FIRST
DIVE
PRESENTED BY
Qualcomm

Fruitport FTC Kickoff Event

FTC Java Programming Basics

Presented by: Lawrence Welty

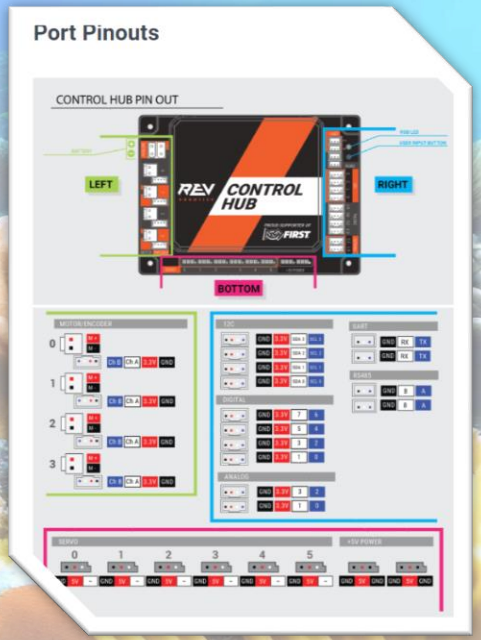
Coach - Programming | Fruitport Techno Trojans

Workshop Agenda

- Robot Basics
- Programming Options
- Android Studio Java – Getting Started
  - Programming Tools Used
  - Equipment Needed
  - Java Framework
  - Where Do I Start? (I have the framework, now what?)
- Resources
- Questions

Robot Basics – Control Systems

Rev Robotics Control Hub



Robot Basics – Control Systems

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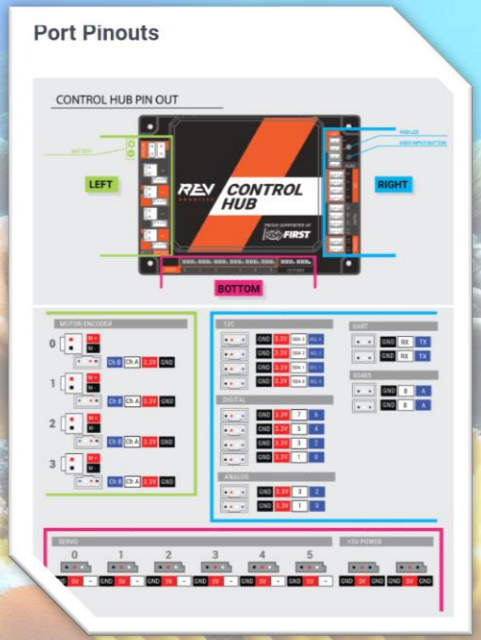
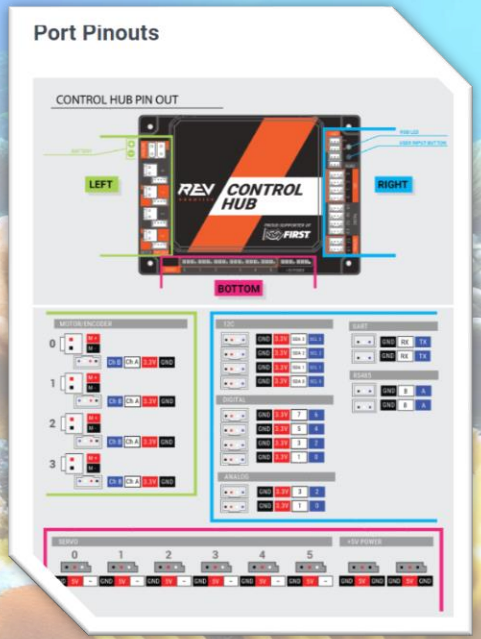


