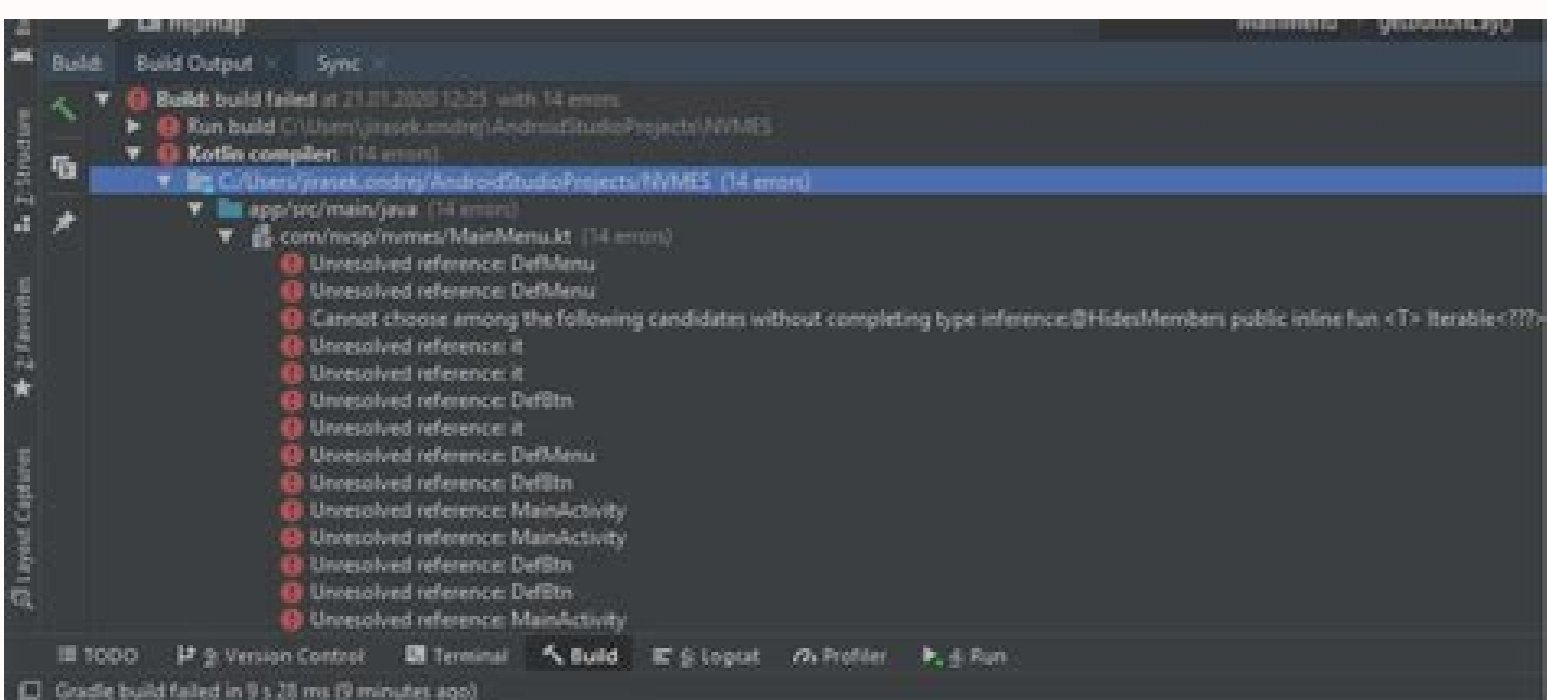
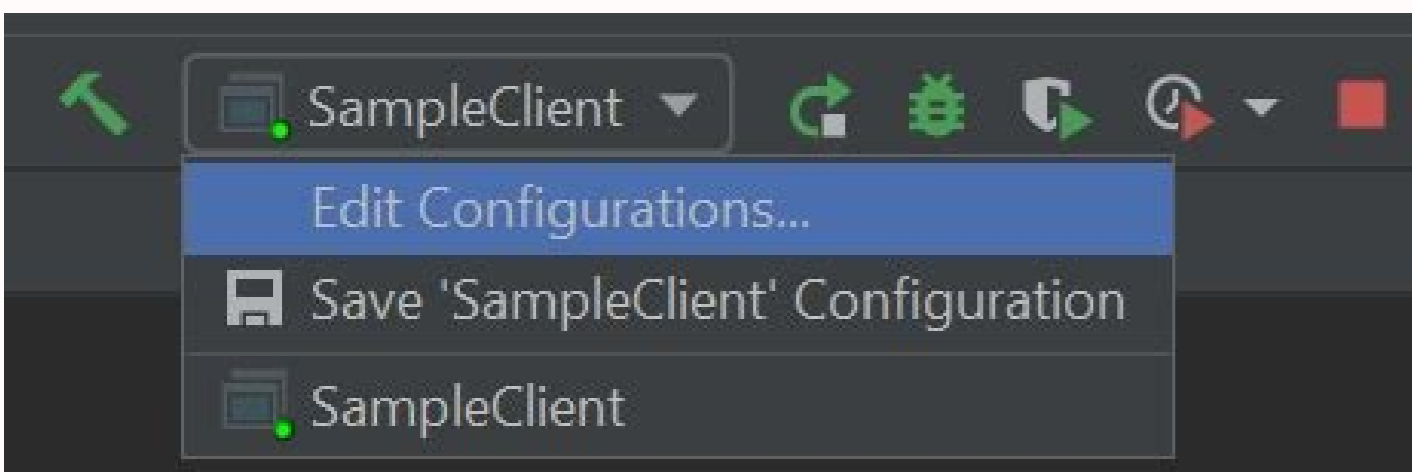
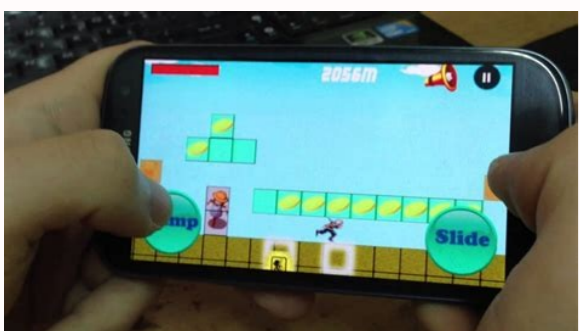
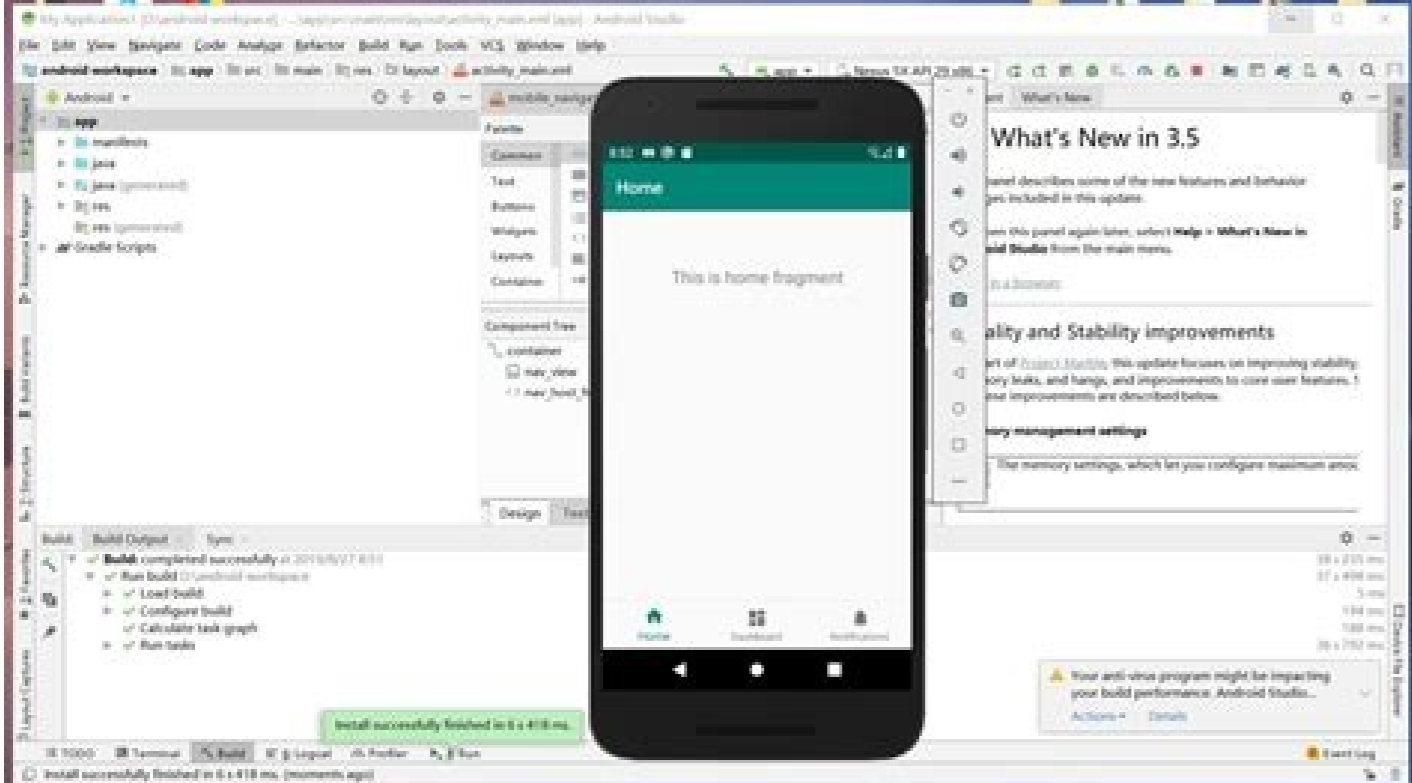


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This repository contains the public FTC SDK for the Freight Frenzy (2021-2022) competition season. Welcome! This GitHub repository contains the source code that is used to build an Android app to control a FIRST Tech Challenge competition robot. To use this SDK, download/clone the entire project to your local computer. Getting Started If you are new to robotics or new to the FIRST Tech Challenge, then you should consider reviewing the FTC Blocks Tutorial to get familiar with how to use the control system: [FTC Blocks Online Tutorial](#) Even if you are an advanced Java programmer, it is helpful to start with the FTC Blocks tutorial, and then migrate to the OnBot Java Tool or to Android Studio afterwards. Downloading the Project If you are an Android Studio programmer, there are several ways to download this repo. Note that if you use the Blocks or OnBot Java Tool to program your robot, then you do not need to download this repository. If you are a git user, you can clone the most current version of the repository: `git clone` Or, if you prefer, you can use the "Download Zip" button available through the main repository page. Downloading the project as a .ZIP file will keep the size of the download manageable. You can also download the project folder (as a .zip or .tar.gz archive file) from the Downloads subsection of the Releases page for this repository. The Releases page also contains prebuilt APKs. Once you have downloaded and uncompressed (if needed) your folder, you can use Android Studio to import the folder ("Import project (Eclipse ADT, Gradle, etc.)"). Getting Help User Documentation and Tutorials FIRST maintains online documentation with information and tutorials on how to use the FIRST Tech Challenge software and control system. You can access this documentation using the following link: [FTC Robot Controller Online Documentation](#) Note that the online documentation is an "evergreen" document that is constantly being updated and edited. It contains the most current information about the FIRST Tech Challenge software and control system. Javadoc Reference Material The Javadoc reference documentation for the FTC SDK is now available online. Click on the following link to view the FTC SDK Javadoc documentation as a live website: [FTC Javadoc Documentation](#) Online User Forum For technical questions regarding the Control System or the FTC SDK, please visit the FTC Technology forum: [FTC Technology Forum Sample OpModes](#) This project contains a large selection of Sample OpModes (robot code examples) which can be cut and pasted into your /teamcode folder to be used as-is, or modified to suit your team's needs. Samples Folder: [Samples Folder](#) Changes Increases the Robocol version. This means an 8.0 or later Robot Controller or Driver Station will not