ Virtual File System
- ▶ Project Model
- ▶ PSI
- ▶ Editors

```
ProjectManagerListener.java
1 // Copyright 2000-2022 JetBrains s.r.o. and contributors. Use of this source code is governed by a
2 package com.intellij.openapi.project;
3
4 import ...
5
6
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```

Listener for the [Project](#) lifecycle events.
See Also: [ProjectManager.TOPIC](#)

```
public interface ProjectManagerListener extends EventListener {
    ProjectManagerListener[] EMPTY_ARRAY = new ProjectManagerListener[0];

    /**
     * Deprecated Do not use. Post start-up activity maybe an alternative.
     * @Deprecated(forRemoval = true)
     * default void projectOpened(@NotNull Project project) {
     * }

    /**
     * Deprecated Use VetoableProjectManagerListener instead
     * @DeprecatedIsStillUsed/
     * @Deprecated(forRemoval = true)
     * default boolean canCloseProject(/unused/ @NotNull Project project) { return true; }

    /**
     * Invoked on project close. Consider using ProjectCloseListener
     * default void projectClosed(@NotNull Project project) {
     * }

    /**
     * Invoked on project close before any closing activities. Consider using ProjectCloseListener
     * default void projectClosing(@NotNull Project project) {
     * }

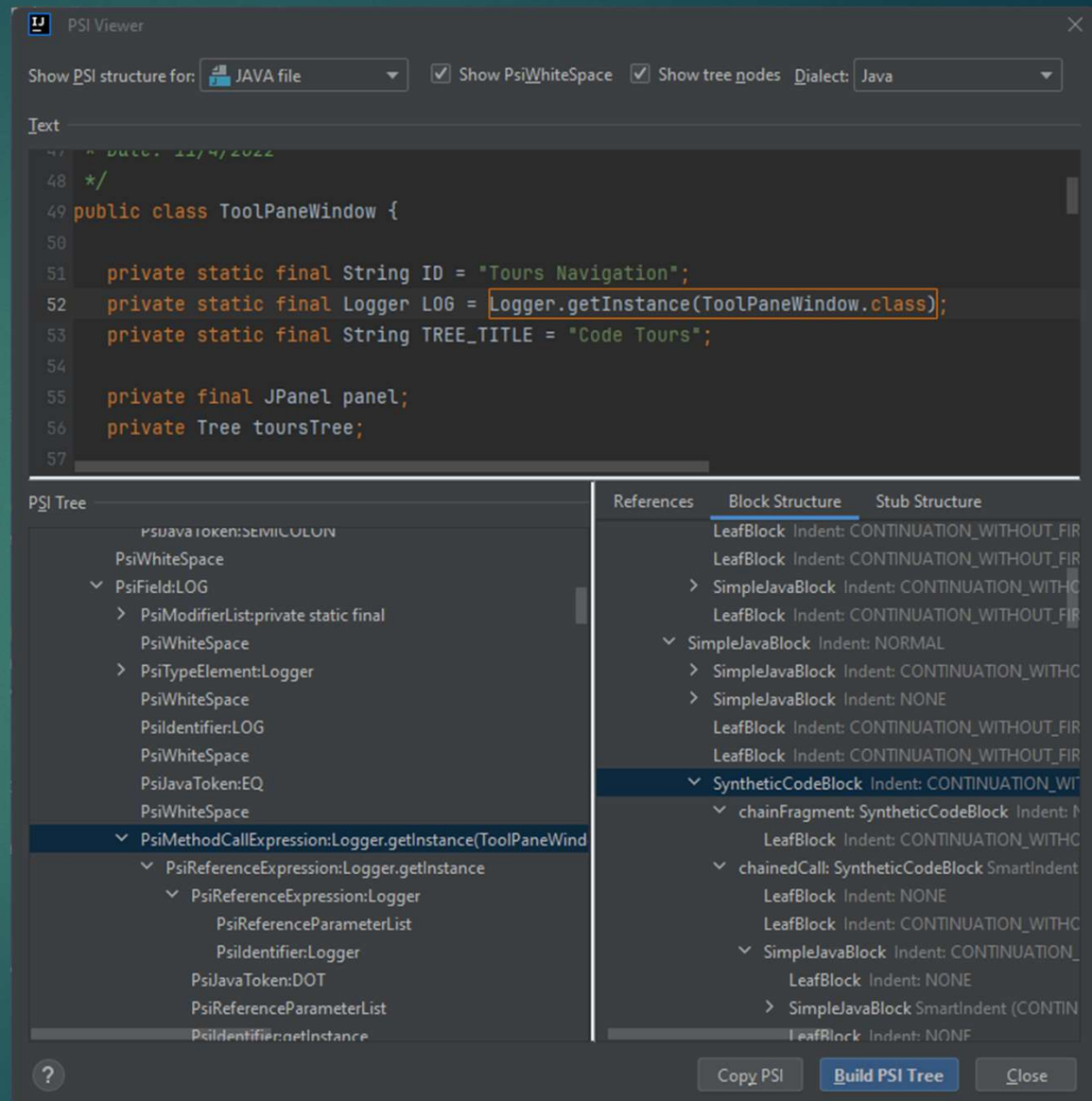
    /**
     * @AvailableSince(value = "172.2273.8")
     * default void projectClosingBeforeSave(@NotNull Project project) {
     * }
}
```

SDK Overview

- ▶ Actions
 - A PSI (Program Structure Interface) file is the tree-like representation of a file's contents
- ▶ Virtual File System
 - Language Specific Implementation – Generic Parsers are available
- ▶ Project Model
 - Frequently Updated but Ultra Fast!
- ▶ **PSI**
 - Backs the Code formatting, Code completion and highlighting
- ▶ Editors
 - PSI Viewer

SDK Overview

- ▶ Actions
- ▶ Virtual File System
- ▶ Project Model
- ▶ PSI
- ▶ Editors

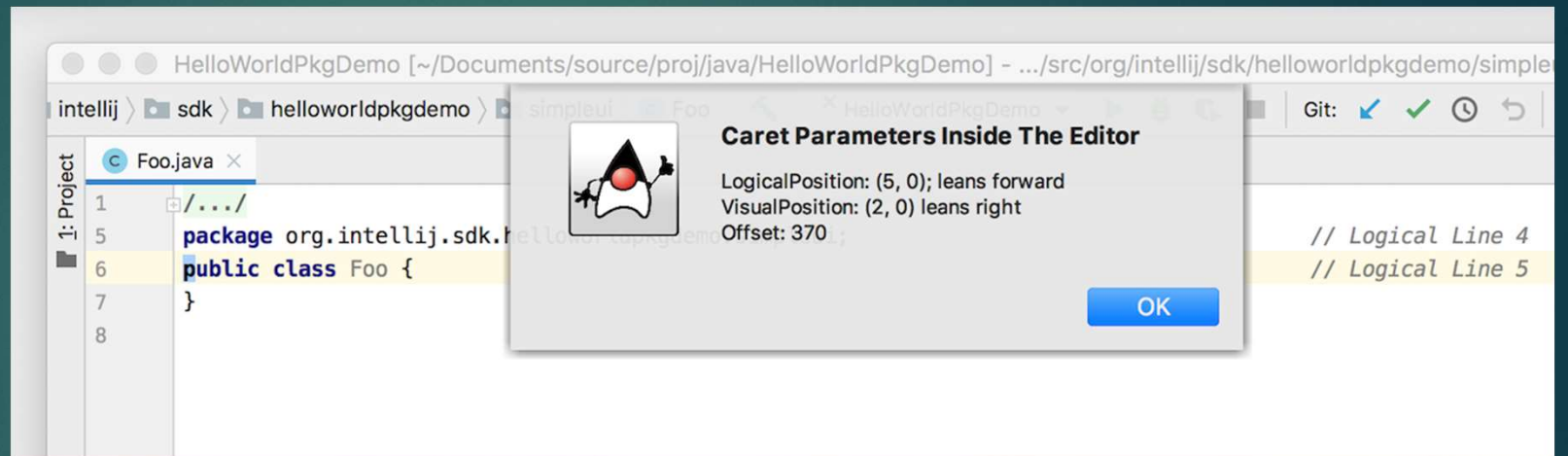


SDK Overview

- ▶ Actions
 - Editor Active View
- ▶ Virtual File System
 - Caret (or multiple carets) for Actions (e.g. right click)
- ▶ Project Model
 - Code Block Selection
- ▶ PSI
 - Logical vs Visual Position
- ▶ **Editors**

SDK Overview

- ▶ Actions
- ▶ Virtual File System
- ▶ Project Model
- ▶ PSI
- ▶ Editors



Plugin Development

- ▶ **Alternative to Plugin**
 - SSR - Structural Search and Replace Inspections
 - Search patterns
 - Code Inspections!
