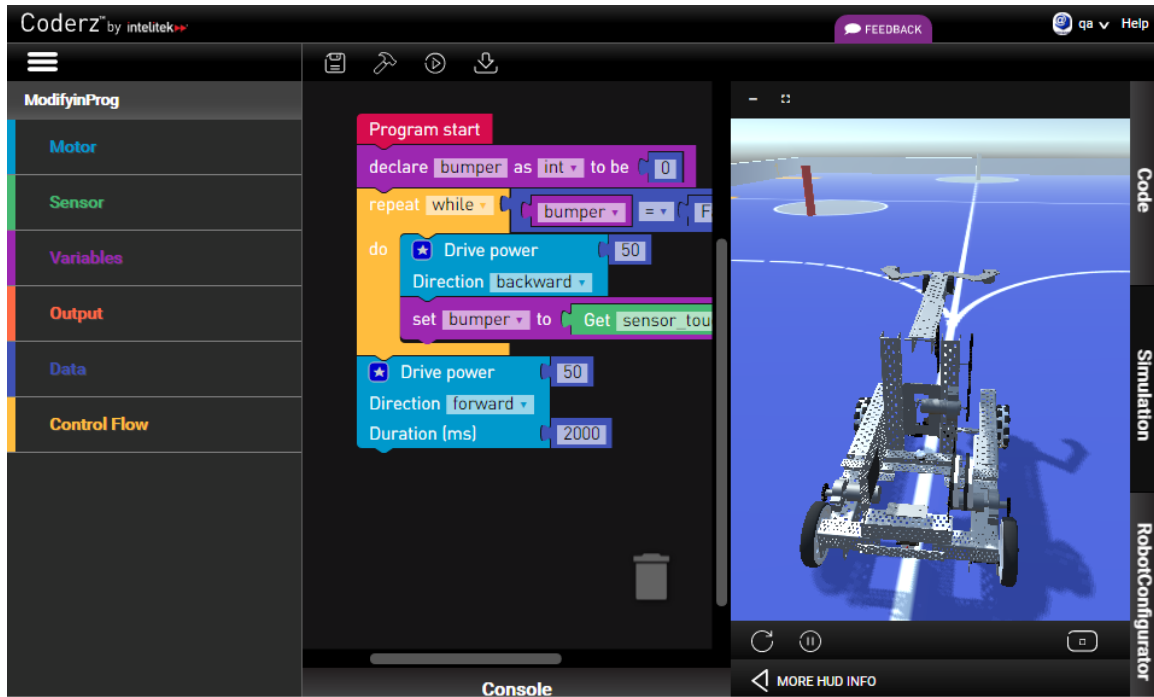


Coderz™ User Guide



January 2016

Catalog #200079 Rev. A



Table of Contents

1.	Introduction	1
2.	Users	2
2.1.1.	Creating a Teacher Account	2
2.1.2.	Creating a Student Account.....	6
2.1.3.	Profile.....	8
3.	Home Interface	10
3.1.	Navigation Icons	10
3.2.	View Area	11
3.3.	MAnage Area.....	11
3.4.	Code Area	12
3.5.	Learn Area	12
4.	Managing Projects	13
4.1.	Creating a Project	13
4.2.	Opening a Project	18
4.3.	Renaming a Project	19
4.4.	Deleting a Project	20
4.4.1.	Deleting an Open Project	20
4.4.2.	Deleting a Project from the Projects Page.....	21
5.	Blocks Interface.....	23
5.1.	Overview	23
5.2.	Adding Blocks	25
5.3.	Configuring Blocks.....	26
5.3.1.	Text Input.....	27
5.3.2.	Drop-down Menu.....	27
5.3.3.	Blue Star	27
5.3.3.1.	Drive Block	27
5.3.3.2.	If..Do.....	28
5.4.	Dragging Blocks	29
5.5.	Deleting Blocks	30
5.5.1.	Trashcan	30
5.5.1.1.	Deleting a Single Block.....	30
5.5.1.2.	Deleting a Group of Blocks	30
5.5.2.	Context Menu	30
5.5.2.1.	Deleting a Single Block.....	30
5.5.2.2.	Deleting a Group of Blocks	31
5.6.	Comments	31

5.6.1.	Adding a Comment.....	31
5.6.2.	Removing a Comment	32
5.7.	Context Options.....	33
5.7.1.	Duplicate	33
5.7.2.	Add Comment / Remove Comment	34
5.7.3.	Inline Inputs / External Inputs	34
5.7.4.	Collapse Block / Expand Block	35
5.7.5.	Disable Block / Enable Block.....	35
5.7.6.	Delete Block	35
5.7.7.	Help	35
5.8.	Block Library	36
5.8.1.	Motor Blocks	36
5.8.2.	Sensor Blocks.....	37
5.8.3.	Variables Blocks.....	38
5.8.4.	Output Blocks	38
5.8.5.	Data Blocks	38
5.8.6.	Control Flow Blocks	39
5.9.	Code Pane.....	40
5.9.1.	Expanding the Code Pane.....	40
5.9.2.	Collapsing the Code Pane	40
5.9.3.	Maximizing / Restoring the Code Pane.....	41
6.	Code Interface.....	42
6.1.	Overview	42
6.2.	Managing Files.....	44
6.2.1.	Adding Files	44
6.2.2.	Renaming a File	45
6.2.3.	Opening/Closing a File.....	46
6.2.4.	Deleting a File.....	47
6.3.	Commenting	47
6.4.	Search	48
6.4.1.	Search Box.....	48
6.4.2.	Search for a String	48
6.5.	Autocomplete.....	49
6.6.	Java Commonly Used Functions	50
6.7.	Java Sample Programs	52
7.	Project Interface Panes	53
7.1.	Simulation.....	53
7.1.1.	Overview	53
7.1.2.	Control	54

7.1.2.1.	Zoom	54
7.1.2.2.	Pan	54
7.1.2.3.	Reset	54
7.1.3.	HUD Info.....	54
7.2.	RobotConfigurator.....	55
7.2.1.	Overview	56
7.2.2.	Adding an Element	57
7.2.3.	Editing an Element	59
7.2.4.	Deleting an Element	60
7.3.	Console	61
8.	Running a Program on a Robot	62
8.1.	Preparing the Robot Controller Android Device	62
8.2.	Downloading to a Robot.....	62
8.3.	Configuring the Robot	63
8.4.	Running the Program.....	64
9.	Classes.....	65
9.1.	Creating a Class	65
9.2.	Managing a Class	69

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1. Introduction

Coderz is a tool for programming physical and virtual robots using either its Blocks visual programming interface, or via Java.

