

# FTC Programming as a Team

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Intro to Git and Android Studio

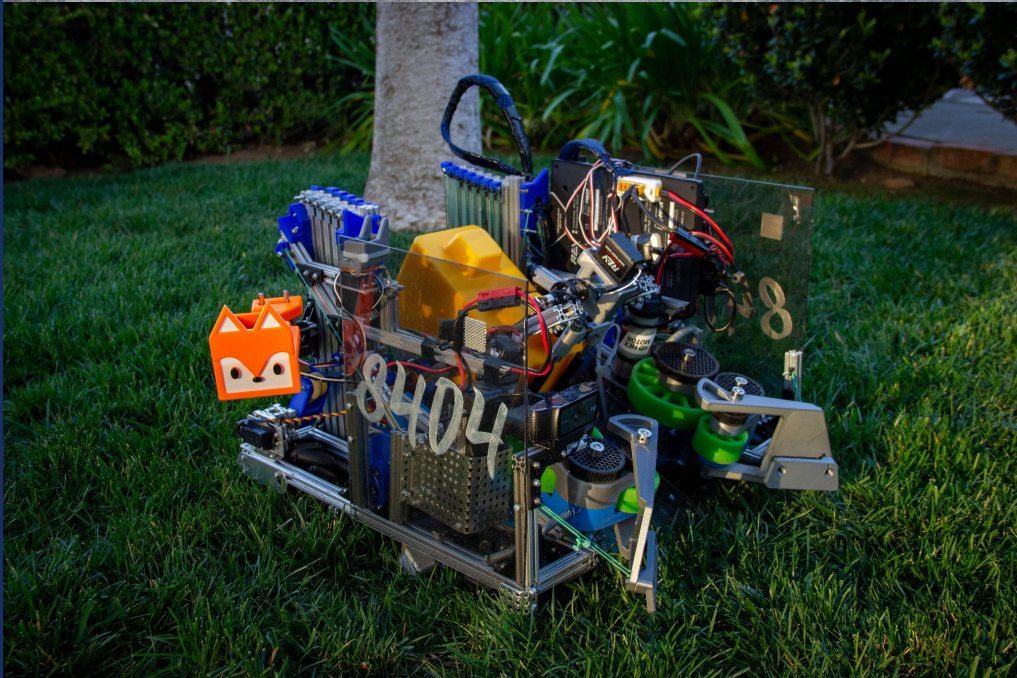
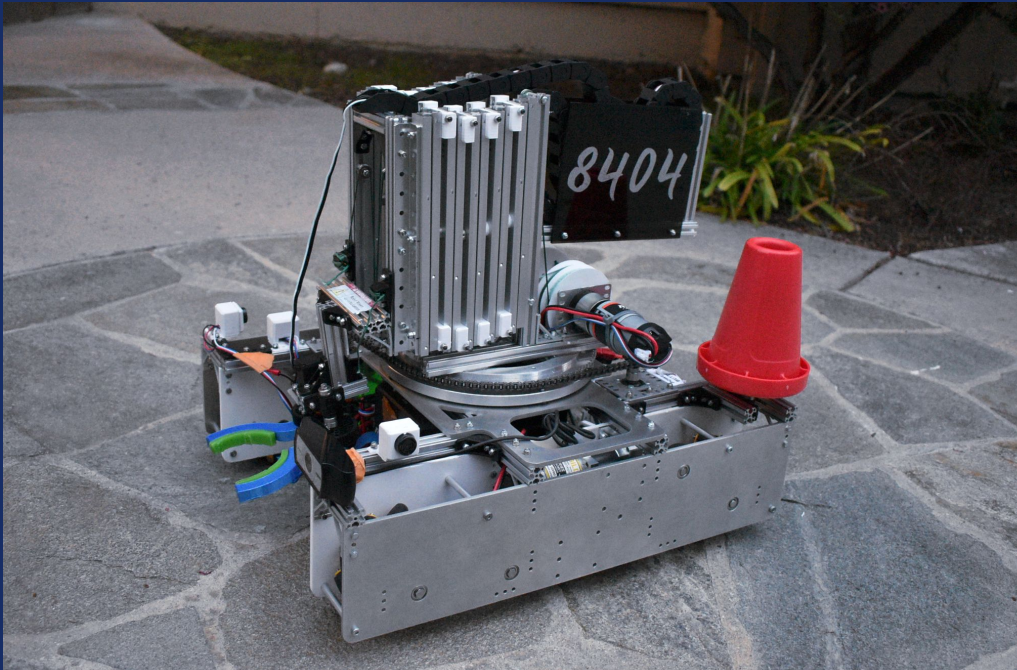
Contact us :

[contact@quixilver8404.org](mailto:contact@quixilver8404.org)

---

Website:

[quixilver8404.org](http://quixilver8404.org)

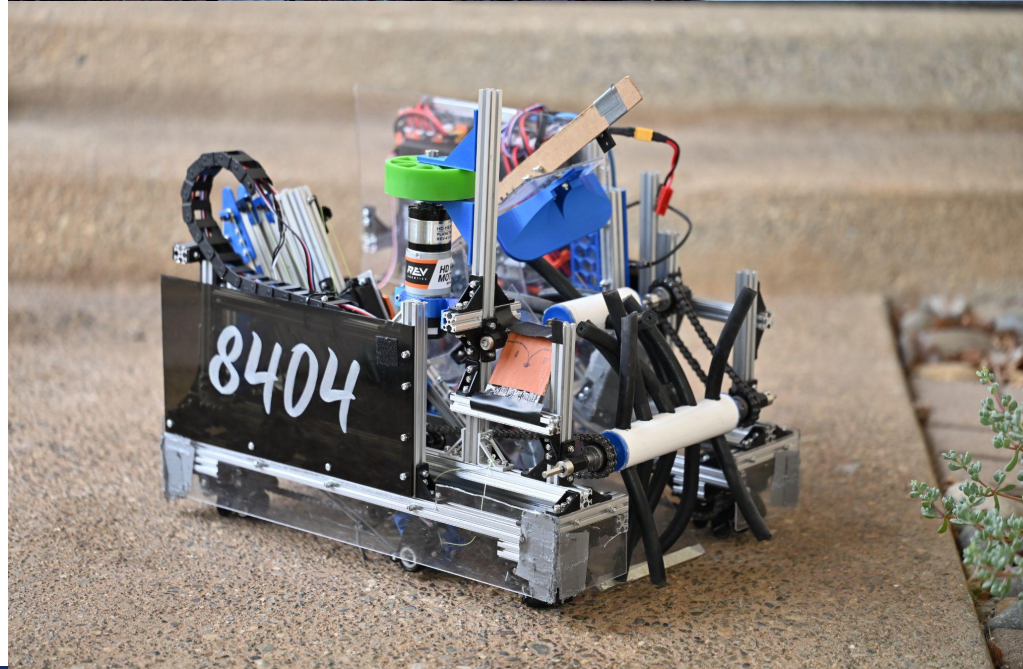
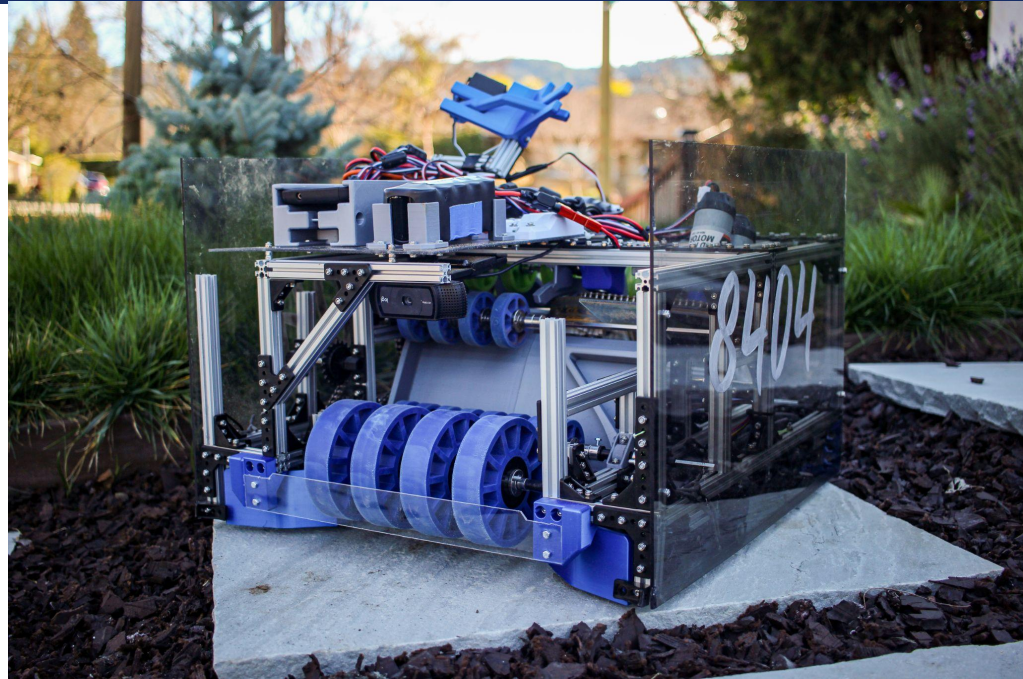