- ▶ Plugin Types
- ▶ Plugin Structure
 - IDE Scripting Console
 - Console with access to IntelliJ platform API
 - Flora Plugin
 - Scripts (Kotlin or JavaScript) for using IntelliJ platform API
 - Shareable with others!

Plugin Development

- ▶ Alternative to Plugin
 - Custom Language Support
- ▶ **Plugin Types**
 - Framework integration
- ▶ Plugin Structure
 - Tool integration
 - User interface enhancements or add-ons
 - Themes

Plugin Development

- ▶ Alternative to Plugin
 - Plugin Configuration File – plugin.xml
- ▶ Plugin Types
 - Plugin Dependencies – Any 3rd party lib
- ▶ **Plugin Structure**
 - Actions – Callbacks on User gestures
 - Extensions – Extend IDE functionality
 - Listeners – Subscribe to IDE events

Hands On | CodeTour

▶ What is CodeTour

▶ Where to get it

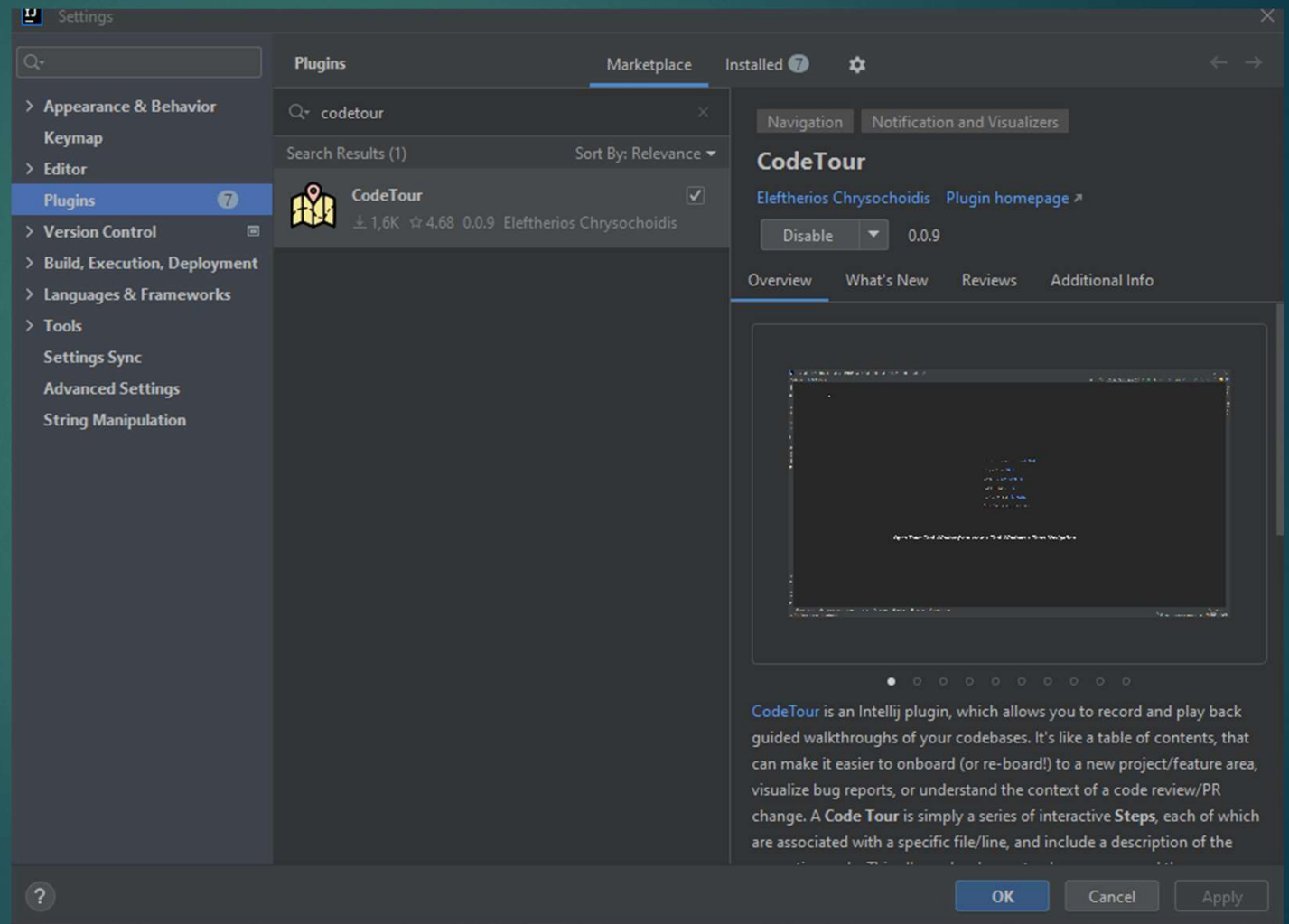
▶ Demo



- Plugin which allows you to record and play back guided walkthroughs of your codebase.
- Markdown and HTML support for Step's description
- Might be useful for
 - Onboard (or re-board) new members on a project
 - Visualize Bugs (providing the path/flow)
 - Explain a Pull Request (explaining the logic flow)
 - Document a Feature (feature's flow is depicted on the code)

Hands On | CodeTour

- ▶ What is CodeTour
- ▶ Where to get it
- ▶ Demo



Hands On | CodeTour

- ▶ What is CodeTour
 - CodeTour - IntelliJ IDEs Plugin | Marketplace