This document is structured as follows:

Section	Description
1. Introduction	Introduces the document.
2. Users	Explains how to create an account in Coderz and how to change your profile.
3. Home Interface	Describes the Coderz Home interface.
4. Managing Projects	Describes how to create, open, rename, delete and download projects.
5. Blocks Interface	Describes the Blocks interface, how to write Blocks programs and the function of each block.
6. Code Interface	Describes the Code interface, lists the commonly used functions and includes sample programs.
7. Project Interface Panes	Describes the Simulation, RobotConfigurator and Console panes that are common for all project interfaces.
8. Running a Program on a Robot	Describes the process of running a program on a robot.
9. Classes	Describes how to create and manage student classes.

2. Users

In order to use Coderz you must be a registered user.

There are two types of users in Coderz, students and teachers. Teacher accounts have an additional Classes feature, in which they can create and monitor classes, and add students to a class. For more information, refer to section 9.2 Managing a Class.

This section describes the following:

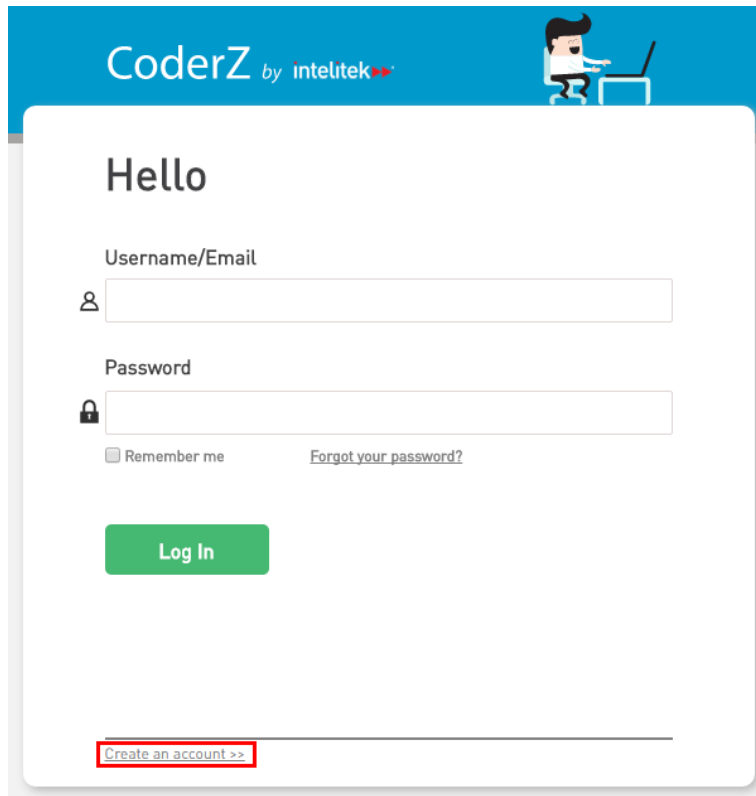
- Creating a Teacher Account
- Creating a Student Account

2.1.1. Creating a Teacher Account

In order to complete the process of creating a Teacher account, you will need the product code that you received from Intelitek. The product key will allow you to add a number of student accounts according to the license that you purchased from Intelitek.

To create a Teacher account in Coderz:


1. Navigate to <http://ftc.coderzworld.com/>.
2. Click **Create an Account >>**.



The Product Key page appears.

3. Type your Coderz Product key.


Get one now >>'. At the bottom of the white box is a green 'Go' button. Below the white box, there is a link: 'Already have an account ? [Log in here.](#)'." data-bbox="264 117 722 495"/>

CoderZ by intelitek 

Join us and get started

Use your key to get into CoderZ world

Product key



Don't have a valid key? [Get one now >>](#)

[Go](#)

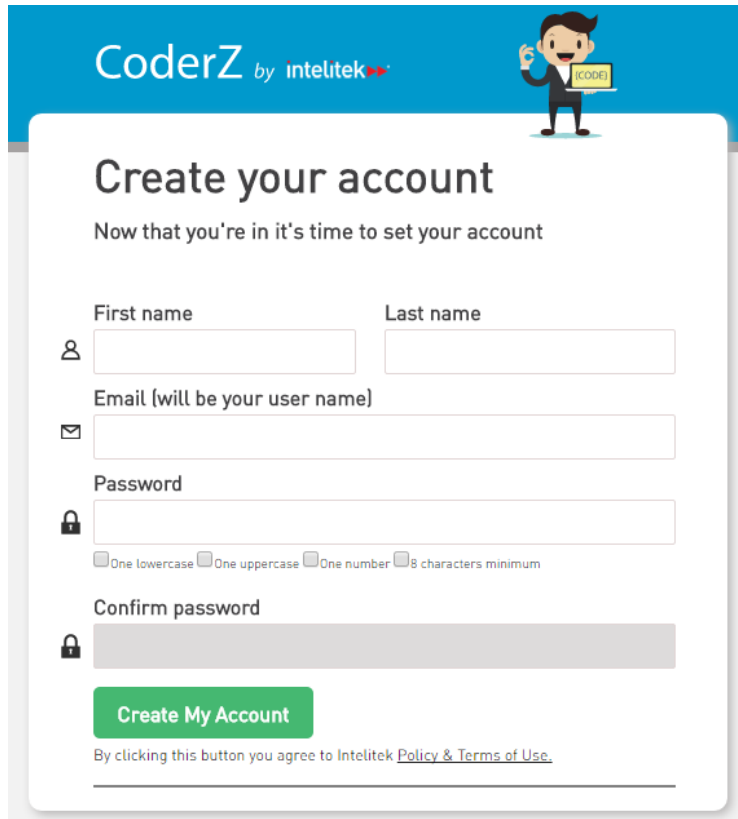
Already have an account ? [Log in here.](#)

4. Click **Go**.

Get one now >>'. A green 'Go' button is highlighted with a red rectangle. At the bottom, there is a link: 'Already have an account ? [Log in here.](#)'" data-bbox="265 118 723 496"/>

The Signup form appears.