be able to communicate with a 7.2 or earlier Driver Station or Robot Controller. If you forget to update both apps at the same time, an error message will be shown explaining which app is older and should be updated. Initializing I2C devices now happens when you retrieve them from the HardwareMap for the first time. Previously, all I2C devices would be initialized before the Op Mode even began executing, whether you were actually going to use them or not. This could result in reduced performance and unnecessary warnings. With this change, it is very important for Java users to retrieve all needed devices from the HardwareMap during the Init phase of the Op Mode. Namely, declare a variable for each hardware device the Op Mode will use, and assign a value to each. Do not do this during the Run phase, or your Op Mode may briefly hang while the devices you are retrieving get initialized. Op Modes that do not use all of the I2C devices specified in the robot control system. You can access this documentation using the following link: [FTC Robot Controller Online Documentation](#) Note that the online documentation is an "evergreen" document that is constantly being updated and edited. It contains the most current information about the FIRST Tech Challenge software and control system. Javadoc Reference Material The Javadoc reference documentation for the FTC SDK is now available online. Click on the following link to view the FTC SDK Javadoc documentation as a live website: [FTC Javadoc Documentation](#) Online User Forum For technical questions regarding the Control System or the FTC SDK, please visit the FTC Technology forum: [FTC Technology Forum Sample OpModes](#) This project contains a large selection of Sample OpModes (robot code examples) which can be cut and pasted into your /teamcode folder to be used as-is, or modified to suit your team's needs. Samples Folder: [Samples Folder](#) Breaking Changes Updates RoboAutoDriveByGyro. Linear Java sample to use REV Control/Expansion hub IMU. Updates Vuforia samples to reference PowerPlay assets and have correct names and field locations of image targets. Updates TensorFlow samples to reference PowerPlay assets. Adds opt-in support for Java 8 language features to the OnBotJava editor. To opt in, open the OnBotJava Settings, and check Enable beta Java 8 support. Note that Java 8 code will only compile when the Robot Controller runs Android 7.0 Nougat or later. Please report issues here. In OnBotJava, clicking on build errors now correctly jumps to the correct location. Improves OnBotJava autocomplete behavior, to provide better completion options in most cases. Adds a QR code to the Robot Controller Inspection Report when viewed from the Driver Station for scanning by inspectors at competition. Improves I2C performance and reliability in some scenarios. Version 7.2 (20220723-130006) Breaking Changes Updates the build tooling. For Android Studio users, this change requires Android Studio Chipmunk 2021.2.1. Removes support for devices that