 - <https://plugins.jetbrains.com/plugin/19227-codetour>
- ▶ Where to get it
- ▶ Demo
 - LfterisXris/CodeTour: IntelliJ Plugin | Github
 - <https://github.com/LfterisXris/CodeTour>



Hands On | CodeTour

- ▶ What is CodeTour
- ▶ Where to get it
- ▶ Demo



Resources

- ▶ **Github Template**
 - Setup a Complete Github Repo in minutes!
- ▶ Plugin Samples
 - Structure, Config, Testing
- ▶ Usage Explorer
 - Continuous integration based on GitHub Actions
 - Dependencies management with Dependabot
 - Changelog maintenance with the Gradle Changelog Plugin
 - Release flow using GitHub Releases
 - Plugin signing with your private certificate
 - Publishing the plugin with the Gradle IntelliJ Plugin
- ▶ Extension Point and Listener List
- ▶ UI Inspector
- ▶ Internal Actions
 - <https://github.com/JetBrains/intellij-platform-plugin-template>

Resources

- ▶ Github Template
- ▶ Plugin Samples
- ▶ Usage Explorer
- ▶ Extension Point and Listener List
- ▶ UI Inspector
- ▶ Internal Actions

Code Sample	Description
Action Basics	Action and Action Group patterns implementation, adds entries to the Tools menu.
Comparing References Inspection	Local Inspection Tool, adds entries to Settings Editor Inspections Java Probable Bugs .
Conditional Operator Intention	Intention action, suggests converting a ternary operator into an <code>if</code> block and adds entry to Settings Editor Intentions SDK Intentions .