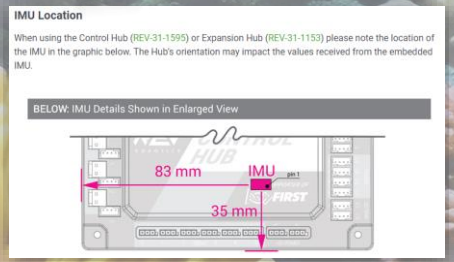
Rev Robotics Driver Hub

Robot Basics – Control Systems

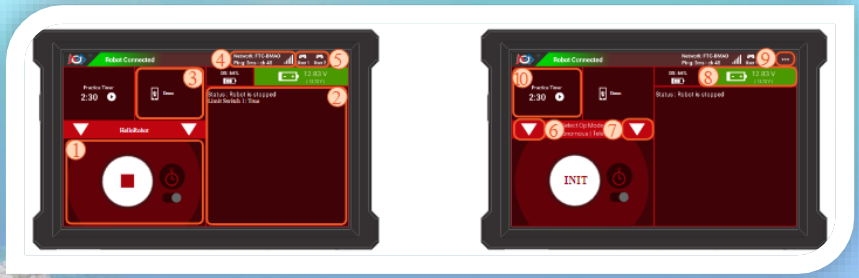
Rev Robotics Control Hub



IMU – Inertia Measurement Unit

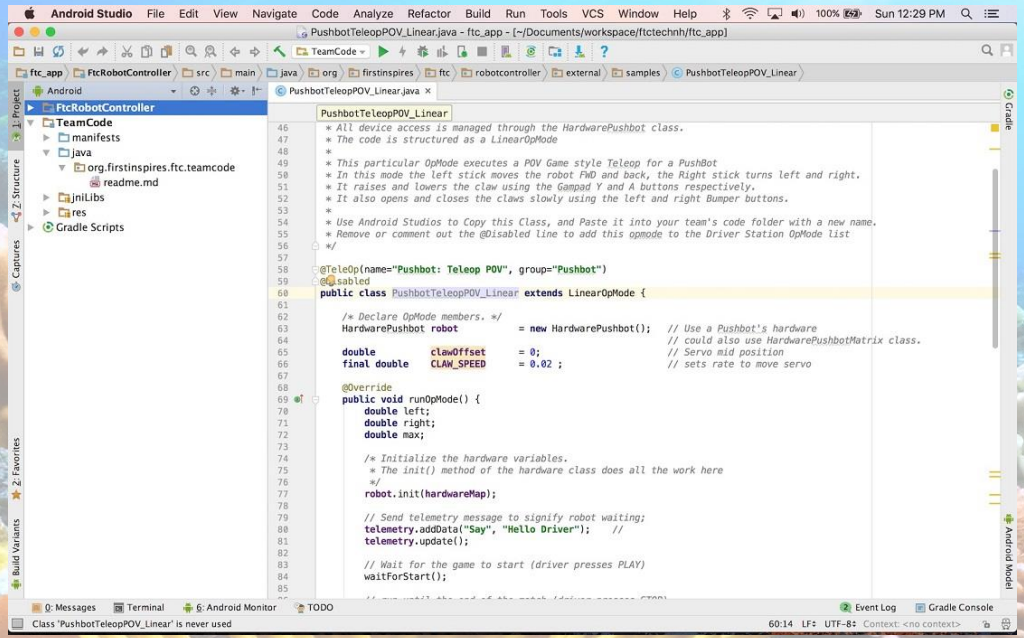


Rev Robotics Driver Hub

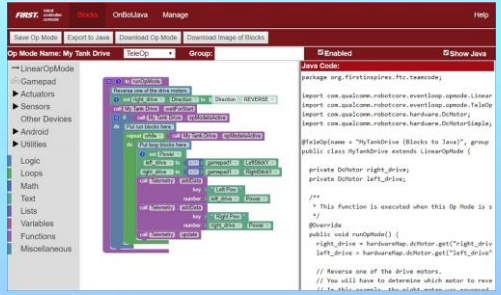


Programming Options

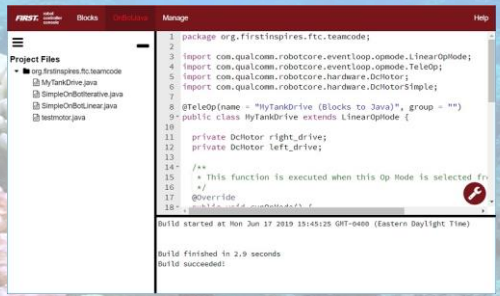
Android Studio - Java



Blocks



OnBot Java



INTO THE DEEP presented by RTX

FIRST TECH CHALLENGE

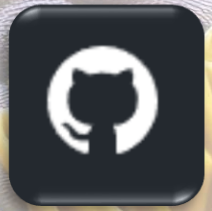
Programming Tools

Required Software / Tools

Development Environment

Android Studio

FtcRobotController – Github Repository



Optional Software / Tools

Source Code Management

Git - SCM

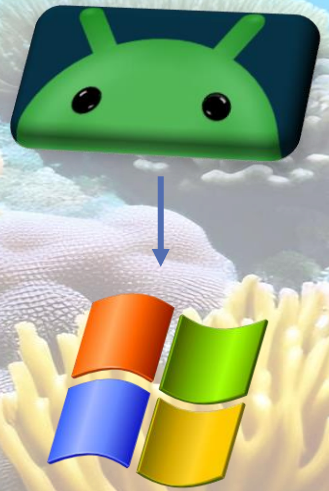
Github Desktop Client

Equipment Needed

Required Software / Tools

Development Environment

Android Studio



Installation Instructions: https://developer.android.com/studio/install

Equipment Requirements:

Windows

Note: Windows machines with ARM-based CPUs aren't currently supported.

Here are the system requirements for Windows:

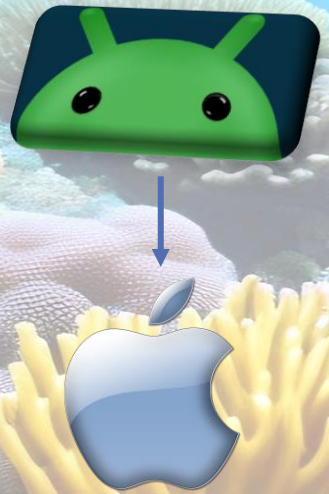
Requirement	Minimum	Recommended
OS	64-bit Microsoft Windows 8	Latest 64-bit version of Windows
RAM	8 GB RAM	16 GB RAM or more
CPU	x86_64 CPU architecture; 2nd generation Intel Core or newer, or AMD CPU with support for a Windows Hypervisor Framework.	Latest Intel Core processor
Disk space	8 GB (IDE and Android SDK and Emulator)	Solid state drive with 16 GB or more
Screen resolution	1280 x 800	1920 x 1080

Equipment Needed

Required Software / Tools

Development Environment

Android Studio



Installation Instructions: https://developer.android.com/studio/install

Equipment Requirements:

Mac

Here are the system requirements for Mac:

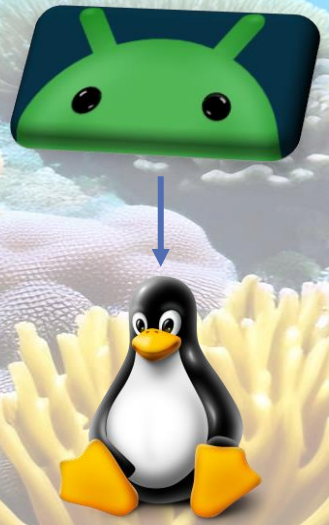
Requirement	Minimum	Recommended
OS	MacOS 10.14 (Mojave)	Latest version of MacOS
RAM	8 GB RAM	16 GB RAM or more
CPU	Apple M1 chip, or 2nd generation Intel Core or newer with support for Hypervisor Framework.	Latest Apple Silicon chip
Disk space	8 GB (IDE and Android SDK and Emulator)	Solid state drive with 16 GB or more
Screen resolution	1280 x 800	1920 x 1080

Equipment Needed

Required Software / Tools

Development Environment

Android Studio



Installation Instructions: https://developer.android.com/studio/install

Equipment Requirements:

Linux

★ **Note:** Linux machines with ARM-based CPUs aren't currently supported.

Here are the system requirements for Linux:

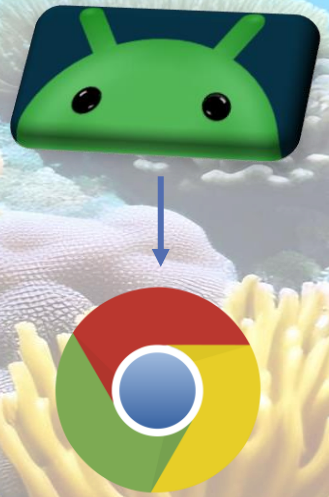
Requirement	Minimum	Recommended
OS	Any 64-bit Linux distribution that supports Gnome, KDE, or Unity DE; GNU C Library (glibc) 2.31 or later.	Latest 64-bit version of Linux
RAM	8 GB RAM	16 GB RAM or more
CPU	x86_64 CPU architecture; 2nd generation Intel Core or newer, or AMD processor with support for AMD Virtualization (AMD-V) and SSSE3.	Latest Intel Core processor
Disk space	8 GB (IDE and Android SDK and Emulator)	Solid state drive with 16 GB or more
Screen resolution	1280 x 800	1920 x 1080

Equipment Needed

Required Software / Tools

Development Environment

Android Studio



Installation Instructions: https://developer.android.com/studio/install

Equipment Requirements:

Install Android Studio on ChromeOS

Android Studio has been officially supported on ChromeOS since version 3.5 . To install Android Studio please follow the Android Studio ChromeOS install instructions .

