

2338 Software Engineering

Robot Programming: Computer Setup



Laptop

- ❖ Laptop running MS Windows
- ❖ Administrator permissions
- ❖ ≈ 30Gb-112.67Gb space

BRING YOUR LAPTOP

There is nothing you can do without it. I don't think you can push code to github without one unless you got a neuralink.

Bring it everywhere

Now that you are a programmer there is always a need for one, no matter where you are

If you don't bring one you might not have anything to do

BRING YOUR LAPTOP

List of Applications

- ❖ [JDK \(Java Development Kit\)](#)
- ❖ [IntelliJ](#)
- ❖ [GitKraken](#)
- ❖ [FRC Game Tools](#)
- ❖ WPILib library

Special Applications (not for everyone)

- ❖ Robot Characterization Tool (Optional)
 - Python
 - Not in this training
- ❖ VS Code (Optional)
 - Only needed for new projects

Installing JDK

1. Download Java JDK from oracle.com:
 - a. 2019-2022: <https://www.oracle.com/java/technologies/javase/jdk11-archive-downloads.html>
 - b. 2023: <https://www.oracle.com/java/technologies/downloads/#jdk17-windows>
2. Download the jdk-xxxx.exe file for your OS and architecture
 - a. 2019-2022 jdk-11.02
 - b. 2023 jdk-17.06
 - c. If necessary, create an Oracle account using school ID
3. Run install script
4. Verify
 - a. Windows
 - i. Open Command prompt
 1. Type "Command" in Windows search bar
 - ii. Type "java -version"
 1. Should return "java version ..."
 - iii. See next slide to troubleshoot java installation



Troubleshooting Windows Java installation

1. Type “command” in Windows search bar
2. Type “echo %JAVA_HOME%”
 - a. If “%JAVA_HOME%” is returned, you need to set the JAVA_HOME environment variable
 - i. Type “Environment” in Windows search bar
 - ii. System Properties opens
 - iii. Select “Environment Variables”
 - iv. Select New
 - v. Set Variable Name to: JAVA_HOME
 - vi. Set Variable Value to Java location below
 1. c:\Program Files\Java\jdk-11.0.2
3. Add JAVA_HOME to path
 - a. Select PATH and click Edit
 - b. Select “New”
 - c. Type %JAVA_HOME%
 - d. Select OK to exit all system properties windows
 - e. Open a new command window and test “java -version” again



Installing IDE

1. Goto:
 - a. <https://www.jetbrains.com/idea/download>
2. Download the Community .exe for your OS and architecture
3. Run install script
 - a. No special options necessary

If you already have Intelli-J installed from a previous year, you can select Help | Check for updates...

Intelli-J may update to intermediate releases before getting to the final release



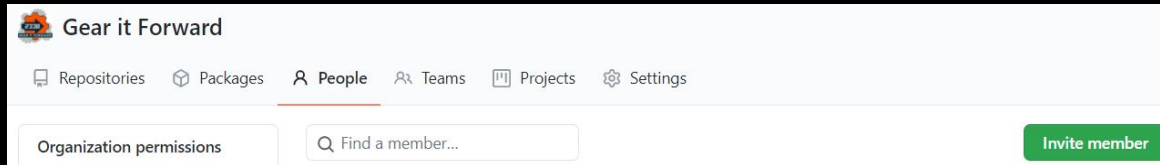
Installing GitKraken

1. Goto:
 - a. <https://www.gitkraken.com/download>
2. Download the .exe file for your OS and architecture
3. Run install script

Create GitHub Account (if you don't have one)