5. Complete the signup form.



The screenshot shows the 'Create your account' form for CoderZ by intelitek. The form is set against a blue header with the logo and a cartoon character. The form fields include: First name, Last name, Email (will be your user name), Password, and Confirm password. The Password field has a lock icon and a list of requirements: One lowercase, One uppercase, One number, and 8 characters minimum. A green 'Create My Account' button is at the bottom, with a link to the 'Policy & Terms of Use' below it.

CoderZ by intelitek

Create your account

Now that you're in it's time to set your account

First name Last name

Email (will be your user name)

Password

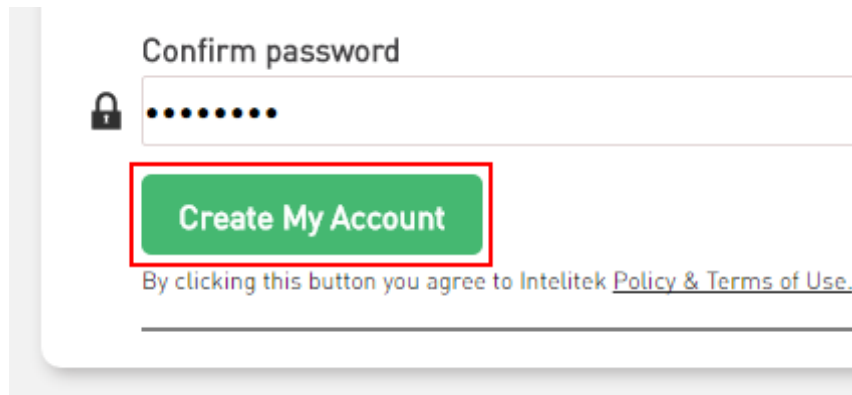
☐ One lowercase ☐ One uppercase ☐ One number ☐ 8 characters minimum

Confirm password

[Create My Account](#)

By clicking this button you agree to Intelitek [Policy & Terms of Use](#).

6. Click **Create My Account**.



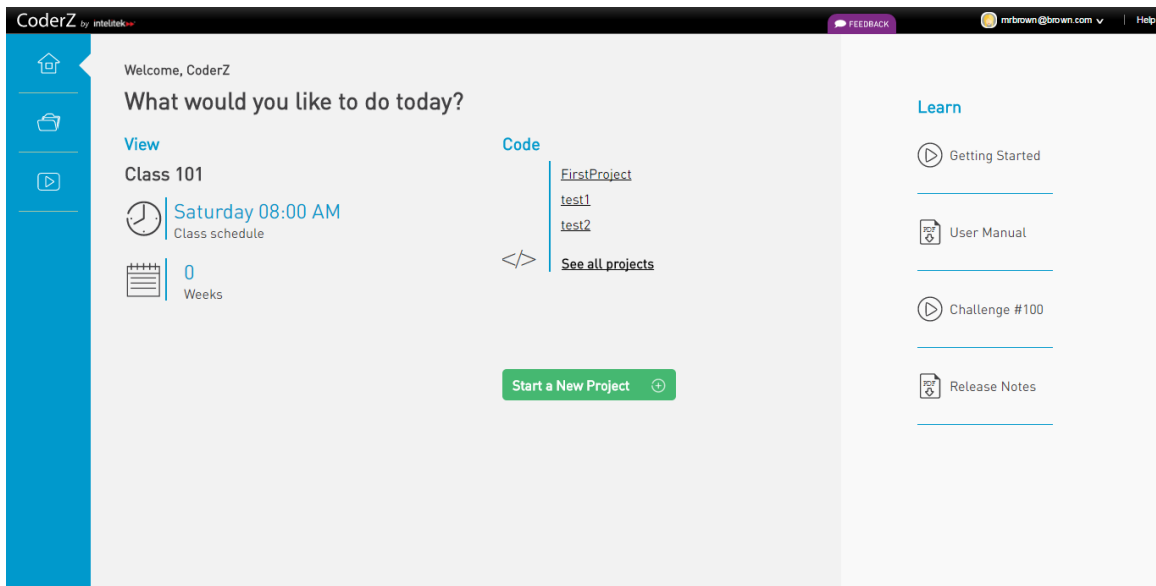
This screenshot shows the 'Confirm password' step of the account creation process. It features a password field with a lock icon and a series of dots representing the password. Below the field is a green 'Create My Account' button, which is highlighted with a red rectangle. At the bottom, there is a link to the 'Policy & Terms of Use'.

Confirm password

[Create My Account](#)

By clicking this button you agree to Intelitek [Policy & Terms of Use](#).

Your account is created and the Welcome page appears.



2.1.2. Creating a Student Account

Once a student has been added by a teacher to a class, an email is sent to the student with instructions and a link. The student needs to follow the link and complete the form in order to complete the process of creating their account.

To create a Student account in Coderz:

1. In the "Coderz: Join class invitation" email you received, click **Sign me up!**. If you did not receive this email, contact your teacher. Your teacher must add you to a class in order to start the process of creating your account.