System requirements for Android Studio

- 8 GB RAM or more recommended
- 20 GB of available disk space minimum
- 1280 x 800 minimum screen resolution
- Intel i5 or higher (U series or higher) recommended

Recommended devices for Android Studio

- **Acer:** Chromebook 13/Spin 13, Chromebox CXI3, Chromebook 712 [C871]
- **ASUS:** Chromebox 3, Chromebook Flip C436FA
- **CTL:** Chromebox CBx1
- **Dell:** Inspiron Chromebook 14, Latitude 5300 2-in-1 Chromebook Enterprise, Latitude 5400 Chromebook Enterprise
- **HP:** Chromebook x360 14, Chromebox G2, Chromebook x360 14c
- **Lenovo:** Yoga C630 Chromebook, Flex 5 Chromebook
- **ViewSonic:** NMP660 Chromebox

Equipment Needed

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Installation Instructions: https://developer.android.com/studio/install

Equipment Requirements:

Required libraries for 64-bit machines

If you are running a 64-bit version of Ubuntu, you need to install some 32-bit libraries with the following command:

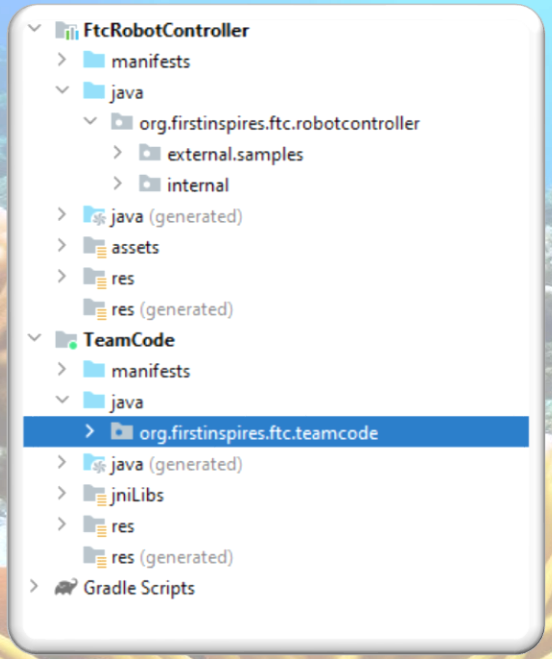
```
$ sudo apt-get install libc6:i386 libncurses5:i386 libstdc++6:i386 lib32z1 libbz2-1.0:i386
```

If you are running 64-bit Fedora, the command is:

```
$ sudo yum install zlib.i686 ncurses-libs.i686 bzip2-libs.i686
```

Java Framework - FtcRobotController

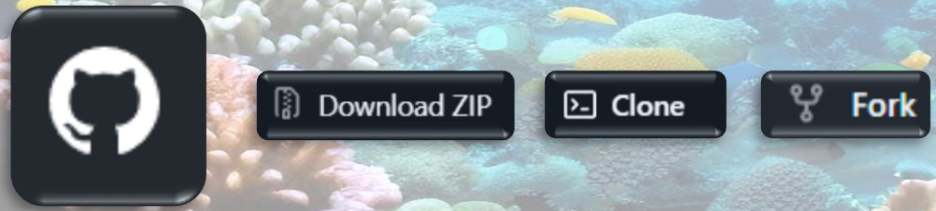
What is the FtcRobotController?



Source project/framework for your Robot

https://github.com/FIRST-Tech-Challenge/FtcRobotController

- Obtained from FTC Github repository
- Can download source to zip
- Can clone repository into own project
- Can fork repository into own project