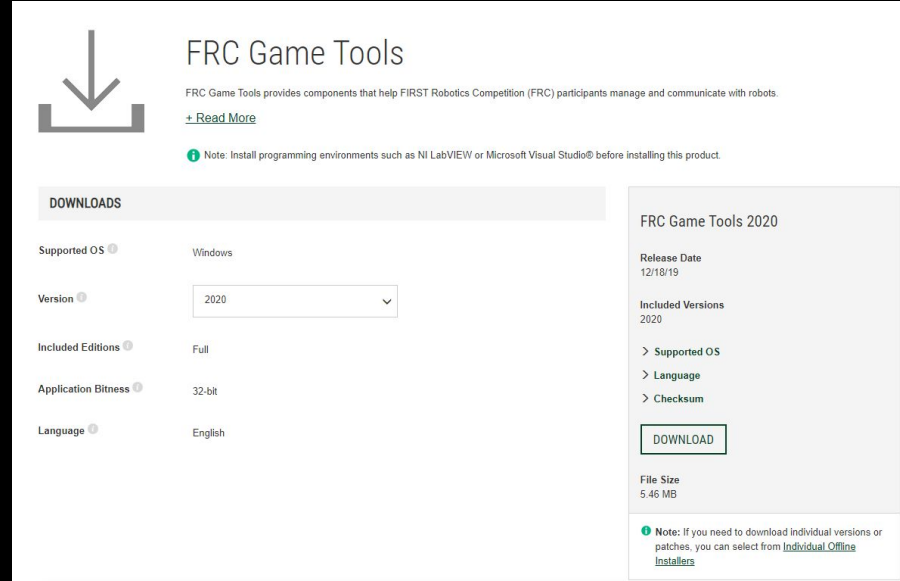
1. Github.com
2. Select "Sign up"
3. Follow sign-up instructions

GitHub Admins: Invite new users to GitHub via:



Installing FRC Game Tools

1. Search “frc game tools” and open the National Instruments webpage
 - a. <https://www.ni.com/en-us/support/downloads/drivers/download.frc-game-tools.html>
2. Download the game tools for the most recent year (not recommended on slow school wifi)
3. Install Game Tools from the downloaded exe
 - a. Install with all default options
 - b. Create an NI User Account when prompted
 - i. Use your school email address
 - c. When asked for an NI license, just close the window
 - d. You will be asked to reboot. Go ahead and reboot.



The screenshot shows the 'FRC Game Tools' download page. At the top, there is a download icon and the title 'FRC Game Tools'. Below the title, a note states: 'FRC Game Tools provides components that help FIRST Robotics Competition (FRC) participants manage and communicate with robots.' A '+ Read More' link is provided. A green note icon indicates: 'Note: Install programming environments such as NI LabVIEW or Microsoft Visual Studio® before installing this product.'

The 'DOWNLOADS' section is highlighted. It lists the following specifications:

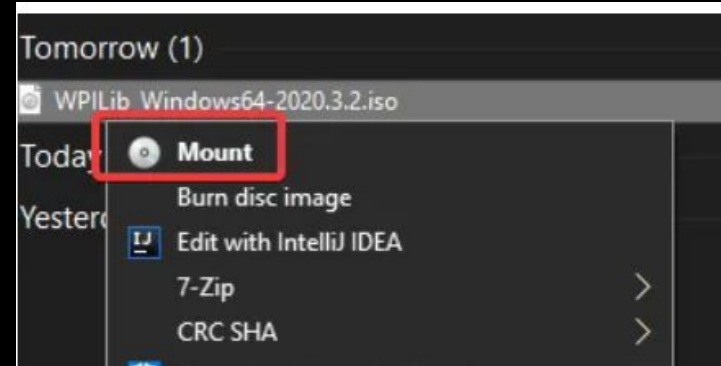
- Supported OS: Windows
- Version: 2020 (dropdown menu)
- Included Editions: Full
- Application Bitness: 32-bit
- Language: English

On the right side, there is a summary box for 'FRC Game Tools 2020' with the following details:

- Release Date: 12/18/19
- Included Versions: 2020
- Actions: > Supported OS, > Language, > Checksum
- Download Button: DOWNLOAD
- File Size: 5.46 MB
- Note: If you need to download individual versions or patches, you can select from [Individual Offline Installers](#).