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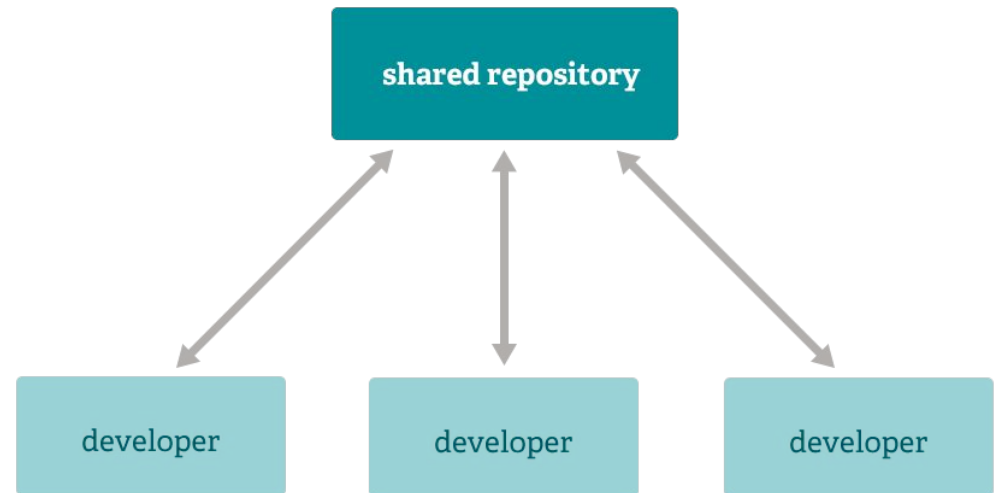
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# Why Version Control

- Backup and restore
- Compare file versions at different points in time
- Collaboration
- SDK updates

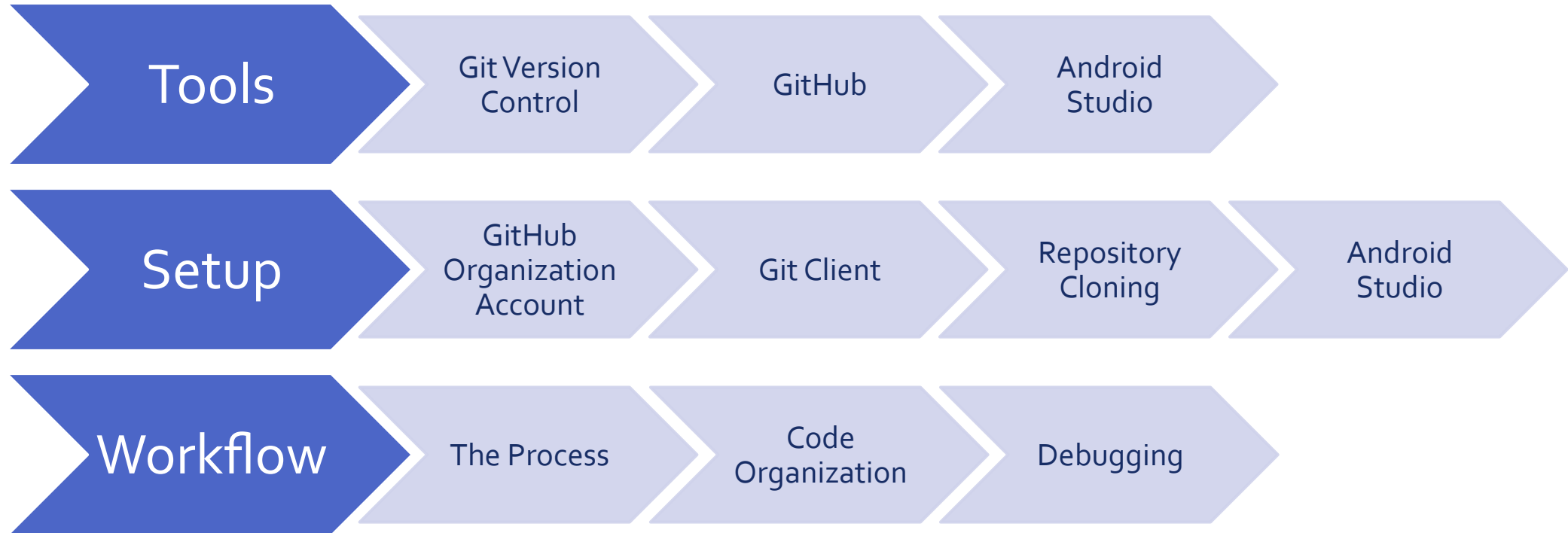


# Why Code Organization

- Maintenance of the project
- Don't solve problems that have already been solved!
- Collaboration



# Schedule



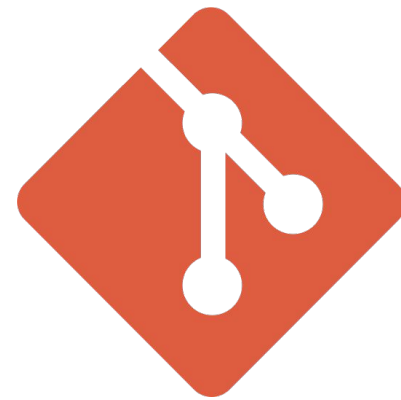
# TOOLS

---

Git, GitHub, Android Studio

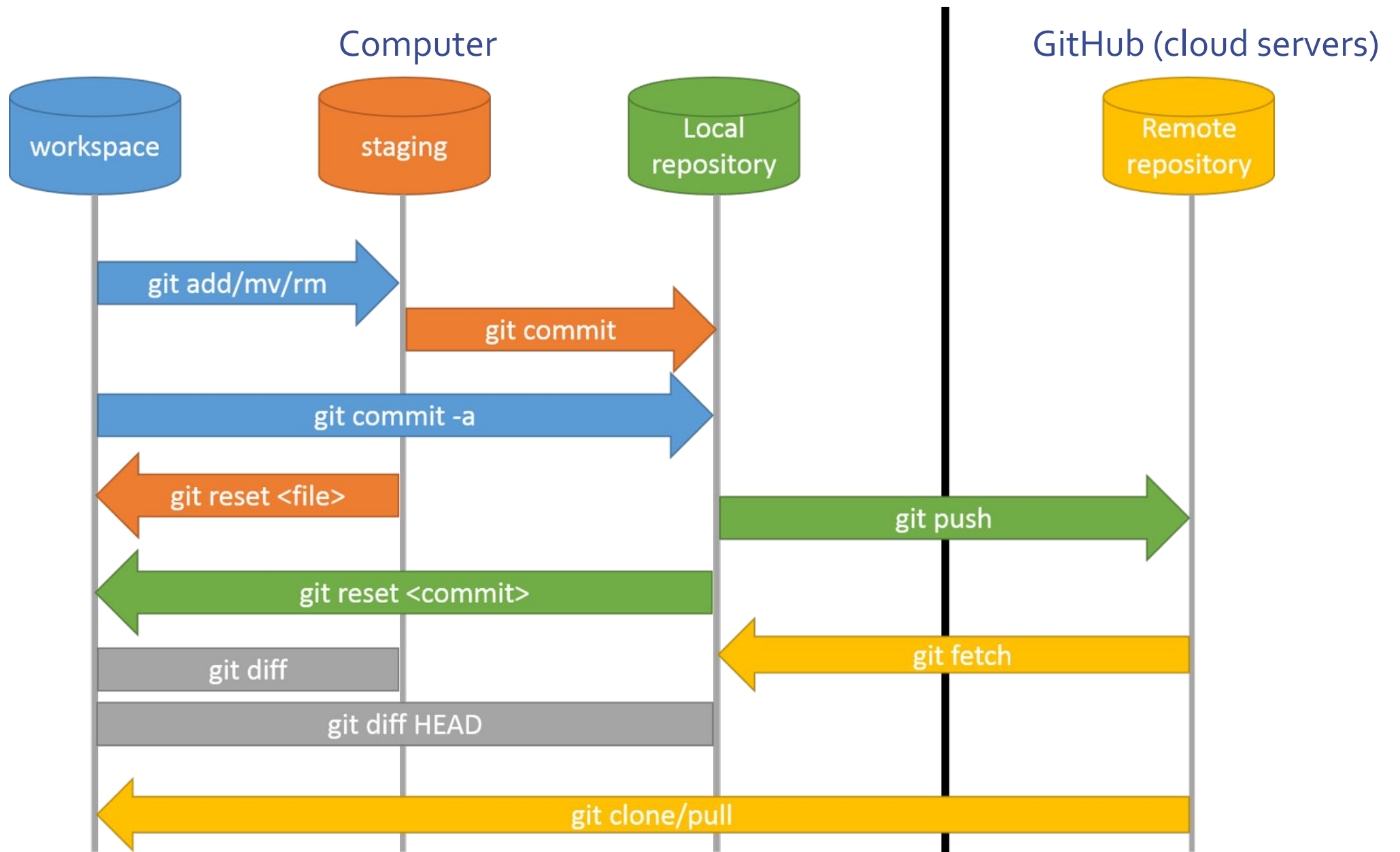
# What is Git

- Open-source version control system
- Changes are tracked
- Allows reversion of chunks of code
- Comparison of differences