Editor Basics	Basic Editor APIs example with editor popup menu with extra actions.
Framework Basics	Basic <i>SDK Demo Framework</i> support added to the File New Project Java wizard.
Kotlin Demo	Kotlin example extending the <i>Main Menu</i> with a Greeting menu group.
Live Templates	Live templates for Markdown language, adds an entry to the Settings Editor Live Templates dialog.
Max Opened Projects	Application services and listeners, shows warning dialog when more than 3 open projects are opened.
Module	<i>SDK Demo Module</i> module type added to the File New Project... wizard.
Product Specific - PyCharm Sample	Plugin project configuration for the PyCharm IDE.
Project Model	Interacts with the project model, adds menu items to Tools and Editor Context menus.
Project View Pane	Project View Pane listing only image files.
Project Wizard	Project Wizard example with demo steps.
PSI Demo	PSI Navigation features presentation.
Run Configuration	Run configuration implementation with factory, options and UI.
Settings	Custom settings panel, adds a settings panel to the Settings panel under Tools .
Simple Language Plugin	Custom language support, defines a new <i>Simple language</i> with syntax highlighting, annotations, code completion, and other features.
Theme Basics	Sample <i>theme</i> plugin with basic interface modifications.
Tool Window	Custom Tool Window example plugin.
Tree Structure Provider	Tree Structure Provider showing only plain text files.

<https://github.com/JetBrains/intellij-sdk-code-samples>

Resources

- ▶ Github Template
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- ▶ Extension Point and Listener List
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- ▶ Internal Actions

The screenshot shows the 'Extensions' tab in the IntelliJ Platform Explorer. On the left, there's a sidebar with a search filter and a list of extension points. The main panel shows a table of installed and available extensions.

	Extensions	Downloads / Updated	
Kotest kotest/kotest	17	144,344 Oct 18, 2023	Testing X
Ansible Lint 4ch1m/intellij-ansible-lint	4	8,582 Oct 18, 2023	Inspection X Tools Integration X
Quarkus Tools redhat-developer/intellij-quarkus	52	114,029 Oct 18, 2023	Code Tools X Tools Integration X
Tabnine: AI Code Completion & Chat in Java JS/TS Python & More codota/tabnine-intellij	11	2,847,915 Oct 18, 2023	Code Tools X JavaScript X

<https://plugins.jetbrains.com/intellij-platform-explorer/extensions>

Resources

- ▶ Github Template
- ▶ Plugin Samples
- ▶ Usage Explorer
- ▶ **Extension Point and Listener List**
