TOOLCHAIN SETUP

CS 346: Application Development

WHAT TO INSTALL

What should be installed <u>manually</u>:

- Git 2.45+
- Java JDK ~~17~~ 21 ✔
- IntelliJ IDEA 2024.2+

What will be imported <u>automatically</u>:

- Kotlin
- Gradle ✖
- JUnit

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.

GUI is optional.
- IntelliJ IDEA has built-in support.
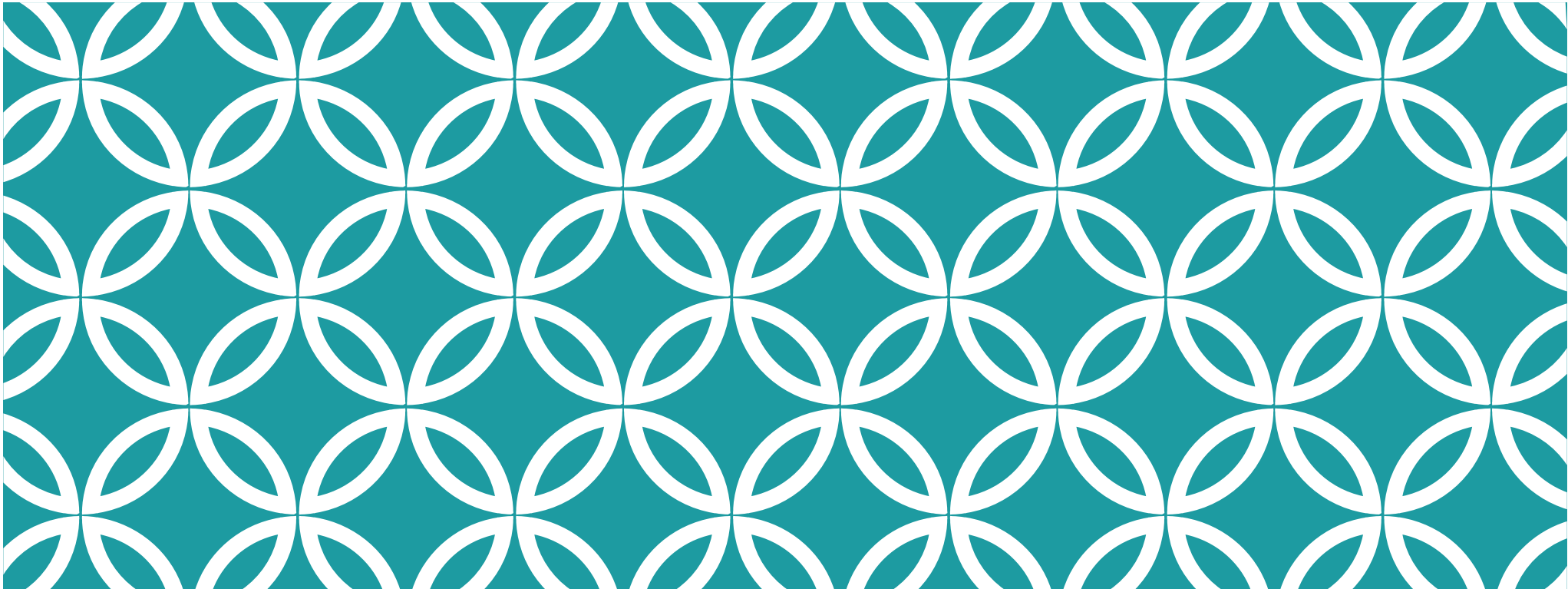- Some great graphical clients if you prefer.

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 ~~17~~ 21 LTS (stable long-term release)
- Make sure you install the correct version for your hardware e.g., ARM for M1.
- Most important – make sure that you and your team are running the same distribution + version!

IMPORTANT: Mixing versions of the JDK can results in inconsistent compilation and runtime behaviors.

INTELLIJ IDEA (IDE)

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WHY IS THIS EVEN A TOPIC?

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

While you certainly *can* use command-line tools to build applications, we strongly recommend a supported IDE. Why?

- **Best language support**: in the case of Kotlin, much better than the OSS language server.
- **Debugging**: optimized debugger which works better than console-debugging.
- **Profiling**: built-in support for profiling complex/multi-threaded code.
- **Refactoring**: best-in-industry refactoring tools.

> "What if I prefer an editor?" That's up to you. The line between editor & IDE is *very, very* thin. VIM is an editor. Is VS code an editor? Does adding plugins make it an IDE?

INSTALLING INTELLIJ IDEA

I use Ultimate. Make sure to 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.

Free Educational Licenses

Learn or teach coding with best-in-class development tools from JetBrains!