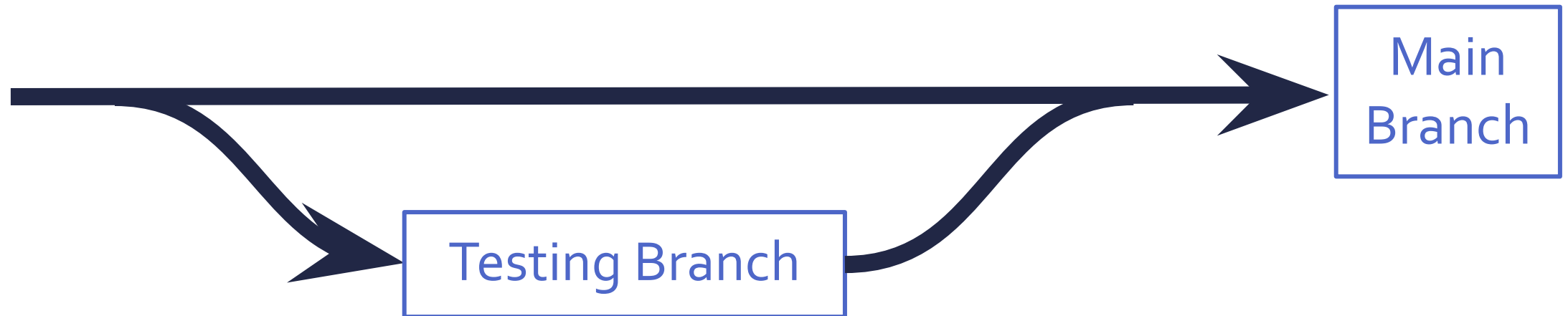
**git**





# What is Git - The Branching Model

- Create new branch for testing
- Merge branches to bring code into the main branch



**master**

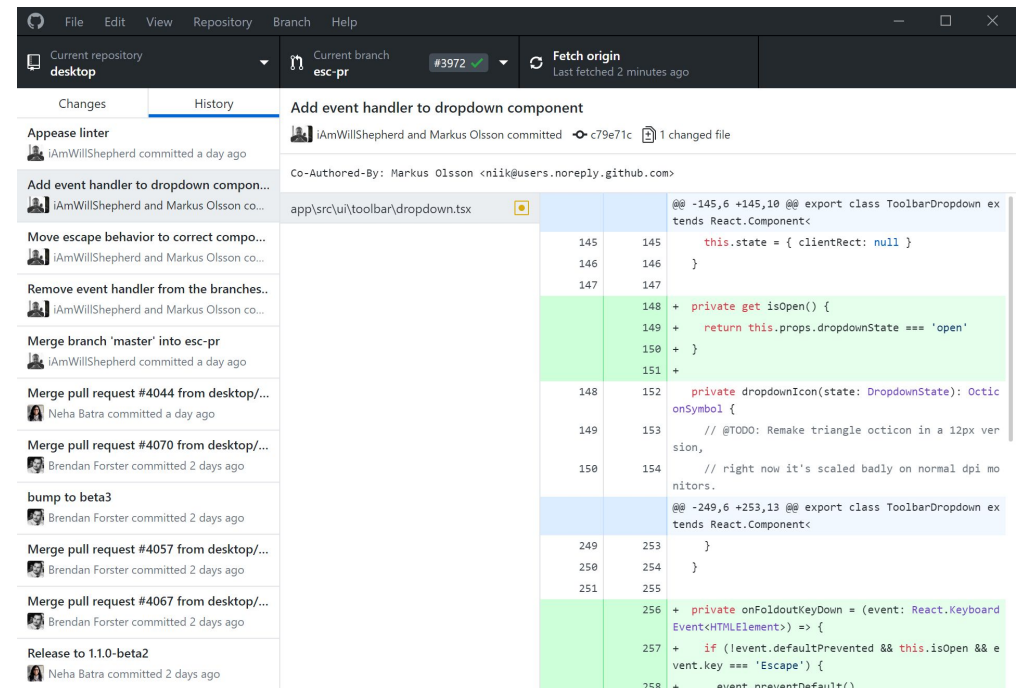
**develop**

**topic**



# What is Git (Continued)

- A set of command line utilities
- GUI available for easier user interface

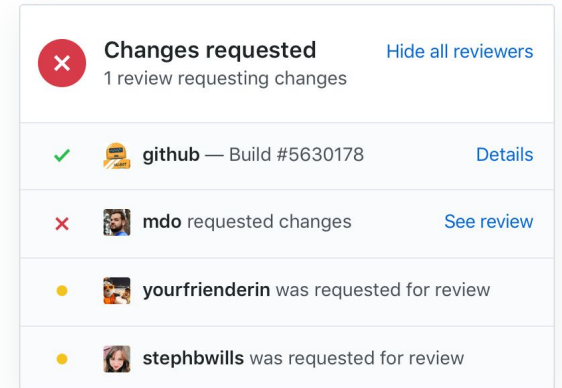


The screenshot displays the GitHub Desktop application interface. At the top, the menu bar includes File, Edit, View, Repository, Branch, and Help. Below the menu bar, the current repository is identified as 'desktop', the current branch as 'esc-pr' (commit #3972), and the 'Fetch origin' button is visible, indicating the last fetch was 2 minutes ago. The main interface is divided into two panes. The left pane shows a 'History' tab with a list of recent commits, including 'Appease linter', 'Add event handler to dropdown compon...', 'Move escape behavior to correct compo...', 'Remove event handler from the branches...', 'Merge branch 'master' into esc-pr', 'Merge pull request #4044 from desktop/...', 'Merge pull request #4070 from desktop/...', 'bump to beta3', 'Merge pull request #4057 from desktop/...', 'Merge pull request #4067 from desktop/...', and 'Release to 1.1.0-beta2'. The right pane shows a diff view for the commit 'Add event handler to dropdown component' by 'iAmWillShepherd and Markus Olsson'. The diff highlights changes in the file 'app/src/ui/toolbar/dropdown.tsx', showing additions and modifications to the 'ToolbarDropdown' class, including a new 'isOpen' state property and an event handler for 'onFoldoutKeyDown'.

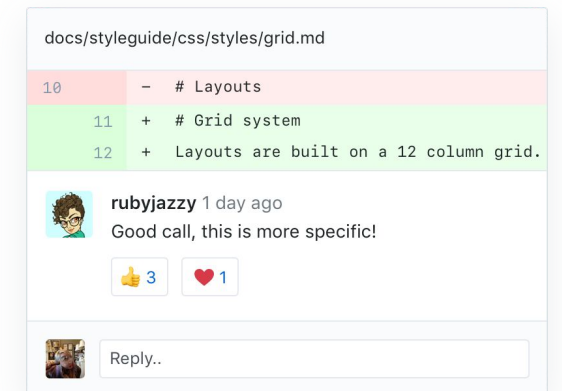
```
@@ -145,6 +145,10 @@ export class ToolbarDropdown extends React.Component {
  this.state = { clientRect: null }
}
+ private get isOpen() {
+   return this.props.dropdownState === 'open'
+ }
+
+ private dropdownIcon(state: DropdownState): OcticonSymbol {
  // @TODO: Remake triangle octicon in a 12px version,
  // right now it's scaled badly on normal dpi monitors.
@@ -249,6 +253,13 @@ export class ToolbarDropdown extends React.Component {
}
}
+ private onFoldoutKeyDown = (event: React.KeyboardEvent<HTMLElement>) => {
+   if (event.defaultPrevented && this.isOpen && event.key === 'Escape') {
+     event.preventDefault()
+   }
+ }
```

# GitHub (different from git)

- Linked to the local code
- Discuss edits before merging into the “main” branch
- Holds the official FTC SDK