Join class

Follow the link below to signup:

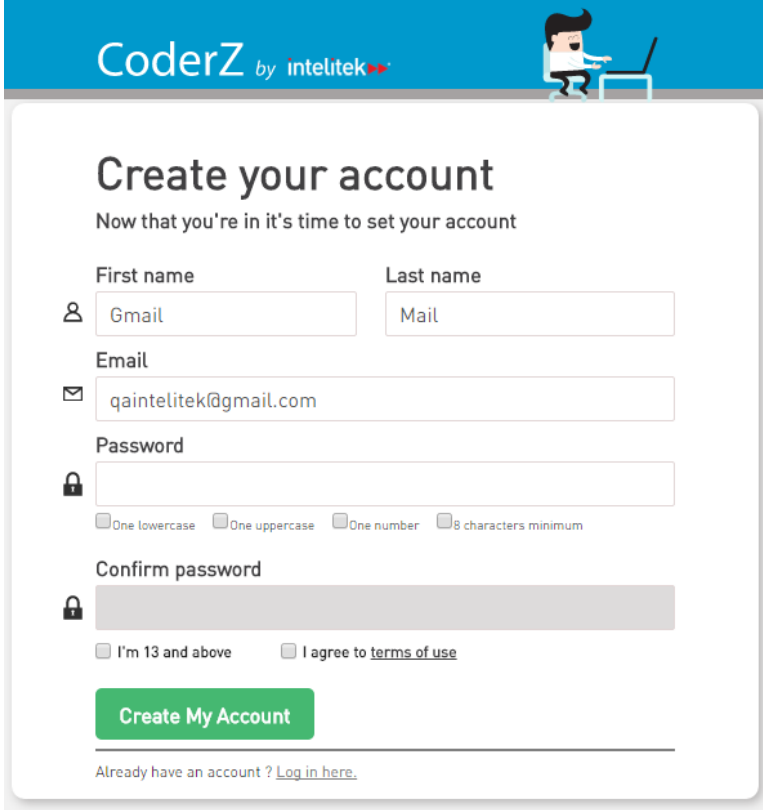
Sign me up!

If you didn't request this, please ignore this email.

The CoderZ Team

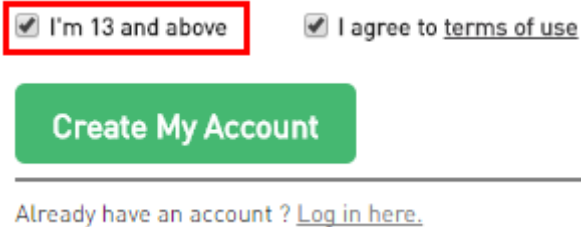
The Create your account page appears.

2. Complete the signup form.



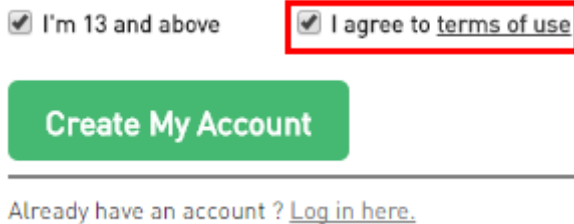
The screenshot shows the 'Create your account' form for CoderZ by intelitek. The form includes fields for First name, Last name, Email, Password, and Confirm password. Below the password field, there are checkboxes for password requirements: One lowercase, One uppercase, One number, and 8 characters minimum. At the bottom, there are checkboxes for 'I'm 13 and above' and 'I agree to terms of use'. A green 'Create My Account' button is at the bottom, and a link 'Log in here.' is provided for existing users.

3. Select the left checkbox at the bottom of the form to confirm that you are over 13 years of age.



This close-up shows the bottom of the form. The checkbox 'I'm 13 and above' is highlighted with a red box. The 'I agree to terms of use' checkbox is also checked. The 'Create My Account' button and the 'Log in here.' link are visible below.

4. Select the right checkbox to agree to the terms of use.



This close-up shows the bottom of the form. The checkbox 'I agree to terms of use' is highlighted with a red box. The 'I'm 13 and above' checkbox is also checked. The 'Create My Account' button and the 'Log in here.' link are visible below.

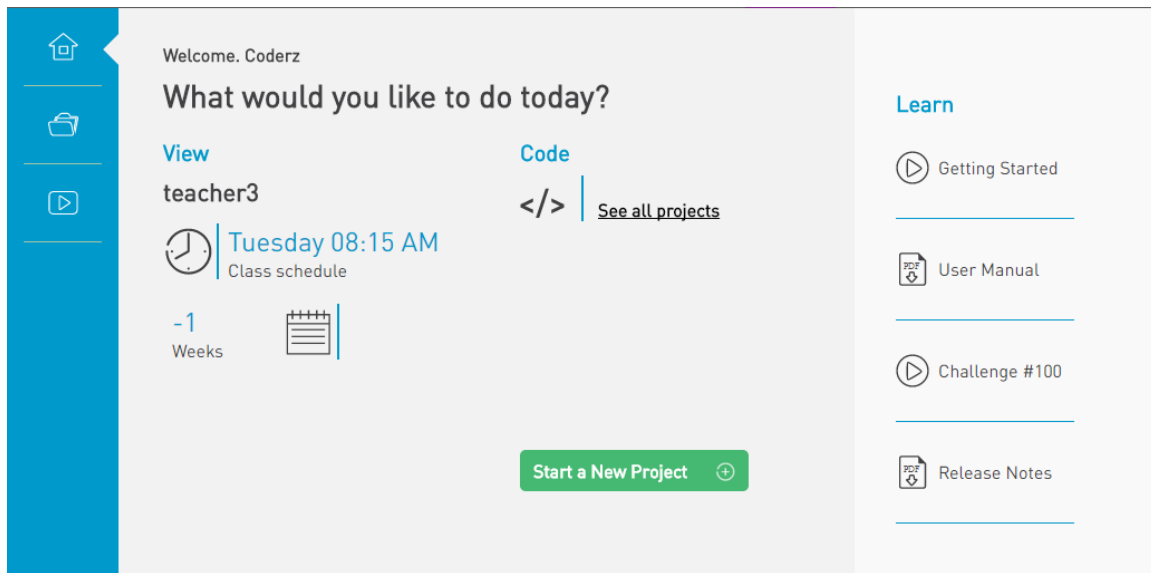
5. Click **Create My Account**.

☒ I'm 13 and above ☒ I agree to [terms of use](#)

Create My Account

Already have an account ? [Log in here.](#)

Your account is created and the Welcome page appears.