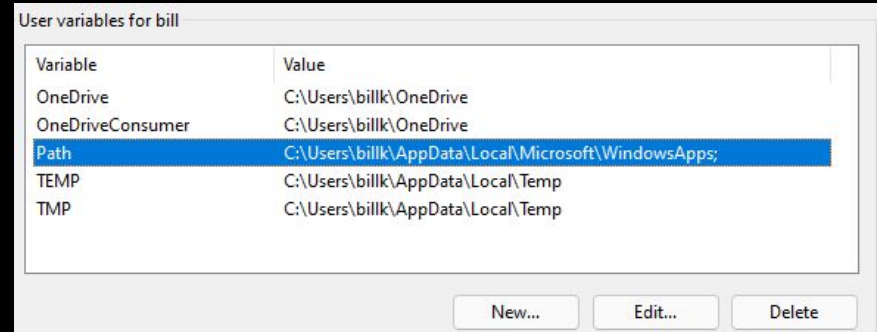
Installing WPILib

1. Find latest on github
 - a. <https://github.com/wpilibsuite/allwpilib/releases>
2. Expand "Assets"
3. Select WPILib_Windows64_YYYY.iso
4. Mount ISO (right click file and select Mount)
5. Open WPILibInstaller
 - a. Install everything for all users
 - b. Select Download for this computer only



Updating execution path

1. Windows Search
2. Select “Edit the System Environment Variables”
3. Select “Environment Variables”
4. Select user variable “Path” and “Edit”
5. Select “New” and type “buildscripts”
6. Select “Ok”, “Ok”, “Ok” to close related System Environment windows



Note: Typically you would use “.buildscripts” but Powershell does not persist the environment update when .\ is used

Historical Versions

Year	Java JDK "C:\Program Files\Java" jdk-x.x.x	Intell-J	FRC Game Tools	GitKraken	WPILib
2023	SE 17.0.6	Community 2022.3.1	2023	9.0.1	2023.2.1
2022	SE 11.0.2	Community 2021.3.1	2022 f1	8.2.1	2022.3.1
2021	SE 11.0.2	Community 2020.3	2021	7.x	

Additional Tools (optional)

- Phoenix Tuner - Updates Talon and Pigeon firmware
 - Phoenix Framework Software from CTR Electronics
- Rev Hardware Client - Updates SparkMax firmware
 - Rev SparkMax Client has been discontinued

Additional Setup Debugging

The screenshot displays the 'Project Structure' dialog in IntelliJ IDEA. The left sidebar shows a tree view with 'Project Settings' expanded to 'Project'. The main area is divided into four sections:

- Project name:** A text field containing 'PracticeBot2020'.
- Project SDK:** A dropdown menu showing '11 version 11.0.2' and an 'Edit' button. This section is circled in red.
- Project language level:** A dropdown menu showing 'SDK default (11 - Local variable syntax for lambda parameters)'. This section is also circled in red.
- Project compiler output:** A text field for the output path, currently empty, with a folder icon to its right.

At the bottom left of the dialog, there is a 'Problems' tab with a notification badge showing the number '23'.

Additional Setup Debugging

The screenshot displays the 'Project Structure' dialog in IntelliJ IDEA. The 'Platform Settings' section is active, and the 'SDKs' sub-section is selected. In the left-hand pane, a folder named '11' is highlighted with a red circle. The right-hand pane shows the configuration for this SDK, with the 'Name' field set to '11' and the 'JDK home path' set to 'C:\Program Files\Java\jdk-11.0.2'. A red circle highlights these two fields. Below the 'JDK home path' field, there are four tabs: 'Classpath', 'Sourcepath', 'Annotations', and 'Documentation Paths'. The 'Classpath' tab is selected, showing a list of system paths for the JDK, including 'C:\Program Files\Java\jdk-11.0.2\java.base', 'C:\Program Files\Java\jdk-11.0.2\java.compiler', 'C:\Program Files\Java\jdk-11.0.2\java.datatransfer', 'C:\Program Files\Java\jdk-11.0.2\java.desktop', 'C:\Program Files\Java\jdk-11.0.2\java.instrument', 'C:\Program Files\Java\jdk-11.0.2\java.logging', 'C:\Program Files\Java\jdk-11.0.2\java.management', and 'C:\Program Files\Java\jdk-11.0.2\java.management.rmi'. The 'Problems' section at the bottom left shows 23 issues.