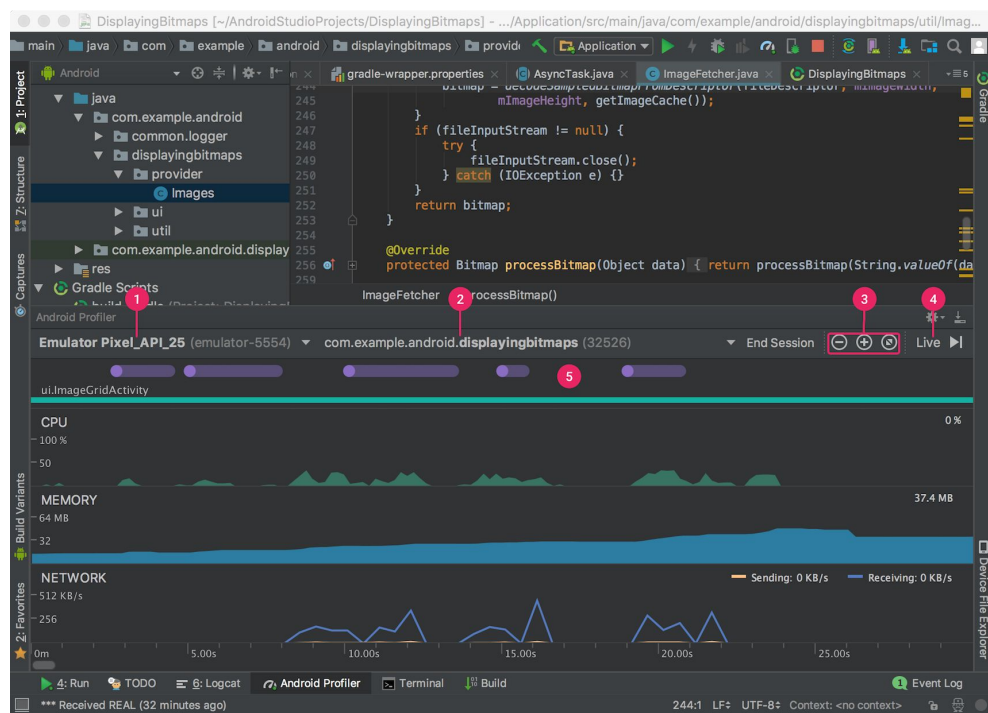


A screenshot of a GitHub pull request review status. At the top, a red circle with a white 'x' icon is followed by the text "Changes requested" and a link "Hide all reviewers". Below this, it says "1 review requesting changes". The list of reviews includes: a green checkmark icon, a robot icon labeled "github — Build #5630178" with a "Details" link; a red 'x' icon, a person icon labeled "mdo requested changes" with a "See review" link; a yellow circle icon, a person icon labeled "yourfrienderin was requested for review"; and another yellow circle icon, a person icon labeled "stephbwills was requested for review".



A screenshot of a GitHub code review comment. The file path is "docs/styleguide/css/styles/grid.md". The code snippet shows line 10 with a minus sign and "# Layouts", line 11 with a plus sign and "# Grid system", and line 12 with a plus sign and "Layouts are built on a 12 column grid.". Below the code, a comment from user "rubyjazzy" (posted 1 day ago) says "Good call, this is more specific!". The comment has 3 thumbs up and 1 heart. At the bottom, there is a "Reply.." input field.

# Android Studio

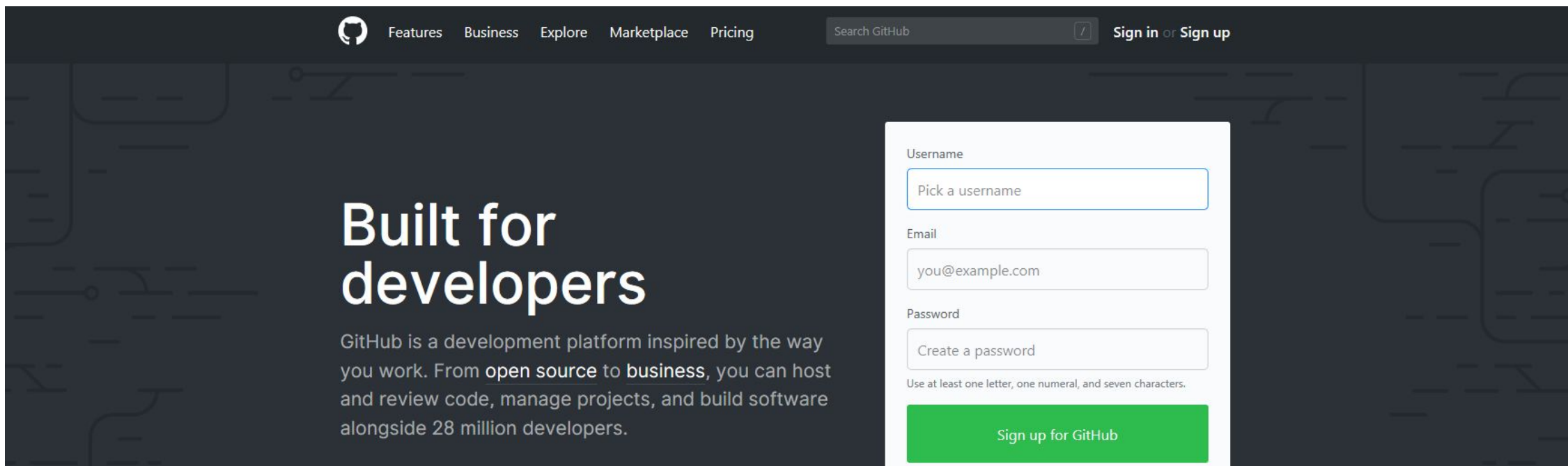


- Create and modify source files
- Build the source files into an android application
- Deploy the built app onto the robot controller
- Monitor and debug application at runtime

# SETUP

---

GitHub account, setting up a repository, local git client, android studio

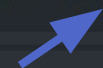
A screenshot of the GitHub website's sign-up page. The top navigation bar includes the GitHub logo, links for 'Features', 'Business', 'Explore', 'Marketplace', and 'Pricing', a search bar with the text 'Search GitHub', and links for 'Sign in' or 'Sign up'. The main content area has a dark background with a faint circuit-like pattern. On the left, the text reads 'Built for developers' in large white font, followed by a paragraph: 'GitHub is a development platform inspired by the way you work. From open source to business, you can host and review code, manage projects, and build software alongside 28 million developers.' On the right, there is a white sign-up form with three input fields: 'Username' (placeholder: 'Pick a username'), 'Email' (placeholder: 'you@example.com'), and 'Password' (placeholder: 'Create a password'). Below the password field is a small note: 'Use at least one letter, one numeral, and seven characters.' At the bottom of the form is a green button labeled 'Sign up for GitHub'.

# GITHUB ORGANIZATION AND ACCOUNTS

---

GitHub.com





# Built for developers

GitHub is a development platform inspired by the way you work. From [open source](#) to [business](#), you can host and review code, manage projects, and build software alongside 28 million developers.

Username

Pick a username

Email

you@example.com

Password

Create a password

Use at least one letter, one numeral, and seven characters.

Sign up for GitHub

By clicking "Sign up for GitHub", you agree to our [terms of service](#) and [privacy statement](#). We'll occasionally send you account related emails.

## Try GitHub Enterprise

Use GitHub on-premises with your own servers or in a private cloud with [GitHub Enterprise](#). Improve your developer efficiency with flexible deployment options, centralized permissions, hundreds of integrations, technical support, and more.

Contact Sales

Join GitHub

# Create your account

**Username \***

PierreGentroux



**Email address \***

pierre.gentroux@gmail.com



**Password \***

.....



Make sure it's [at least 15 characters](#) OR at least 8 characters including a number and a lowercase letter. [Learn more.](#)

**Email preferences**

Send me occasional product updates, announcements, and offers.



**PierreGentroux**  
Personal settings

Profile

Account

Account security

Security log

Security & analysis

Emails

Notifications

Billing

SSH and GPG keys

Blocked users

Repositories

Organizations

Saved replies

Applications

Developer settings

## Organizations

New organization

**You are not a member of any organizations.**

## Transform account

Turn PierreGentroux into an organization



Choose a plan

# Pick a plan for your team

## Free

The basics of GitHub for every team

- ∞ Unlimited public/private repositories
- ∞ Unlimited collaborators
- ✓ 2,000 Actions minutes/month  
Free for public repositories
- ✓ 500MB of GitHub Packages
- ✓ Community Support

**\$0**

Join for free

## Team

Advanced collaboration and support for teams

- ← Everything in Free
- ✓ Required reviewers
- ✓ 3,000 Actions minutes/month  
Free for public repositories
- ✓ 2GB of GitHub Packages
- ✓ Code owners

**\$4** per user/month

Continue with Team

## Enterprise

Security, compliance, and flexible deployment for enterprises

- ← Everything in Team
- ✓ SAML single sign-on
- ✓ 50,000 Actions minutes/month  
Free for public repositories
- ✓ 50GB of GitHub Packages
- ✓ Advanced auditing


**\$21** per user/month

Start Enterprise trial

Tell us about your organization

# Set up your team


**Organization account name \***

Pierre's Baguette & Co. 