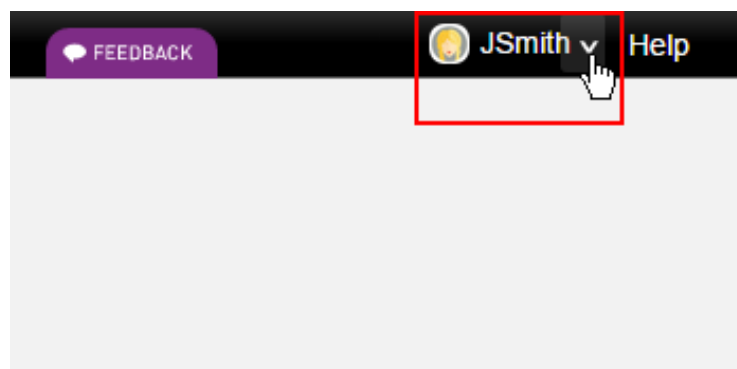


2.1.3. Profile

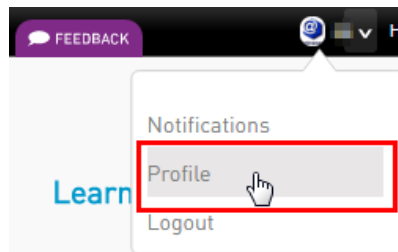
The Profile area offers options for changing your profile settings.

To access the Profile area, on the top-right of the Coderz window:

1. Click the arrow beside your username at the top-right of the page.



2. Click Profile.



The Profile area is shown.

In the Profile area, you can update your e-mail address, first name, last name and profile picture.

Click **Update** to save changes to your profile.

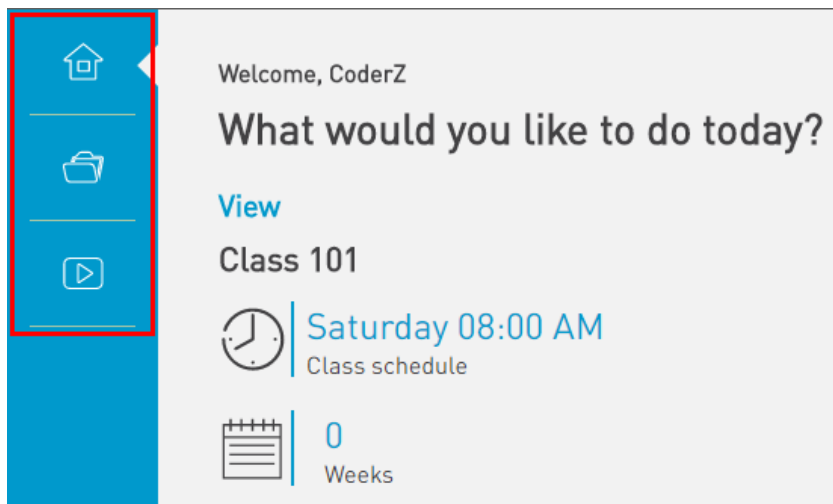
A screenshot of a user profile update form. The form is divided into two main sections: 'Your photo' and 'Your information'. In the 'Your photo' section, there is a placeholder image of a woman with blonde hair, a text prompt 'Upload your photo' with a sub-note 'Photo should be at least 300px x 300px', and a blue 'Upload' button. In the 'Your information' section, there are three text input fields for 'Email', 'First name', and 'Last name'. At the bottom of the form, there are two buttons: a green 'Update' button and a green 'Change Password' button. The 'Update' button is highlighted with a red rectangular border.

3. Home Interface




Upon logging in to Coderz, the Home interface appears.

3.1. NAVIGATION ICONS

The top-left of the Home interface has three icons. Click these icons to switch between the three Home interface pages. Teacher accounts have an additional Classes icon for accessing the Classes page. For more information, refer to section 9.2 Managing a Class.

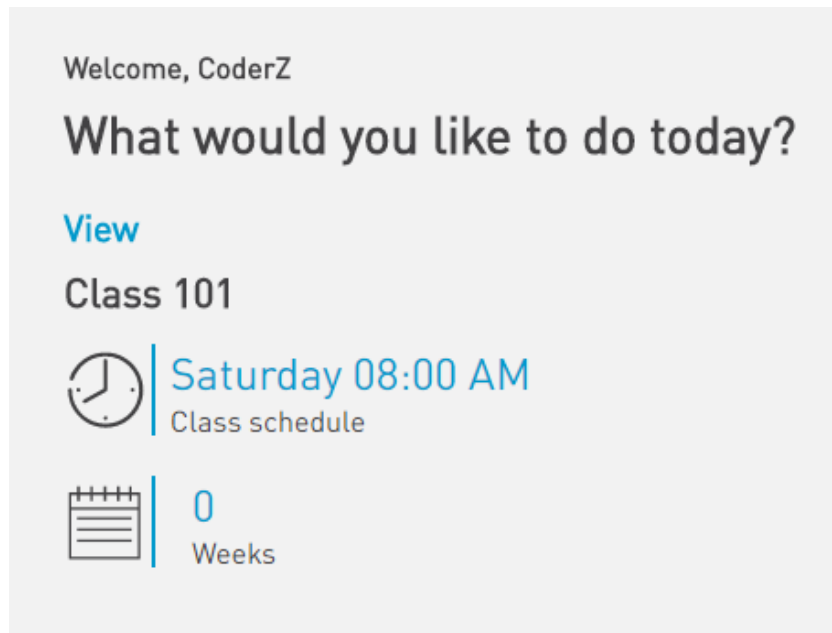


The Home interface has the following three pages:

	Welcome	The Welcome page contains the following two buttons: 1. Start a New Project. Click this option to open the Project Wizard. For more information, refer to section 4.1 Creating a Project, below. 2. Add a Class. This option is only available for Teacher accounts. Click this option to open the Class Wizard. For more information, refer to section 9.1 Creating a Class, below.
	Projects	The Projects page displays all of your programs. From the Projects page you can: 1. Create a project. For more information, refer to section 4.1 Creating a Project, below. 2. Open a project. For more information, refer to section 4.2 Opening a Project, below. 3. Download a project. For more information, refer to the section 8 Running a Program on a Robot, below.
	Tutorials	The Tutorials page contains a number of tutorial videos in ascending order of difficulty. These tutorials are designed to help you get started with using and writing programs in Coderz.