Project Structure

Project Settings

- Project
- Modules
- Libraries
- Facets
- Artifacts

Platform Settings

- SDKs
- Global Libraries

Problems 23

11

azul-13

corretto-11

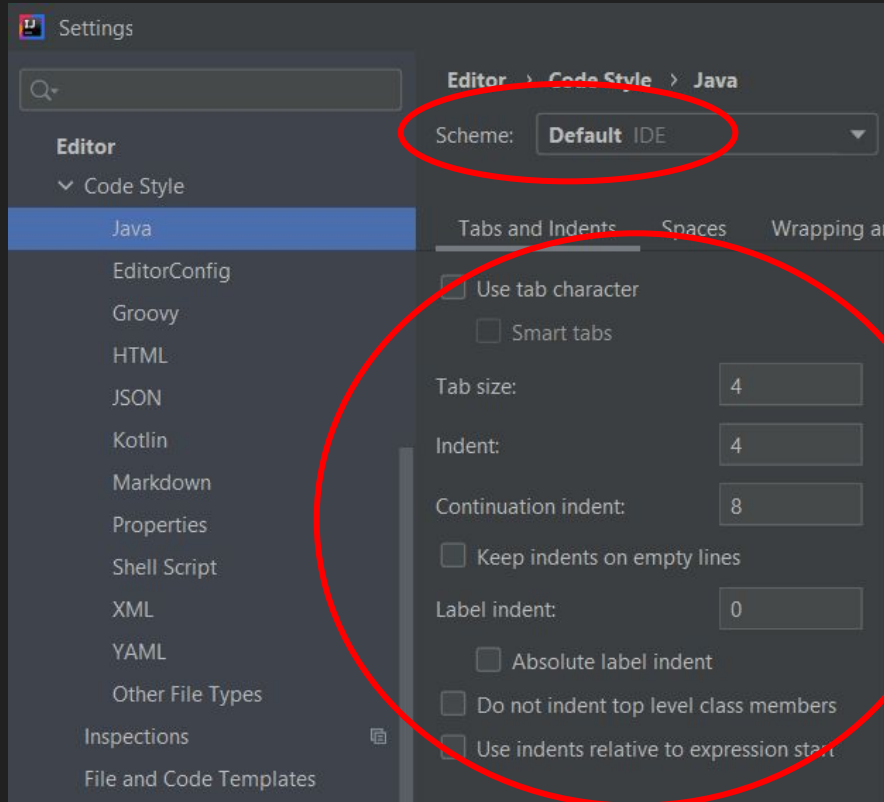
Name: 11

JDK home path: C:\Program Files\Java\jdk-11.0.2

Classpath Sourcepath Annotations Documentation Paths

- C:\Program Files\Java\jdk-11.0.2\java.base
- C:\Program Files\Java\jdk-11.0.2\java.compiler
- C:\Program Files\Java\jdk-11.0.2\java.datatransfer
- C:\Program Files\Java\jdk-11.0.2\java.desktop
- C:\Program Files\Java\jdk-11.0.2\java.instrument
- C:\Program Files\Java\jdk-11.0.2\java.logging
- C:\Program Files\Java\jdk-11.0.2\java.management
- C:\Program Files\Java\jdk-11.0.2\java.management.rmi