This will be the name of your account on GitHub.

Your URL will be: <https://github.com/Pierre-s-Baguette-Co>.

**Contact email \***

pierre.gentroux@gmail.com 

**This organization belongs to: \***

**My personal account**

I.e., PierreGentroux

**A business or institution**

For example: GitHub, Inc., Example Institute, American Red Cross

Next

By creating an account, you agree to the [Terms of Service](#). For more information about GitHub's privacy practices, see the [GitHub Privacy Statement](#). We'll occasionally send you account-related emails.



Tell us about your organization

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**This organization belongs to: \***

**My personal account**

I.e., PierreGentroux

**A business or institution**

For example: GitHub, Inc., Example Institute, American Red Cross

**Name of business or institution this organization belongs to \***

Pierre Gentroux LLC

This business or institution — not **PierreGentroux** (your personal account) — will control this organization account.


Next

By creating an account, you agree to the [Corporate Terms of Service](#) on behalf of Pierre Gentroux LLC. For more information about GitHub's privacy practices, see the [GitHub Privacy Statement](#). We'll occasionally send you account-related emails.



ftc8404



 Repositories 2

 People 4

 Teams 0

 Projects 0

 Settings

Search repositories...

Type: All ▾

Language: All ▾

Customize pinned repositories

 New

## 2015-16-Program

FTC code for 2015-2016 year

 Java Updated on Mar 10 2016

## FTCQbertProgram

Our FTC program 2015

 Java  1 Updated on Sep 16 2015

### Top languages

 Java

### People

4 >



Invite someone



Organization permissions

Members 14

Outside collaborators 4

Pending collaborators

















Pending invitations

Failed invitations

Find a member...

Export

Invite member


<input type="checkbox"/>	Members	2FA	Role
<input type="checkbox"/>	 AndreaBaretta	2FA x Private Owner 0 teams	
<input type="checkbox"/>	 Alex axchen7	2FA x Private Owner 0 teams	
<input type="checkbox"/>	 DanielNoronha	2FA x Private Member 0 teams	
<input type="checkbox"/>	 EstherKung	2FA x Private Member 0 teams	
<input type="checkbox"/>	 Ethan Pang ethanpang5	2FA x Private Member 0 teams	
<input type="checkbox"/>	 Ryan Niemi J3T4R0	2FA x Private Member 0 teams	
<input type="checkbox"/>	 Injiang	2FA x Private Member 0 teams	
<input type="checkbox"/>	 Pakman Pakman919	2FA x Private Member 0 teams	







ftc8404

 Repositories 2

 People 4

 Teams 0

 Projects 0

 Settings

Search repositories...

Type: All ▾

Language: All ▾

Customize pinned repositories

 New

## 2015-16-Program

FTC code for 2015-2016 year

 Java Updated on Mar 10 2016

## FTCQbertProgram

Our FTC program 2015

 Java  1 Updated on Sep 16 2015

### Top languages

 Java

### People

4 >



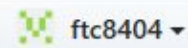
Invite someone



## Create a new repository

A repository contains all the files for your project, including the revision history.

Owner



Repository name

rover ruckus



Great repository name

Your new repository will be created as **rover-ruckus** about **shiny-octo-enigma**.

Description (optional)

**Public**

Anyone can see this repository. You choose who can commit.

**Private**

You choose who can see and commit to this repository.

**Initialize this repository with a README**

This will let you immediately clone the repository to your computer. Skip this step if you're importing an existing repository.

Add .gitignore: **None** ▾

Add a license: **None** ▾



Create repository

Options

Manage access

Security & analysis

Branches

Webhooks

Notifications

Integrations

Deploy keys

Actions

Secrets

Pages

## Who has access

PRIVATE REPOSITORY



Only those with access to this repository can view it.

[Manage](#)

BASE ROLE

Write

All 14 members can access this repository.

[Manage](#)

DIRECT ACCESS



0 teams or members have access to this repository. Only **Owners** can contribute to this repository.

## Manage access

[Create team](#)



### You haven't added any teams or people yet

Organization owners can manage individual and team access to the organization's repositories. Team maintainers can also manage a team's repository access. [Learn more about organization access](#)

[Invite teams or people](#)

ftc8404 / freight-frenzy Private

Watch 0 Star 0 Fork 0

Code Issues Pull requests Actions

Options

Manage access

Security & analysis

Branches

Webhooks

Notifications

Integrations

Deploy keys

Actions

Secrets

Pages

Who has access

PRIVATE

Only those with access can view this repository.

Manage access

Invite teams or people to freight-frenzy

Search by team name, username, full name, or email

Select a team or member above

Write

DIRECT ACCESS

0 teams or members have access to this repository. Only Owners can contribute to this repository.

Manage access

Create team

You haven't added any teams or people yet

Organization owners can manage individual and team access to the organization's repositories. Team maintainers can also manage a team's repository access. [Learn more about organization access](#)

Invite teams or people

Git is easy to learn and has a tiny footprint with lightning fast performance. It outclasses SCM tools like Subversion, CVS, Perforce, and ClearCase with features like [cheap local branching](#), convenient [staging areas](#), and [multiple workflows](#).



Learn Git in your browser for free with [Try Git](#).



#### About

The advantages of Git compared to other source control systems.



#### Documentation

Command reference pages, Pro Git book content, videos and other material.



#### Downloads

GUI clients and binary releases for all major platforms.



#### Community

Get involved! Bug reporting, mailing list, chat, development and more.



[Pro Git](#) by Scott Chacon and Ben Straub is available to [read online for free](#). Dead tree versions are available on [Amazon.com](#).



[Windows GUIs](#)



[Tarballs](#)



[Mac Build](#)



[Source Code](#)

[Companies & Projects Using Git](#)

# INSTALLING GIT

[git-scm.com](http://git-scm.com)

# git --distributed-even-if-your-workflow-isnt

Search entire site...

Git is a **free and open source** distributed version control system designed to handle everything from small to very large projects with speed and efficiency.

Git is **easy to learn** and has a **tiny footprint with lightning fast performance**. It outclasses SCM tools like Subversion, CVS, Perforce, and ClearCase with features like **cheap local branching**, convenient **staging areas**, and **multiple workflows**.



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Windows GUIs



Tarballs



Mac Build



Source Code

### Companies & Projects Using Git

Google

facebook

Microsoft

twitter

LinkedIn

NETFLIX



PostgreSQL



## ation

reference pages, Pro  
at, videos and

## ity

bug reporting,  
at, development

e for free. Dead



Windows GUIs



Tarballs



Mac Build



Source Code

[About](#)

[Documentation](#)

[Blog](#)

**Downloads**

[GUI Clients](#)

[Logos](#)

[Community](#)

The entire **Pro Git book** written by Scott Chacon and Ben Straub is available to [read online for free](#). Dead tree versions are available on [Amazon.com](#).

## Downloading Git



### Your download is starting...

You are downloading the latest (**2.14.1**) **64-bit** version of **Git for Windows**. This is the most recent **maintained build**. It was released **24 days ago**, on 2017-08-10.

If your download hasn't started, [click here to download manually](#).

### Other Git for Windows downloads

**Git for Windows Setup**

[32-bit Git for Windows Setup](#).

[64-bit Git for Windows Setup](#).

**Git for Windows Portable ("thumbdrive edition")**

[32-bit Git for Windows Portable](#).

[64-bit Git for Windows Portable](#).

The current source code release is version **2.14.1**. If you want the newer version, you can build it from [the source code](#).

### Now What?

Now that you have downloaded Git, it's time to start using it.



#### Read the Book

Dive into the Pro Git book and learn at your own pace.



#### Download a GUI

Several free and commercial GUI tools are available for the



#### Get Involved

A knowledgeable Git community is available to answer your



### Information

Please read the following important information before continuing.



When you are ready to continue with Setup, click Next.

## GNU General Public License

Version 2, June 1991

Copyright (C) 1989, 1991 Free Software Foundation, Inc.  
59 Temple Place - Suite 330, Boston, MA 02111-1307, USA

Everyone is permitted to copy and distribute verbatim copies  
of this license document, but changing it is not allowed.