- ▶ UI Inspector
- ▶ Internal Actions

IntelliJ Platform - Listeners ↗	
Topic	Listener
ProblemsListener#TOPIC ↗	ProblemsListener ↗
EditorOptionsListener#FOLDING_CONFIGURABLE_TOPIC ↗	EditorOptionsListener
EditorOptionsListener#APPEARANCE_CONFIGURABLE_TOPIC ↗	EditorOptionsListener
EditorOptionsListener#OPTIONS_PANEL_TOPIC ↗	EditorOptionsListener
EditorOptionsListener#SMART_KEYS_CONFIGURABLE_TOPIC ↗	EditorOptionsListener
EditorOptionsListener#GUTTER_ICONS_CONFIGURABLE_TOPIC ↗	EditorOptionsListener

Listener List

Legend

Listeners

Extension Points

Tags

IntelliJ Platform

IntelliJ Platform - Listeners

Analysis.xml

AnalysisImpl.xml

builtinServer.xml

CodeStyle.xml

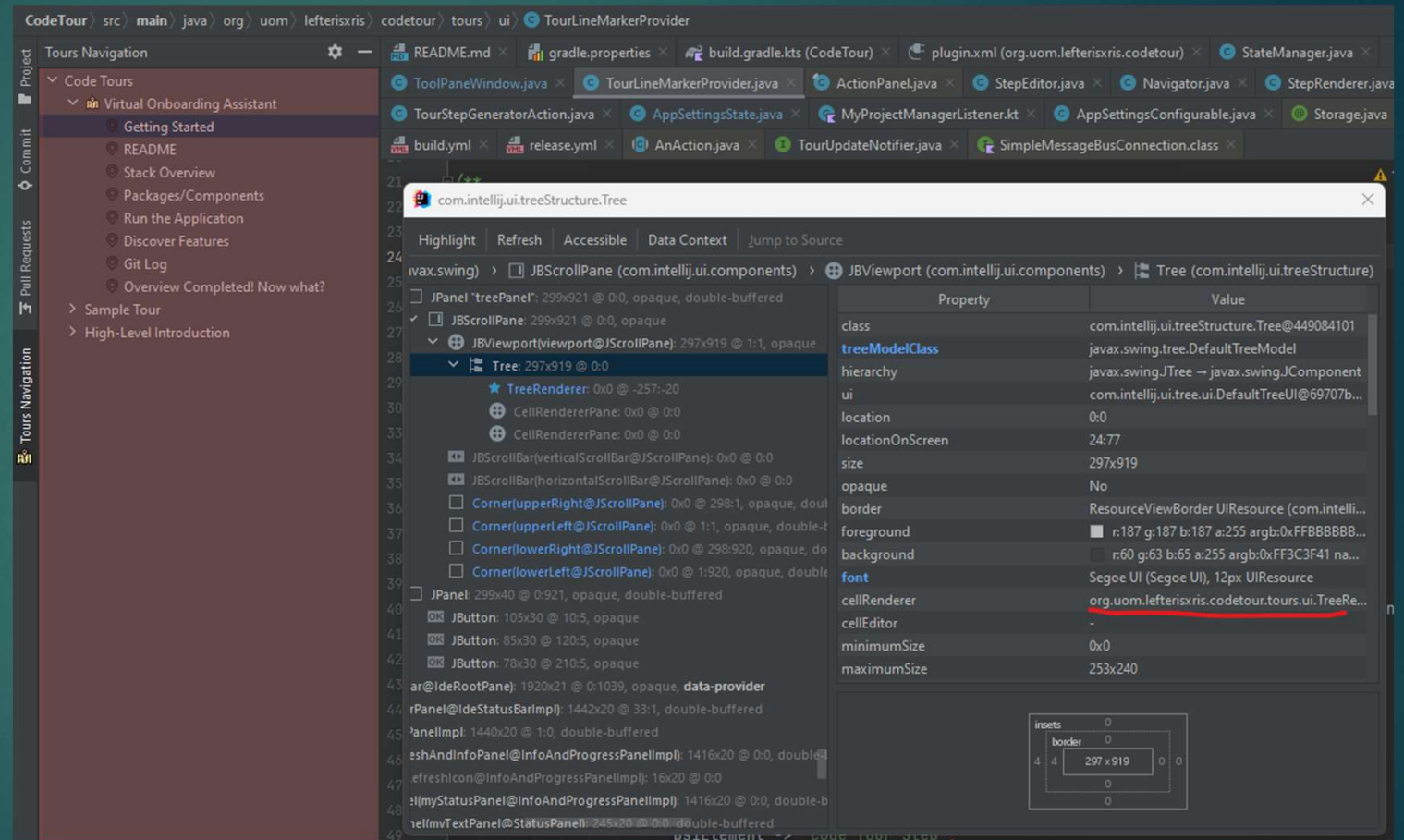
com.intellij.platform.im_

CompletionExtensionP_

<https://plugins.jetbrains.com/docs/intellij/extension-point-list.html>

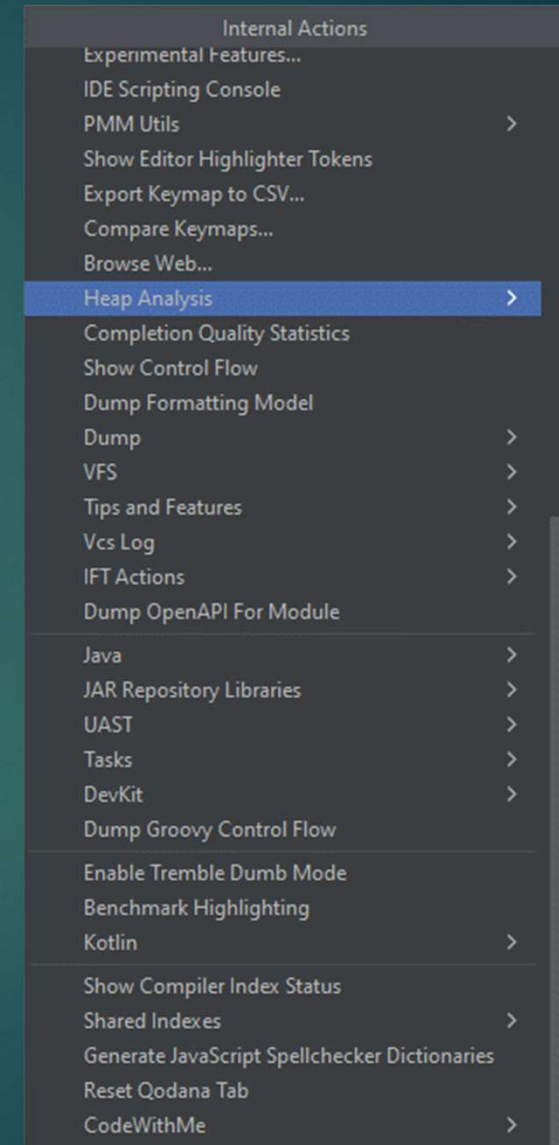
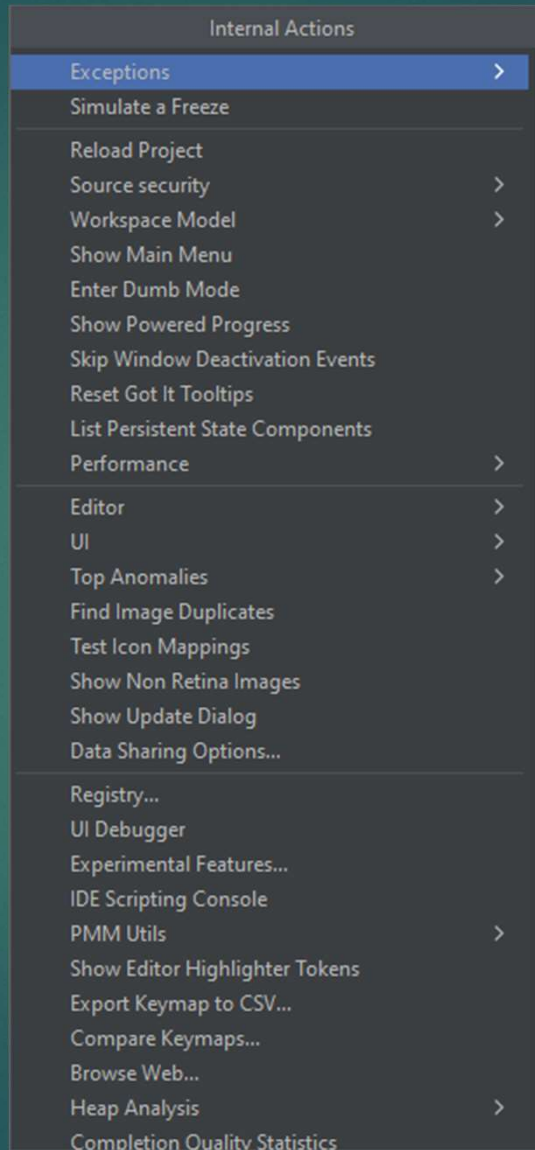
Resources

- ▶ Github Template
- ▶ Plugin Samples
- ▶ Usage Explorer
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- ▶ Internal Actions



Resources

- ▶ Github Template
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- ▶ Usage Explorer
- ▶ Extension Point and Listener List
- ▶ UI Inspector
- ▶ **Internal Actions**



QA Time!