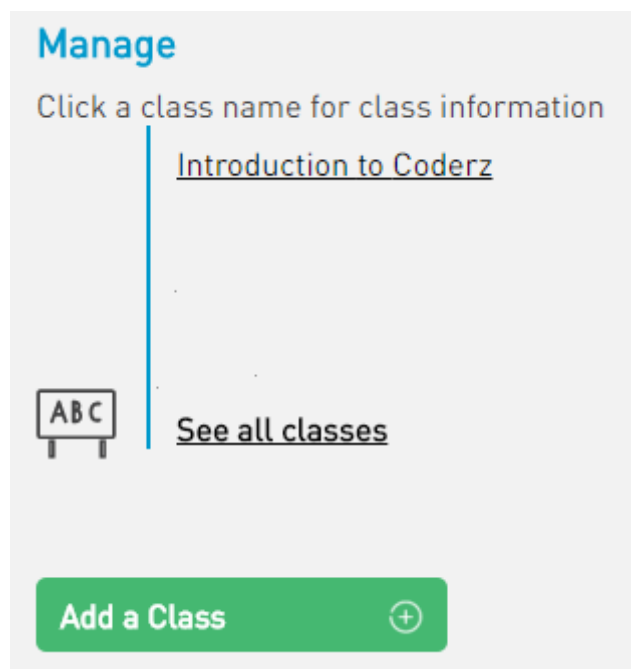
3.2. VIEW AREA

The View area of the Home interface includes information about your class including the schedule and duration.



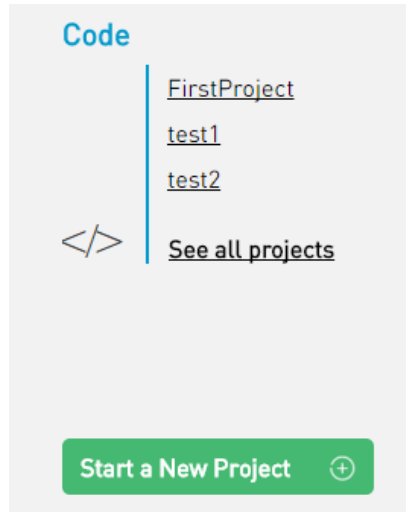
3.3. MANAGE AREA

The Manage area of the Home interface is only available in Teacher accounts. It provides links to the three most recently opened classes, and an Add a Class button. For more information about creating a class, refer to section 9.1 Creating a Class.







3.4. CODE AREA

The Code area of the Home interface provides links to the three most recently opened projects, and a Start a New Project button. For more information about creating a new project, refer to section 4.1 Creating a Project.



3.5. LEARN AREA

The Learn area of the Home interface contains links to the following:

 Getting Started	A YouTube playlist with getting started tutorials for Coderz
 User Manual	This Coderz User Guide
 Challenge #100	A YouTube playlist with challenges for Coderz
 Release Notes	Release notes for Coderz

4. Managing Projects

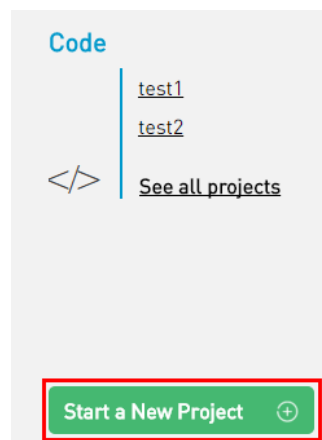
This section describes the following processes for managing projects in Coderz:

- Creating a Project
- Opening a Project
- Renaming a Project
- Deleting a Project

4.1. CREATING A PROJECT

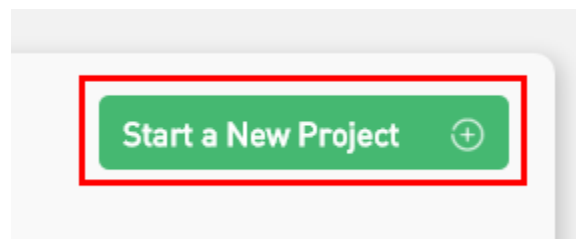
To create a new Coderz project:

1. Either:
 - On the Welcome page of the Home interface, click **Start a New Project**.



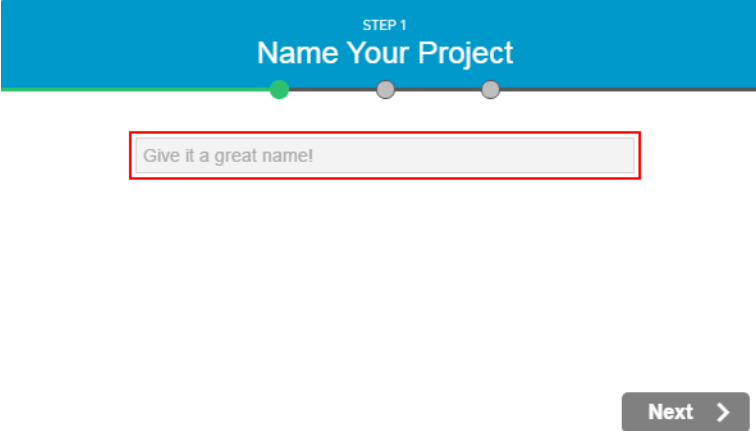
or

- On the top-right of the Projects page of the Home interface, click **New Project**.



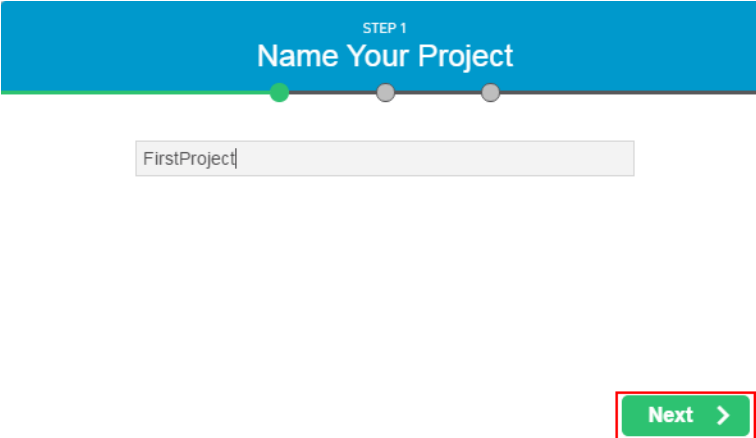
The Project Wizard appears.