are not competition legal, including Modern Robotics Core Control Modules, the Matrix Controller, and HiTechnic/NXT controllers and sensors. Support remains for Modern Robotics I2C sensors. Enhancements Increases the height of the 3-dots Landscape menu touch area on the Driver Station, making it much easier to select. Adds terminateOpModeNow() method to allow OpModes to cleanly self-exit immediately. Adds opModeInit() method to LinearOpMode to facilitate init-loops. Similar to opModelsActive() but for the init phase. Warns user if they have a Logitech F310 gamepad connected that is set to DirectInput mode. Allows SPARKmini motor controllers to react more quickly to speed changes. Hides the version number of incorrectly installed sister app (i.e. DS installed on RC device or vice-versa) on inspection screen. Adds support for allowing the user to edit the comment for the runOpMode block. Adds parameterDefaultValues field to @ExportToBlocks. This provides the ability for a java method with an @ExportToBlocks annotation to specify default values for method parameters when it is shown in the block editor. Make LinearOpMode blocks more readable. The opmode name is displayed on the runOpMode block, but not on the other LinearOpMode blocks. Added support to TensorFlowObjectDetection for using a different frame generator, instead of Vuforia. Using Vuforia to pass the camera frame to TFOD is still supported. Removes usage of Rendszer. Fixes logspam on app startup of repeated stacktraces relating to "Failed resolution of: Landroid/net/wifi/p2p/WiFiP2pManager\$DeviceInfoListener". Allows disabling bluetooth radio from inspection screen. Improves warning messages when I2C devices are not responding. Adds support for controlling the RGB LED present on PS4/Etpark gamepads from OpModes. Removes legacy Pushbot references from OpMode samples. Renames "Pushbot" samples to "Robot". Motor directions reversed to be compatible with "direct Drive" drive train. Bug fixes Fixes issue #316 (MatrixF.inverted() returned an incorrectly-sized matrix for 1x1 and 2x2 matrices). Self-inspect now allows for Driver Station and Robot Controller compatibility between point releases. Fixes bug where if the same RumbleEffect object instance was queued for multiple gamepads, it could happen that both rumble commands would be sent to just one gamepad. Fixes bug in Driver Station where on the Driver Hub, if Advanced Gamepad Features was disabled and an officially supported gamepad was connected, then opening the Advanced Gamepad Features or Gamepad Type Overrides screens would cause the gamepad to be rebound by the custom USB driver even though advanced gamepad features was disabled. Protects against (unlikely) null pointer exception in Vuforia Localizer. Harden OnBotJava and Blocks saves to protect against save issues when disconnecting from Program and Manage Fixes issue where the RC app would hang if a REV Hub I2C write failed because the previous I2C operation was still in progress. This hang most commonly occurred