Java Framework - FtcRobotController

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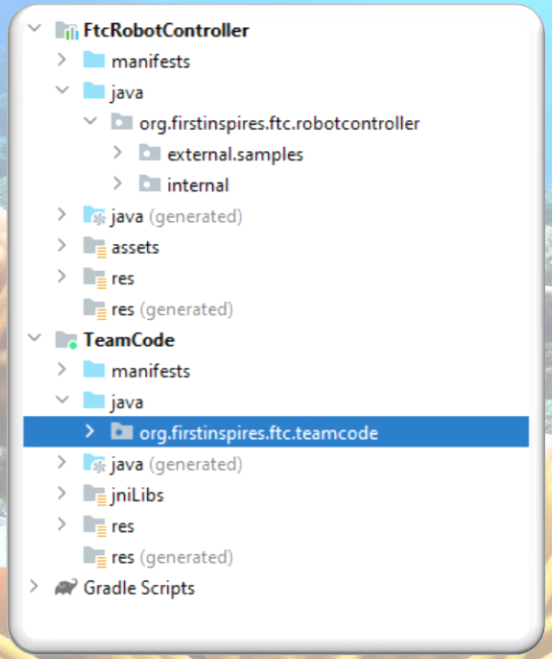
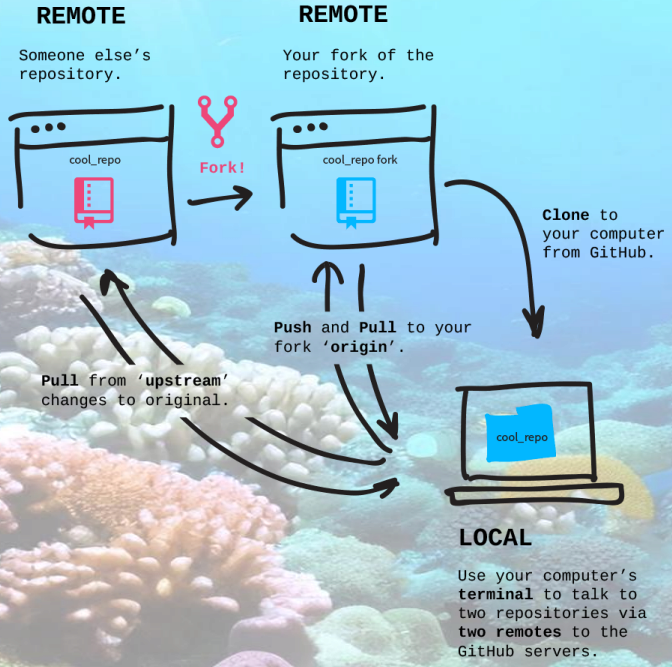
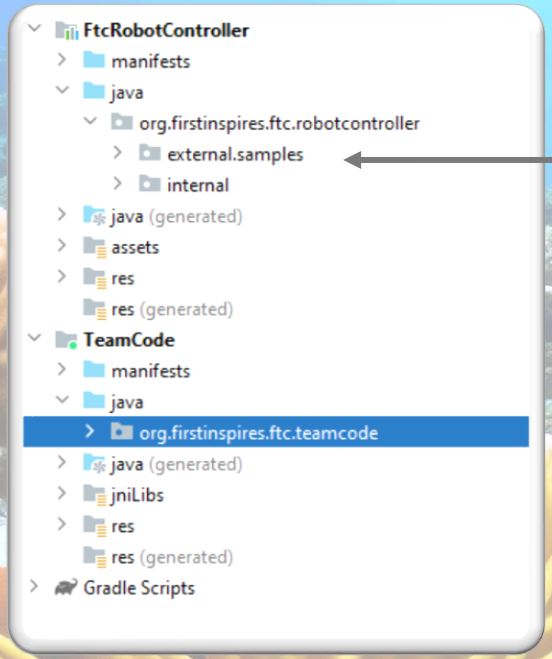


Repository – Clone vs Fork



Java Framework - FtcRobotController

What is the FtcRobotController?



I have the project... what is it?

- Project includes the base framework for your robot
- Contains sample modules
  - Sample code located in FtcRobotController package
  - FtcRobotController package: org.firstinspires.ftc.robotcontroller
- ALL team code (your code) to be maintained in teamcode
  - Teamcode package: org.firstinspires.ftc.teamcode

Resources

FIRST Tech Challenge documentation — FIRST Tech Challenge Docs 0.2 documentation (firstinspires.org)

https://ftc-docs.firstinspires.org/en/latest/index.html

Development Environment

Android Studio	https://developer.android.com/studio
FtcRobotController – Github Repository	https://github.com/FIRST-Tech-Challenge/FtcRobotController
Git - SCM	https://git-scm.com/
Github Desktop Client	https://desktop.github.com/

2023-2024 FTC Resources | fruitportrobotics

https://www.fruitportrobotics.org/2024-2025-ftc-resources

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Fruitport FTC Kickoff Event

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