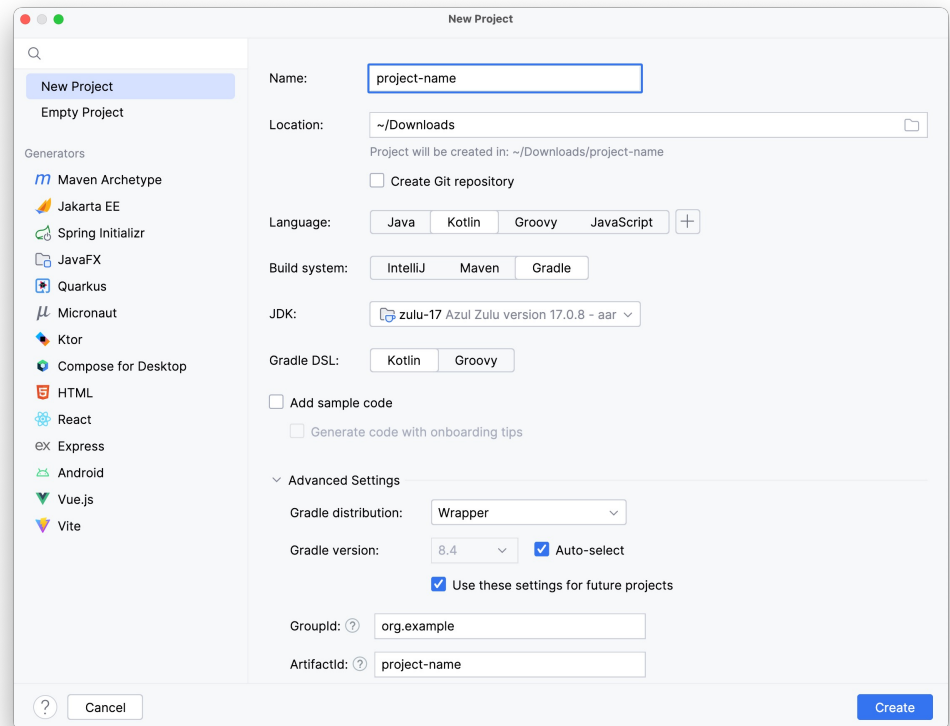https://www.jetbrains.com/community/education/#students
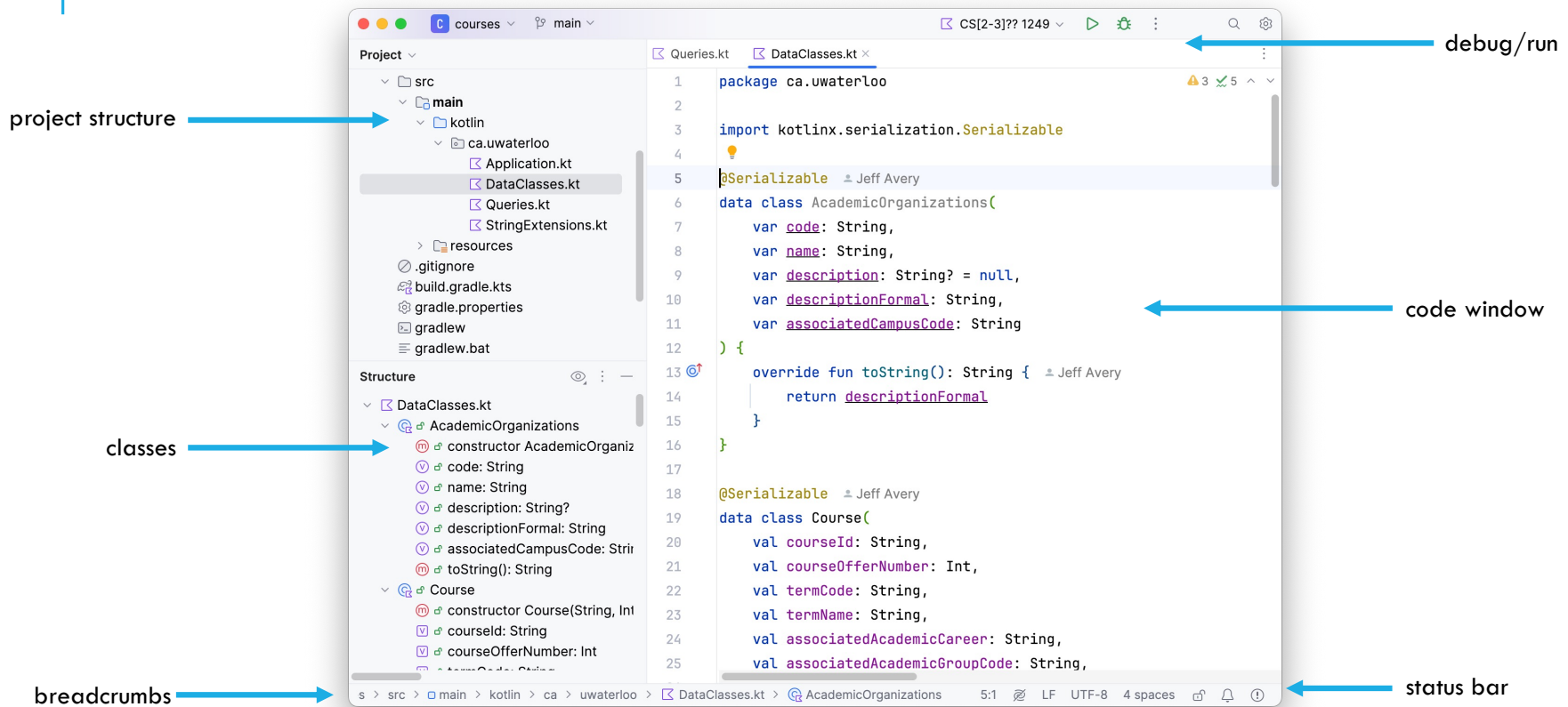
CREATING A NEW PROJECT

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

debug/run

code window

status bar

CONFIGURATION

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 (!)

Full list at https://student.cs.uwaterloo.ca/~cs346/1249/toolchain/intellij/#my-settings

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