2. In the field, name your project.



The screenshot shows the 'Name Your Project' step of a wizard. At the top, a blue header bar contains the text 'STEP 1' and 'Name Your Project'. Below the header is a progress bar with three dots; the first dot is green, and the other two are grey. Underneath the progress bar is a text input field with the placeholder text 'Give it a great name!'. To the right of the input field is a grey button labeled 'Next >'.

3. Click **Next**.



This screenshot shows the same 'Name Your Project' step as the previous one, but with the text 'FirstProject' entered into the input field. The 'Next >' button is now highlighted with a red border, indicating it is the next step to click.

Step 2 of the Project Wizard appears.

4. Select a method for writing a program for the project. The options here will depend on which version of Coderz you are using.
 - **Blocks/Java:** A Blocks program is written by dragging and configuring blocks. The code that is written when you add and configure blocks is Java. You do not need to know or use Java for this method.
 - **Code:** A Code program is written in code using the Java programming language.

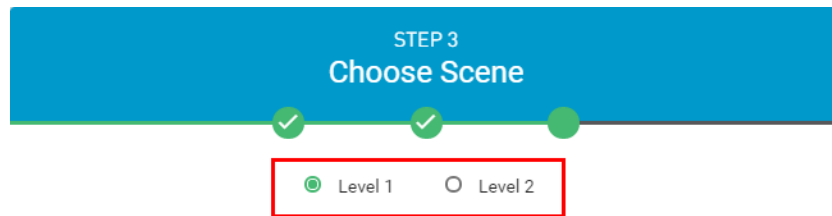


5. Click **Next**.

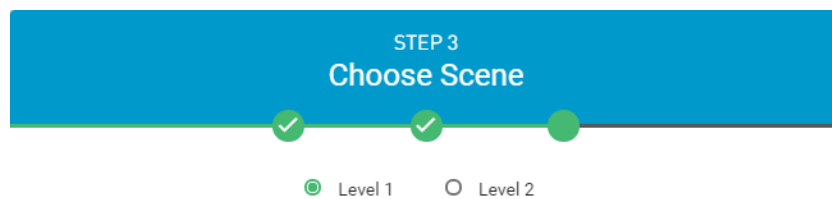


Step 3 of the Project Wizard appears.

6. Select a scene for the project.



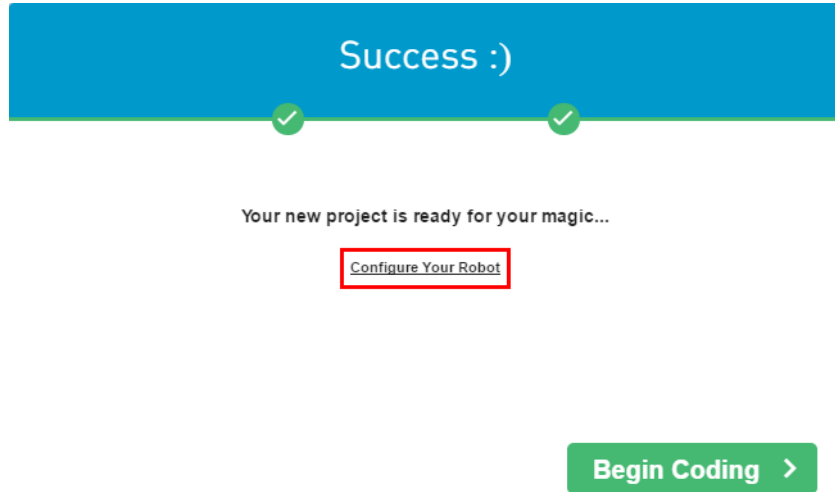
7. Click **Next**.



The Success page of the Project Wizard appears.

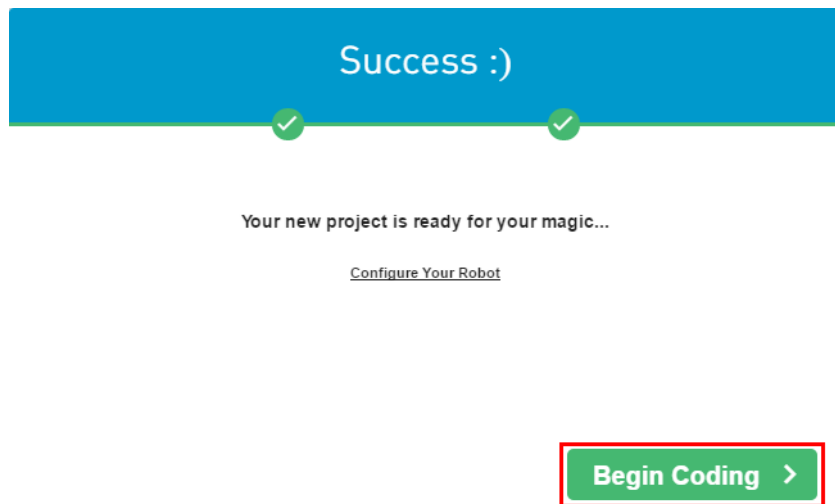
8. The project is created.

- Click **Configure Your Robot** to configure the ports for your robot's motors, servos and sensors. The RobotConfigurator appears. For more information, refer to the RobotConfigurator section below.



or

- Click **Begin Coding** to skip robot configuration and open the project.