### Preamble

The licenses for most software are designed to take away your  
freedom to share and change it. By contrast, the GNU General Public  
License is intended to guarantee your freedom to share and change

is://git-for-windows.github.io/

Next >

Cancel

# Run the Installer

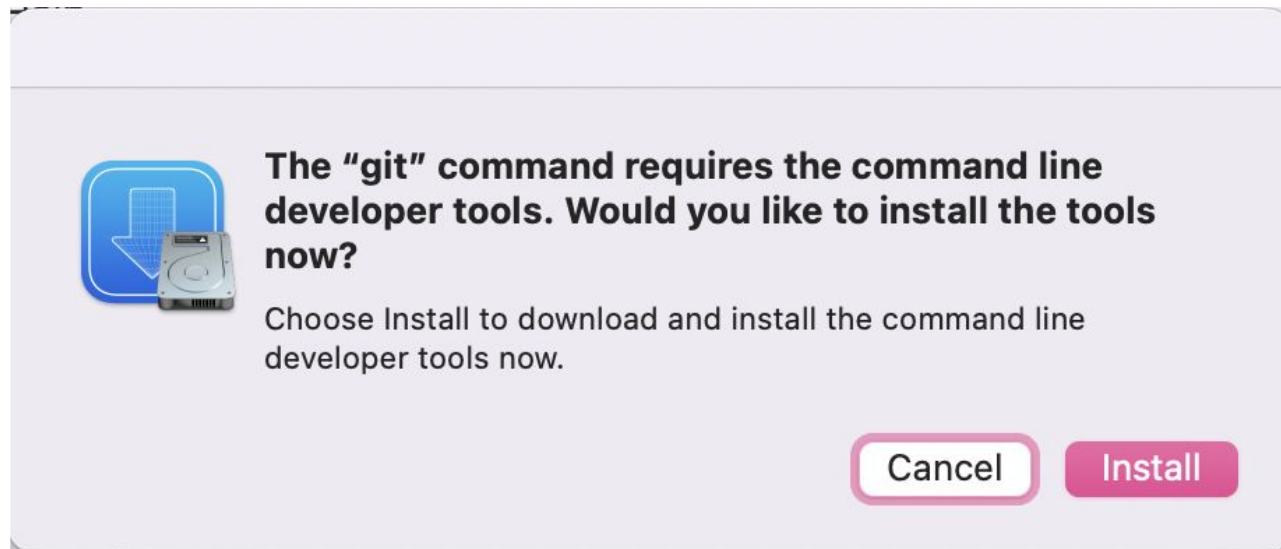
- Leave All Settings to Defaults

Mac Users:

Open Terminal and use command:

```
git --help
```

You Should See:



For MAC &  
Linux  
Users

## Linux Users:

Open Terminal and use command:

```
$ sudo apt-get install git
```

## You Should See:

```
tp@linux:~$ sudo apt-get install git  
[sudo] password for tp:  
Reading package lists... Done  
Building dependency tree
```

**For MAC &  
Linux  
Users**

---



[Home](#) / [Students](#) / [Student Developer Pack](#)

## Learn to ship software like a pro.

There's no substitute for hands-on experience, but for most students, real world tools can be cost prohibitive. That's why we created the GitHub Student Developer Pack with some of our partners and friends: to give students free access to the best developer tools in one place so they can learn by doing.

Get your Pack

Tweet

Like 47K

# SIDE NOTE: GITHUB STUDENT PACK

Android Studio

**DOWNLOAD**

WHAT'S NEW

USER GUIDE

PREVIEW



Android Studio provides the fastest tools for building apps on every type of Android device.

**DOWNLOAD ANDROID STUDIO**

4.0.1 for Linux 64-bit (865 MB)

DOWNLOAD OPTIONS

RELEASE NOTES

---

# DOWNLOAD ANDROID STUDIO

[developer.android.com/studio](https://developer.android.com/studio)

## Android Studio

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WHAT'S NEW

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4.0.1 for Linux 64-bit (865 MB)

**DOWNLOAD OPTIONS**

**RELEASE NOTES**

## Download Android Studio

Before downloading, you must agree to the following terms and conditions.

relevant owners.

7.3 You acknowledge that your use of such third party applications, data, content, or resources may be subject to separate terms between you and the relevant third party. In that case, the License Agreement does not affect your legal relationship with these third parties.

### 8. Using Android APIs

#### 8.1 Google Data APIs

8.1.1 If you use any API to retrieve data from Google, you acknowledge that the data may be protected by intellectual property rights which are owned by Google or those parties that provide the data (or by other persons or companies on their behalf). Your use of any such API may be subject to additional Terms of Service. You may not modify, rent, lease, loan, sell, distribute or create derivative works based on this data (either in whole or in part) unless allowed by the relevant Terms of Service.

8.1.2 If you use any API to retrieve a user's data from Google, you acknowledge and agree that you shall retrieve data only with the user's explicit consent and only when, and for the limited purposes for which, the user has given you permission to do so. If you use the Android Recognition Service API, documented at the following URL: <https://developer.android.com/reference/android/speech/RecognitionService>, as updated from time to time, you acknowledge that the use of the API is subject to the Data Processing Addendum for Products where Google is a Data Processor, which is located at the following URL: <https://privacy.google.com/businesses/gdprprocessorterms/>, as updated from time to time. By clicking to accept, you hereby agree to the terms of the Data Processing Addendum for Products where Google is a Data Processor.

### 9. Terminating this License Agreement

9.1 The License Agreement will continue to apply until terminated by either you or Google as set out below.

9.2 If you want to terminate the License Agreement, you may do so by ceasing your use of the SDK and any relevant developer credentials.

9.3 Google may at any time, terminate the License Agreement with you if:

- (A) you have breached any provision of the License Agreement; or
- (B) Google is required to do so by law; or
- (C) the partner with whom Google offered certain parts of SDK (such as APIs) to you has terminated its relationship with Google or ceased to offer certain parts of the SDK to you; or

I have read and agree with the above terms and conditions

[DOWNLOAD ANDROID STUDIO FOR LINUX](#)



`android-studio-ide-193.6626763-linux.tar.gz`

2017-18-program  
~\Documents\2017-18-program



# Android Studio

Version 2.3.3

- ✦ Start a new Android Studio project
- 📁 Open an existing Android Studio project
- ⬇️ Check out project from Version Control ▾
- 📁 Import project (Eclipse ADT, Gradle, etc.)
- 📄 Import an Android code sample

⚙️ Configure ▾ Get Help ▾



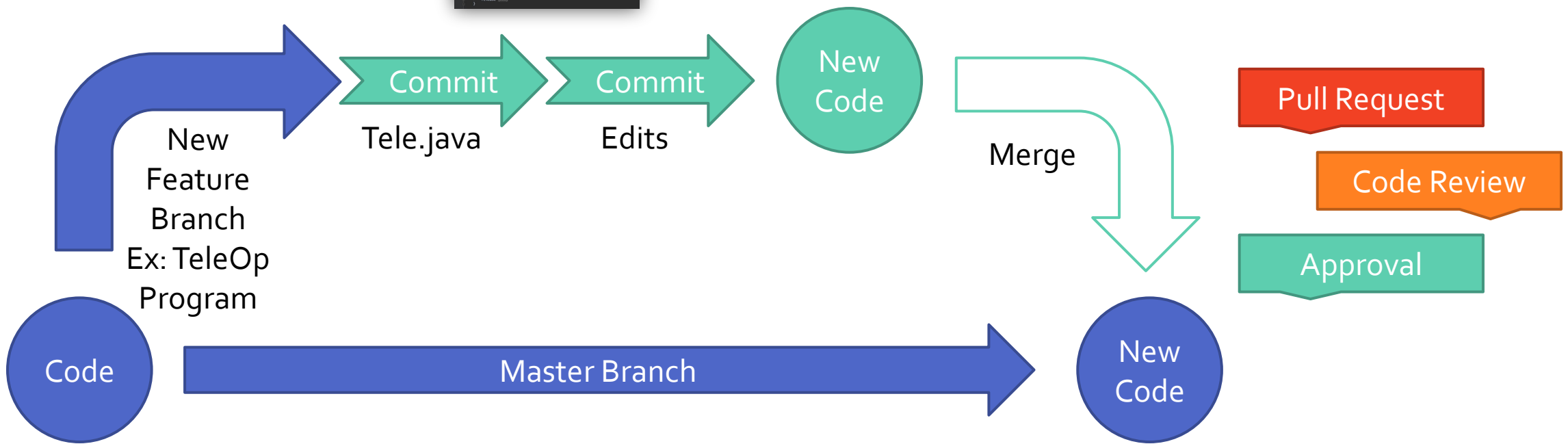
# THE WORKFLOW

---

Branches, Commits, Pull Requests, and SDK Updates

# The Process

```
1 package com.example.app;
2
3 import androidx.appcompat.app.AppCompatActivity;
4 import androidx.appcompat.widget.Toolbar;
5
6 public class MainActivity extends AppCompatActivity {
7     @Override
8     protected void onCreate(Bundle savedInstanceState) {
9         super.onCreate(savedInstanceState);
10        setContentView(R.layout.activity_main);
11        Toolbar toolbar = findViewById(R.id.toolbar);
12        setSupportActionBar(toolbar);
13        FloatingActionButton fab = findViewById(R.id.fab);
14        fab.setOnClickListener(new View.OnClickListener() {
15            @Override
16            public void onClick(View view) {
17                // TODO: Add your action code here
18            }
19        });
20    }
21}
22
23 // End of file
```



# Set Up FTC Robot Controller

---

Create new repo, Clone, pushing remote, Organization, Debug

Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository.](#)

Owner **\*** Repository name **\***

AndreaBaretta / test

Great repository names are short and memorable. Need inspiration? How about [fluffy-garbanzo?](#)

Description (optional)

Public  
Anyone on the internet can see this repository. You choose who can commit.

