

Toolchain Setup

CS 346: Application
Development

What to install

- What should be installed manually:

- Git 2.45+
- Java JDK 21
- IntelliJ IDEA 2024.2+



- What will be imported automatically:

- Kotlin
- Gradle
- JUnit



See
Reference >
Toolchain

Installing Git



Required for working with GitLab & source code.

- Preinstalled on macOS and Linux.
- Needs to be manually installed on Windows.
 - <https://git-scm.com/>

Command-line is fine for 99% of what you will need to do.

- IntelliJ IDEA has built-in support.
- Some [great graphical clients](#) if you prefer.

JDK installation

- You will need the Java JDK installed for building desktop + Android applications.
- Azul has [great/stable OpenJDK builds](#) for all platforms.
 - Recommend JDK 21 LTS (stable long-term release)
 - Make sure you install the correct version for your hardware
 - X86 vs ARM

IMPORTANT: Mixing versions of the JDK can results in inconsistent compilation and runtime behaviors. [You and your team need to install the same versions of everything!](#)

IntelliJ IDEA (IDE)

The “best” Kotlin IDE.

Why is this even a topic?

An Integrated Development Environment (IDE) is a software development environment. It typically includes a code editor, debugging, testing and profiling tools, and anything else that might be needed.

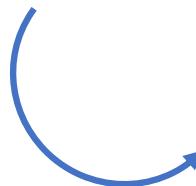
We strongly recommend a supported IDE. Why?

- **Best language support:** much better than a language server.
- **Debugging:** optimized debugger.
- **Profiling:** support for profiling complex/multi-threaded code.
- **Refactoring:** best-in-industry refactoring tools.

Installing IntelliJ IDEA

I use Ultimate but Community is fine.
Install the latest version.

- **IntelliJ IDEA** can be downloaded from <https://www.jetbrains.com/idea>
- There are two versions of IntelliJ IDEA:
 - **Community Edition**, which is open source
 - **Ultimate Edition**, which is commercially licensed, but has advanced features.



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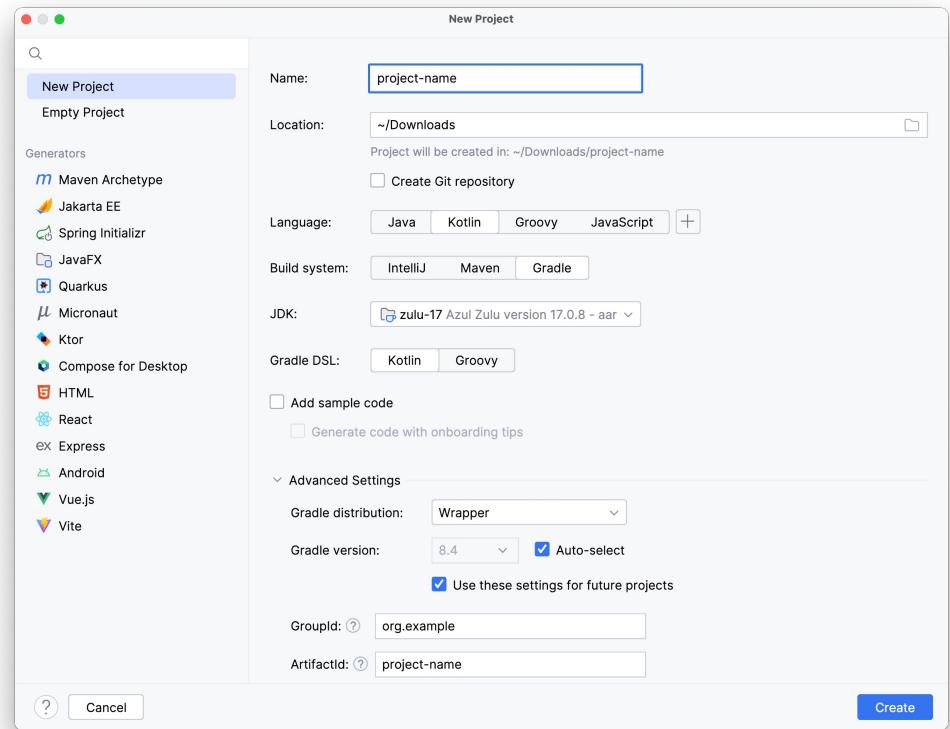
Creating a new Project

This is desktop. See
Android setup later!

- File > New Project
 - Language: Kotlin
 - Build System: Gradle
 - JDK: 21 (recommended)
 - Gradle DSL: Kotlin
 - Gradle distribution: Wrapper
 - Groupid: ca.uwaterloo
 - Artifactid: <default>

You can mostly pick defaults.

You can modify your project configuration as the course progresses.



IDE Layout

project structure

classes

breadcrumbs

The screenshot shows the IntelliJ IDEA interface with the following layout components:

- Project structure:** The left sidebar showing the project structure with 'src' and 'main' directories, including 'kotlin', 'ca.uwaterloo', and 'DataClasses.kt'.
- classes:** The 'Structure' tool window on the left, showing the class hierarchy for 'DataClasses.kt' and 'Course'.
- breadcrumbs:** The breadcrumb navigation bar at the bottom left, showing the file path: 'src > main > kotlin > ca > uwatertloo > DataClasses.kt'.
- debug/run:** The top right corner of the code editor.
- code window:** The main area where the code is written, containing the 'DataClasses.kt' file content.
- status bar:** The bottom right corner of the interface, showing build status and other information.

```
1 package ca.uwaterloo
2
3 import kotlinx.serialization.Serializable
4
5 @Serializable
6 data class AcademicOrganizations(
7     var code: String,
8     var name: String,
9     var description: String? = null,
10    var descriptionFormal: String,
11    var associatedCampusCode: String
12 ) {
13     override fun toString(): String {
14         return descriptionFormal
15     }
16 }
17
18 @Serializable
19 data class Course(
20     val courseId: String,
21     val courseOfferNumber: Int,
22     val termCode: String,
23     val termName: String,
24     val associatedAcademicCareer: String,
25     val associatedAcademicGroupCode: String,
```

Configuration

My settings. I like a minimal UI and use hotkeys. The only thing I strongly recommend is memory settings.

- IDE settings (stored in `.idea`) and project settings (stored in config files).
 - Put `.idea` in your `.gitignore` so that you don't wreck your teammates config (!).

Settings

- Help > Change Memory Settings > 4096 MB 
- View > Appearance > Compact Mode
- View > Appearance > Tool Window Bars OFF
- View > Appearance > Navigation Bar > In Status Bar

Plugins

- Mermaid // for rendering diagrams in markdown
- Rainbow Brackets // for highlighting matching brackets
- IdeaVim // for Vim keybindings in IntelliJ (!)