Intelli-J Editor Settings - tabs

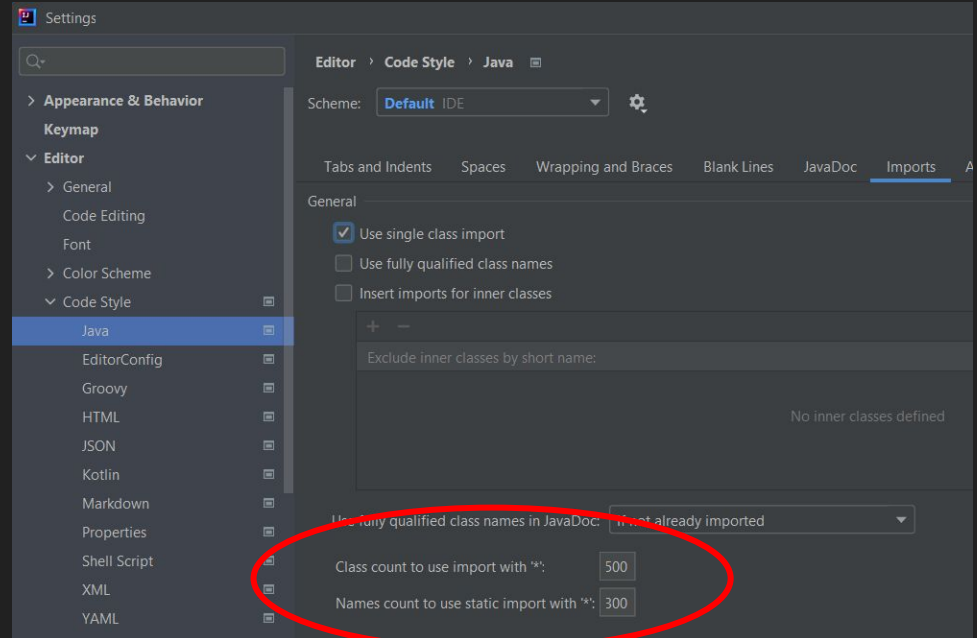


Intelli-J Editor Settings - imports

File | Settings | Editor | Code Style | Java | Imports

Class count to use import with *: 500

Names count to use static import with *: 300



Setting up project for new year (eg 2022 -> 2023)

- Modify folder structure
 - `.../src/main/java/frc/robot` -> `.../src/main/java/team/gif/robot`
- Modify `build.gradle`
 - `"frc.robot.Main"` -> `"team.gif.robot.Main"`
- Copy `.../FRC2022/buildscripts` to `.../FRC2023`
- Modify `.gitignore` (add `.idea` to file - see 2022 `.gitignore` file)
- Copy `README.md` and modify as appropriate

Useful libraries and files to carry over

- `.../src/main/java/team/gif/lib/*`
- `.../robot/commands/autos/Mobility`
- `.../robot/commands/drivetrain/*`
- `.../robot/subsystems/drivers/*`
- `.../robot/subsystems/Drivetrain`
- `.../robot/Constants` (remove season specific constants)
- `.../robot/Globals` (remove season specific globals)
- `.../robot/OI` (remove season specific actions)
- `.../robot/Robot` (skim through and copy non season-specific functionality)
- `.../robot/RobotContainer` (skim through ...)
- `.../robot/RobotMap` (skim through ...)
- `.../robot/UI` (skim through ...)
- `.../robot/UiSmartDashboard` (skim through ...)

GitHub settings

- Create project workflow
- Link project workflow to project
- Modify workflow tab titles
- Restrict merge to main
- Automate new issue to “ToDo” tab

Installing VS Code (Optional) - DO NOT DO

This is used ONLY for creating brand new projects

1. Download and install [here](#)
2. Open VS Code
3. Install the WPILib extension
 - a. Go to “Extensions” in the sidebar
 - b. Search for WPILib on their extension library
 - c. Install extension