Private  
You choose who can see and commit to this repository.

Initialize this repository with:

Skip this step if you're importing an existing repository.

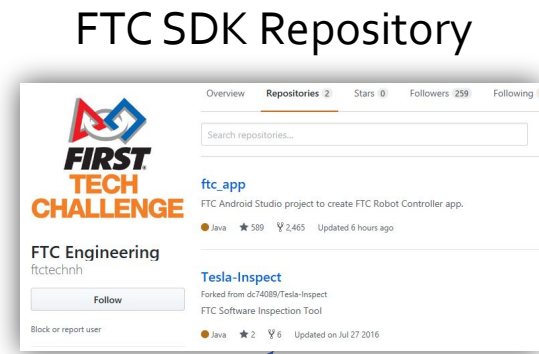
Add a README file  
This is where you can write a long description for your project. [Learn more.](#)

Add .gitignore  
Choose which files not to track from a list of templates. [Learn more.](#)

Choose a license  
A license tells others what they can and can't do with your code. [Learn more.](#)

Create repository

Create Remote Repository



git remote add upstream <repository>

Sign in to GitHub

Username or email address

Alex

Password [Forgot password?](#)

Sign in

New to GitHub? [Create an account.](#)

GitHub Accounts

Quick setup — if you've done this kind of thing before

or HTTPS SSH git@github.com:AndreaBaretta/test.git

Get started by creating a new file or uploading an existing file. We recommend every repository include a README, LICENSE, and .gitignore.

git remote add origin <repository>



Local Repository

Android Studio

```

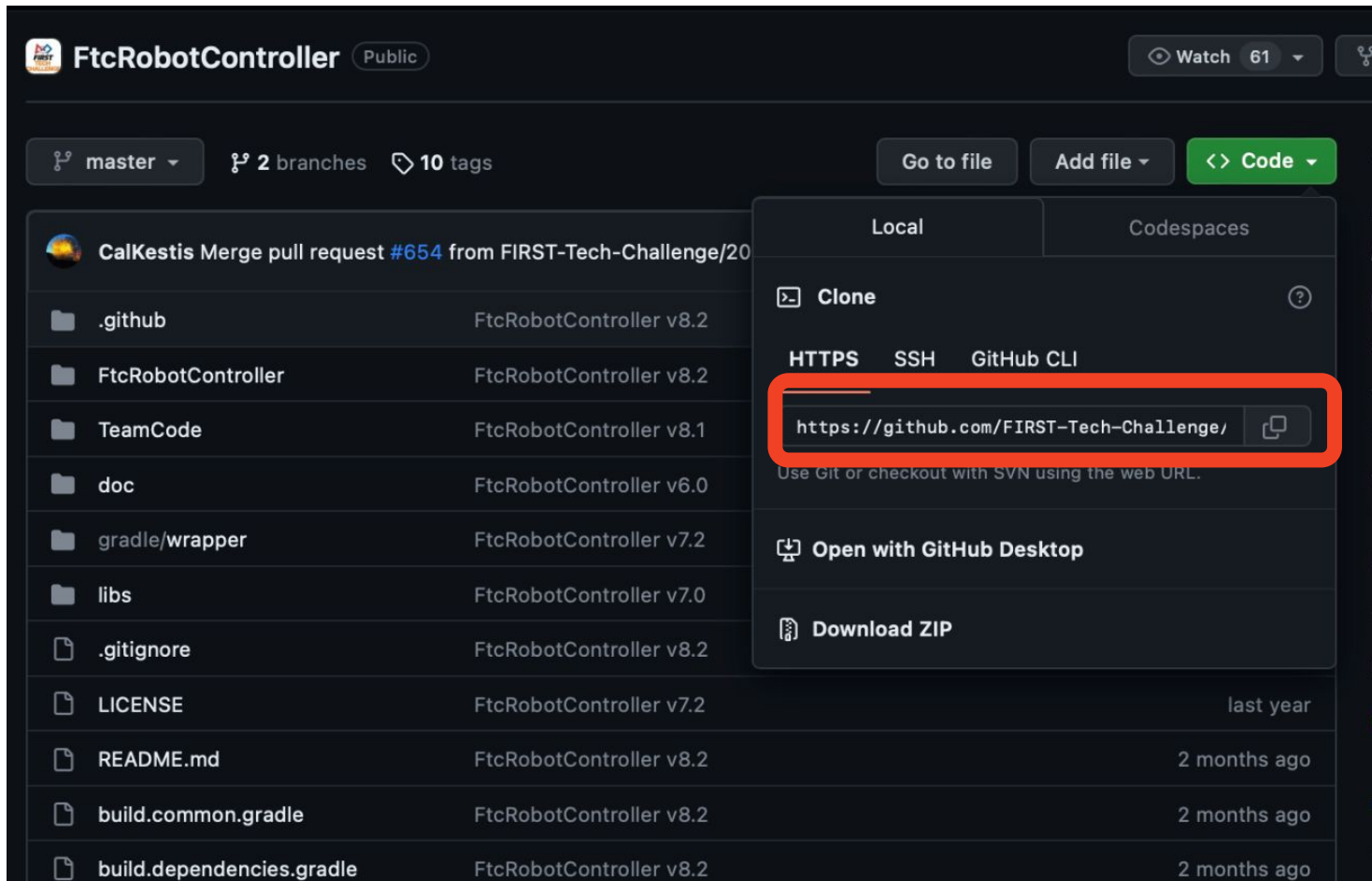
gradle sync in progress...
apply plugin: 'com.android.application'
ext {
    densityList = ['mdpi', 'hdpi', 'xhdpi', 'xxhdpi']
    abiList = ['armeabi', 'armeabi-v7a', 'x86']
}
android {
    compileSdkVersion rootProject.ext.compileSdkVersion
    buildToolsVersion rootProject.ext.buildToolsVersion
    defaultConfig {
        applicationId "com.google.android.apps.santatracker"
        minSdkVersion rootProject.ext.minSdkVersion
        targetSdkVersion rootProject.ext.targetSdkVersion
        versionCode 4812888
        versionName "4.8.12"
        vectorDrawables.useSupportLibrary = true
        testInstrumentationRunner "android.support.test.runner.AndroidJUnit4"
    }
    buildTypes {
        debug {
            applicationIdSuffix ".debug"
            versionNameSuffix "-debug"
            // Enabling multidex support.
            multiDexEnabled true
        }
        release {
    }
}

```

Robot Controller



# Clone robot controller



The screenshot shows the GitHub repository page for 'FtcRobotController'. The 'Code' dropdown menu is open, showing options for cloning the repository. The 'Clone' option is selected, and the 'HTTPS' tab is active. The URL 'https://github.com/FIRST-Tech-Challenge/' is highlighted with a red box. Below the URL, there is a note: 'Use Git or checkout with SVN using the web URL.' Other options in the menu include 'Open with GitHub Desktop' and 'Download ZIP'.

File/Folder	Version	Last Modified
CalKestis Merge pull request #654 from FIRST-Tech-Challenge/20		
.github	FtcRobotController v8.2	
FtcRobotController	FtcRobotController v8.2	
TeamCode	FtcRobotController v8.1	
doc	FtcRobotController v6.0	
gradle/wrapper	FtcRobotController v7.2	
libs	FtcRobotController v7.0	
.gitignore	FtcRobotController v8.2	
LICENSE	FtcRobotController v7.2	last year
README.md	FtcRobotController v8.2	2 months ago
build.common.gradle	FtcRobotController v8.2	2 months ago
build.dependencies.gradle	FtcRobotController v8.2	2 months ago

- Copy link
- open command window (Terminal)
- Use command `git clone <link>`

# Create pushing remote

Basic command is "git remote add"

```
git remote [-v | --verbose]
git remote add [-t <branch>] [-m <master>] [-f] [--[no-]tags] [--mirror=
(fetch|push)] <name> <URL>
git remote rename [--[no-]progress] <old> <new>
git remote remove <name>
git remote set-head <name> (-a | --auto | -d | --delete | <branch>)
git remote set-branches [--add] <name> <branch>...
git remote get-url [--push] [--all] <name>
git remote set-url [--push] <name> <newurl> [<oldurl>]
git remote set-url --add [--push] <name> <newurl>
git remote set-url --delete [--push] <name> <URL>
git remote [-v | --verbose] show [-n] <name>...
git remote prune [-n | --dry-run] <name>...
git remote [-v | --verbose] update [-p | --prune] [(<group> | <remote>)...]
```

# Code Organization

Why comment on your code?