during REV 2M Distance Sensor initialization. Removes ConceptWebcam.java sample program. This sample is not compatible with OnBotJava. Fixes bug where using html tags in an @ExportToBlocks comment field prevented the blocks editor from loading. Fixes blocks editor so it doesn't ask you to save when you haven't modified anything. Fixes uploading a very large blocks project to offline blocks editor. Fixes bug that caused blocks for DcMotorEX to be omitted from the blocks editor toolbox. Fixes Blocks Programs Stripped of Blocks (due to using TensorFlow Label block) Version 7.1 (20211223-120805) Fixes crash when calling isPwmEnabled() (issue #223). Fixes lint error (issue #4). Fixes Driver Station crash when attempting to use DualShock4 v1 gamepad with Advanced Gamepad Features enabled (issue #173). Fixes possible (but unlikely) Driver Station crash when connecting gamepads of any type. Fixes bug where Driver Station would use generic bluetooth radio from inspection screen. Improves warning messages when I2C devices are not responding. Added SimpleOmnidrive sample OpMode. Adds UVC white balance control API. Fixes issue #259 Most blocks samples for TensorFlow can't be used for a different model. The blocks previously labeled TensorFlowObjectDetectionFreightFrenzy (from the subcategory named "Optimized for Freight Frenzy") and TensorFlowObjectDetectionCustomModel (from the subcategory named "Custom Model") have been replaced with blocks labeled TensorFlowObjectDetection. Blocks in existing opmodes will be automatically updated to the new blocks when opened in the blocks editor. Fixes issue #260 Blocks can't call java method that has a VuforiaLocalizer parameter. Blocks now has a block labeled VuforiaFreightFrenzy.getVuforiaLocalizer for this. Added a page to manage the TensorFlow Lite models in /sdcard/FIRST/tflitemodels. To get to the TFLite Models page: You can click on the link at the bottom of the Manage page. You can click on the link at the upper-right the Blocks project page. Fixes logspam when isBusy() is called on a motor not in RTP mode. Hides the "RC Password" item on the inspection screen for phone-based Robot Controllers. (It is only applicable for Control Hubs). Adds channel 165 to Wi-Fi Direct channel selection menu in the settings screen. (165 was previously available through the web UI, but not locally in the app). Version 7.0 (20210915-141025) Enhancements and New Features Adds support for external libraries to OnBotJava and Blocks. Upload .jar and .aar files in OnBotJava. Known limitation - RobotController device must be running Android 7.0 or greater. Known limitation - .aar files with assets are not supported. External libraries can provide support for hardware devices by using the annotation in the com.qualcomm.robotcore.hardware.configuration.annotations package. External libraries can include .so files for native code. External libraries can be used from OnBotJava op modes. External libraries that use the following annotations can add new hardware devices: com.qualcomm.robotcore.hardware.configuration.annotations.DeviceProperties com.qualcomm.robotcore.hardware.configuration.annotations.DeviceProperties com.qualcomm.robotcore.hardware.configuration.annotations.I2CDeviceType com.qualcomm.robotcore.hardware.configuration.annotations.MotorType com.qualcomm.robotcore.hardware.configuration.annotations.ServoType External libraries that use the following annotations can add new functionality to the Robot Controller: org.firstinspires.ftc.ftccommon.external.OnCreate org.firstinspires.ftc.ftccommon.external.OnCreateEventLoop org.firstinspires.ftc.ftccommon.external.OnCreateMenu org.firstinspires.ftc.ftccommon.external.OnDestroy org.firstinspires.ftc.ftccommon.external.WebHandlerRegistrar Adds support for REV Robotics Driver Hub. Adds fully custom userspace USB gamepad driver to Driver Station (see "Advanced Gamepad Features" menu in DS settings). Allows gamepads to work on devices without native Linux kernel support (e.g. some Romanian Motorola devices). Allows the DS to read the unique serial number of each gamepad, enabling auto-recovery of dropped gamepads even if two gamepads of the same model drop. (NOTE: unfortunately this does not apply to Etpark gamepads, because they do not have a unique serial). Reading the unique serial number also provides the ability to configure the DS to assign gamepads to a certain position by default (so no need to do start+a/b at all). The LED ring on the Xbox360 gamepad and the RGB LED bar on the PS4 gamepad is used to indicate the driver position the gamepad is bound to. The rumble motors on the Xbox360, PS4, and Etpark gamepads can be controlled from OpModes. The 2-point touchpad on the PS4 gamepad can be read from OpModes. The "back" and "guide" buttons on the gamepad can now be safely bound to robot controls (Previously, on many devices, Android would intercept these buttons as home button presses and close the app). Advanced Gamepad features are enabled by default, but may be disabled through the settings menu in order to revert to gamepad support provided natively by Android. Improves accuracy of ping measurement. Fixes issue where the ping time showed as being higher than reality when initially connecting to or restarting the robot. To see the full improvement, you must update both the Robot Controller and Driver Station apps. Updates samples located at /FtcRobotController/src/main/java/org/firstinspires/ftc/robotcontroller/external/samples. Added ConceptGamepadRumble and ConceptGamepadTouchpad samples to illustrate the use of these new gamepad capabilities. Condensed existing Vuforia samples into just 2 samples (ConceptVuforiaFieldNavigation & ConceptVuforiaFieldNavigationWebcam) showing how to determine the robot's location on the field using Vuforia. These both use the current season's Target Images. Added ConceptVuforiaDriveToTargetWebcam to illustrate an easy way to drive directly to any visible Vuforia target. Makes many improvements to



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