- **MAINTENANCE of the project**
- Others will understand your code quicker
- Increase readability

# Code Organization

Each method should be

- Modularized
- Less than one screen(preferably)
- Name variables reasonably
  - I, J, K 's stay in the for loop



# Code Organization

Comments should...

- NOT explain what the code is doing
- Explain the REASONING behind the code
- Explain HOW the variables/methods are used

```
// nw: northwest node
// ne: northeast node
// sw: southwest node
// se: southeast node
// nn: north auxiliary node
// ee: east auxiliary node
// ss: south auxiliary node
// ww: west auxiliary node
// cc: central auxiliary node
#[derive(Eq, Derivative, Clone)]
#[derivative(PartialEq, Hash)]
pub struct Node {
    nw: NodePointer,
    ne: NodePointer,
    sw: NodePointer,
    se: NodePointer,
    nn: NodePointer,
    ee: NodePointer,
    ss: NodePointer,
    ww: NodePointer,
    cc: NodePointer,
    depth: usize,
    area: usize,
}
```

# Code Organization (FTC Specific)

- Opmode should be short and concise
  - Easier to debug
  - Only call other methods
- Separate hardware declaration with opmode
  - Increases readability of the code
  - Shortens the length
- Main Algorithms deserve a folder  
Mostly very long  
complicated

main 1 branch 0 tags

Go to file

Add file

Code

Alex12344576543 WHO WANTS TO FOLLOW MY LINES

62c2b8d on Sep 18, 2022 60 commits

2_13_YellowRunNorCal.Imsp	Add files via upload	last year
2_14_PurpleRunNorCal.Imsp	Add files via upload	last year
2_16_BlueRunNorCal.Imsp	Add files via upload	last year
2_18_PurpleRunNorCal.Imsp	Add files via upload	last year
2_20_BlueRunNorCal.Imsp	Add files via upload	last year
Basic Line Follower 1.llsp	WHO WANTS TO FOLLOW MY LINES	last year
Blue Final.Imsp	Add files via upload	2 years ago
BlueRunFinal-Fast.Imsp	Add files via upload	2 years ago
BlueRunNorCal.Imsp	Add files via upload	last year
BlueRunNorCalFeb8.Imsp	Add files via upload	last year
Bluerun (1).Imsp	Add files via upload	2 years ago
Bluerun 2.Imsp	Add files via upload	2 years ago
Bluerun 3.Imsp	Add files via upload	2 years ago
Bluerun final.Imsp	Add files via upload	2 years ago
Bluerun.Imsp	Add files via upload	2 years ago
Bluerun3 w comments updated.Im...	Add files via upload	last year
Bluerun3 w comments.Imsp	Add files via upload	2 years ago
GyroPlusLine-Baba.Imsp	Add files via upload	last year
Gyro_Follower_Python.llsp	Add files via upload	last year

# Bad Example

- Relying on only one branch
- Non-organized codebase
- Repetitive files
- Updates got lost

fil-2021 Private Watch 2

main 1 branch 0 tags Go to file Add file <> Code

Alex12344576543 WHO WANTS TO FOLLOW MY LINES 62c2b8d on Sep 18, 2022 60 commits

2_13_YellowRunNorCal.Imsp	Add files via upload	last year
2_14_PurpleRunNorCal.Imsp	Add files via upload	last year
2_16_BlueRunNorCal.Imsp	Add files via upload	last year
2_18_PurpleRunNorCal.Imsp	Add files via upload	last year
2_20_BlueRunNorCal.Imsp	Add files via upload	last year
Basic Line Follower 1.lisp	WHO WANTS TO FOLLOW MY LINES	last year
Blue Final.Imsp	Add files via upload	2 years ago
BlueRunFinal-Fast.Imsp	Add files via upload	2 years ago
BlueRunNorCal.Imsp	Add files via upload	last year
BlueRunNorCalFeb8.Imsp	Add files via upload	last year
Bluerun (1).Imsp	Add files via upload	2 years ago
Bluerun 2.Imsp	Add files via upload	2 years ago
Bluerun 3.Imsp	Add files via upload	2 years ago
Bluerun final.Imsp	Add files via upload	2 years ago
Bluerun.Imsp	Add files via upload	2 years ago
Bluerun3 w comments updated.Im...	Add files via upload	last year
Bluerun3 w comments.Imsp	Add files via upload	2 years ago
GyroPlusLine-Baba.Imsp	Add files via upload	last year
Gyro_Follower_Python.lisp	Add files via upload	last year
LineSquaring.lisp	Add files via upload	last year
Purple 1 updated.Imsp	Add files via upload	2 years ago
Purple Final .Imsp	Add files via upload	2 years ago
Purple Run 1.Imsp	Add files via upload	2 years ago
Purple Run Proportional.Imsp	Add files via upload	2 years ago

```

JSONArray configAnchors = new JSONArray();
JSONArray configSegments = new JSONArray();
JSONArray configCurves = new JSONArray();

int t = 0;
for (Curve curve : curves) {
    int n = curve.xVals.size();
    if (curve == curves.get(curves.size() - 1)) n--;

    if (isV2) {
        curve.constraints.forEach(constraint -> {
            if (constraint instanceof AnchorPoint) {
                if (constraint == curve.getAnchor1() || curve == curves.get(curves.size() - 1)) {
                    configAnchors.add(anchorPointToJSON((AnchorPoint) constraint));
                }
            } else if (constraint instanceof SegmentPoint) {
                configSegments.add(segmentPointToJSON((SegmentPoint) constraint, c));
            }
        });

        configCurves.add(curveToJSON(curve));
    } else {
        curve.xVals.forEach(e -> xVals.add(Math.round(e * 10000.0) / 10000.0));
        curve.yVals.forEach(e -> yVals.add(Math.round(e * 10000.0) / 10000.0));
        curve.headings.forEach(e -> headings.add(Math.round(e * 10000.0) / 10000.0));
        curve.velocities.forEach(e -> velocities.add(Math.round(e * 10000.0) / 10000.0));
        for (ConstraintPoint constraint : curve.constraints) {
            if (constraint == curve.getAnchor2() && curve != curves.get(curves.size() - 1)) {
                continue;
            }
            int t2 = (int) Math.round(constraint.getTFromAnchor(curve) * n) + t;
            for (int action : constraint.getActions()) {
                JSONArray curActions = new JSONArray();
                curActions.add(t2);
                curActions.add(action);
                actions.add(curActions);
            }
        }
    }
}

```

# Bad Example

- No comments
  - Low maintenance
  - Hard to debug
- Hard to understand
- And most importantly,
  - Light mode

```
140 JSONArray configAnchors = new JSONArray();
141 JSONArray configSegments = new JSONArray();
142 JSONArray configCurves = new JSONArray();
143
144 int t = 0;
145 for (Curve curve : curves) {
146     int n = curve.xVals.size();
147     if (curve == curves.get(curves.size() - 1)) n--;
148
149     if (isV2) {
150         curve.constraints.forEach(constraint -> {
151             if (constraint instanceof AnchorPoint) {
152                 if (constraint == curve.getAnchor1() || curve == curves.get(curves.size() - 1)) {
153                     configAnchors.add(anchorPointToJSON((AnchorPoint) constraint));
154                 }
155             } else if (constraint instanceof SegmentPoint) {
156                 configSegments.add(segmentPointToJSON((SegmentPoint) constraint, c));
157             }
158         });
159
160         configCurves.add(curveToJSON(curve));
161     } else {
162         curve.xVals.forEach(e -> xVals.add(Math.round(e * 10000.0) / 10000.0));
163         curve.yVals.forEach(e -> yVals.add(Math.round(e * 10000.0) / 10000.0));
164         curve.headings.forEach(e -> headings.add(Math.round(e * 10000.0) / 10000.0));
165         curve.velocities.forEach(e -> velocities.add(Math.round(e * 10000.0) / 10000.0));
166         for (ConstraintPoint constraint : curve.constraints) {
167             if (constraint == curve.getAnchor2() && curve != curves.get(curves.size() - 1)) {
168                 continue;
169             }
170             int t2 = (int) Math.round(constraint.getTFromAnchor(curve) * n) + t;
171             for (int action : constraint.getActions()) {
172                 JSONArray curActions = new JSONArray();
173                 curActions.add(t2);
174                 curActions.add(action);
175                 actions.add(curActions);
176             }
177         }
178     }
179 }
```

# How to Debug

- Separate the method into sections
- Eliminate error section by section
- Use telemetry
- Track each stage
- Use test cases
- Record the failing cases
- Increase readability of the code
  - Typo, index error, variable appearance
- Search up error code

THE END

---