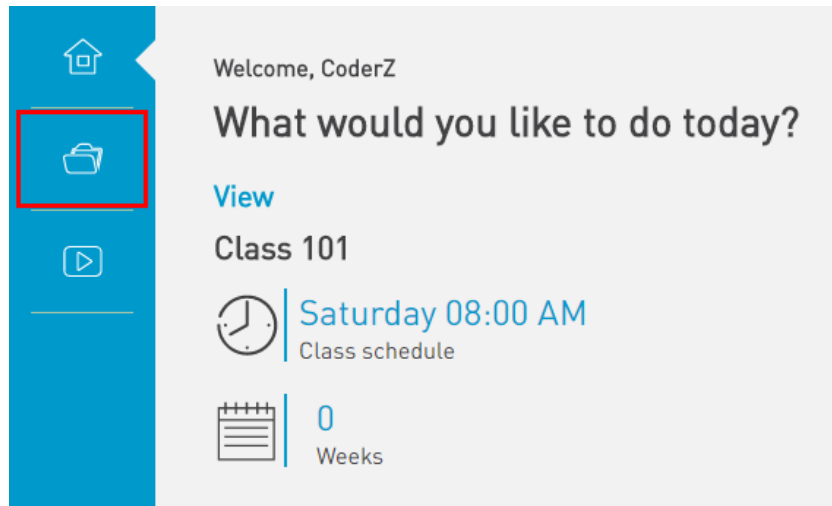


The new project appears.

4.2. OPENING A PROJECT

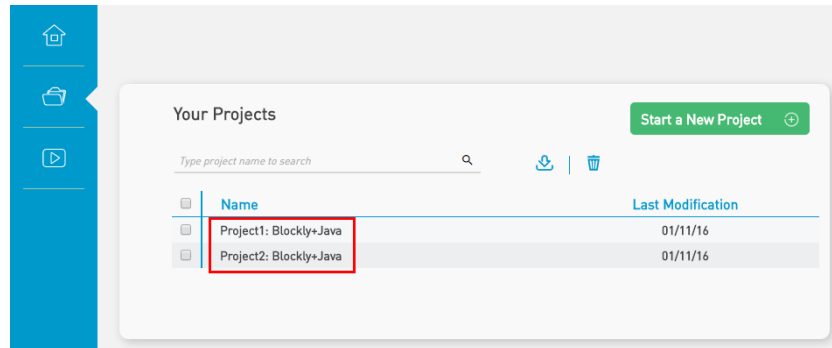
To open an existing project:

1. On the top-right of the Welcome page of the Home interface, click the  Projects icon.



The Projects page appears.

2. From the Your Projects list, click the name of the desired project.

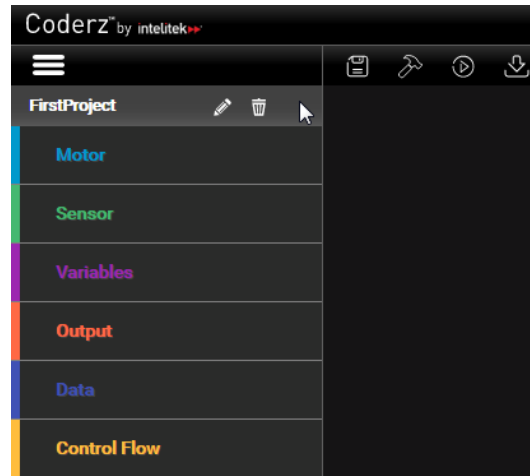


The project is opened.

4.3. RENAMING A PROJECT

To rename a project:

1. If the project you want to rename is not already open, open it as described in section 4.2 Opening a Project, above.
2. On the top-left of the project window, hover over the bar that contains the project name.



Two icons appear.

3. Click the pencil icon.



The Edit Project Name dialog box appears.

4. In the Project name field, replace the existing project name with another name.

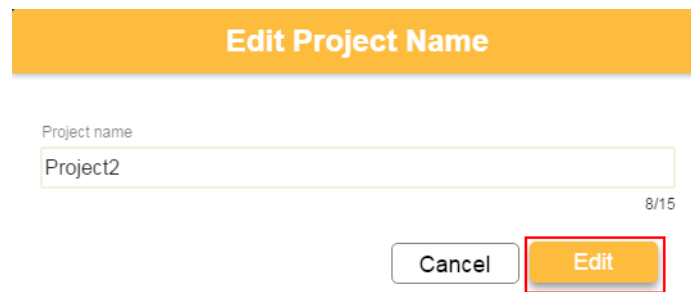
Edit Project Name

Project name

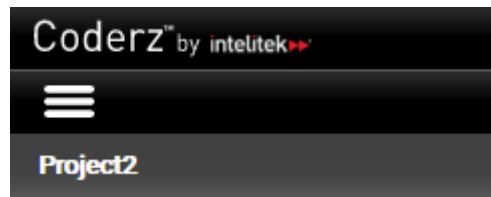
8/15

Cancel Edit

5. Click **Edit**.



The project is renamed. The new project name appears on the top-left of the project window.



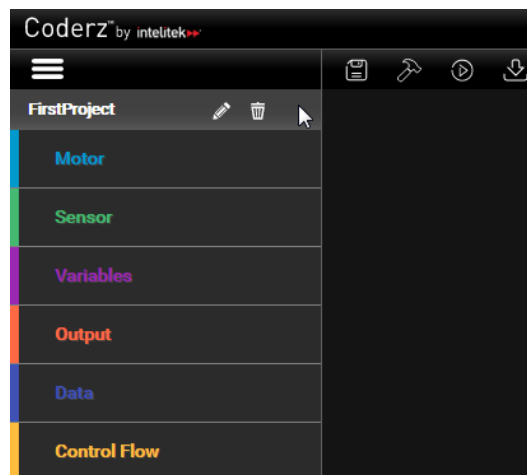
4.4. DELETING A PROJECT

Projects can be deleted from within the open project, or from the Projects page of the Home interface.

4.4.1. Deleting an Open Project

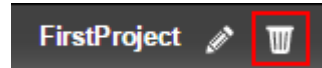
To delete a project:

1. If the project you want to rename is not already open, open it as described in section 4.2 Opening a Project, above.
2. On the top-left of the project window, hover over the bar that contains the project name.



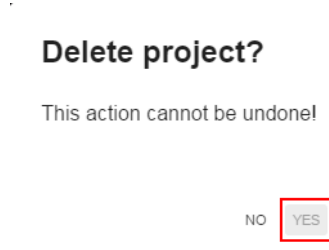
Two icons appear.

3. Click the trashcan icon.



The Delete project? dialog box appears.

4. Click **YES**.

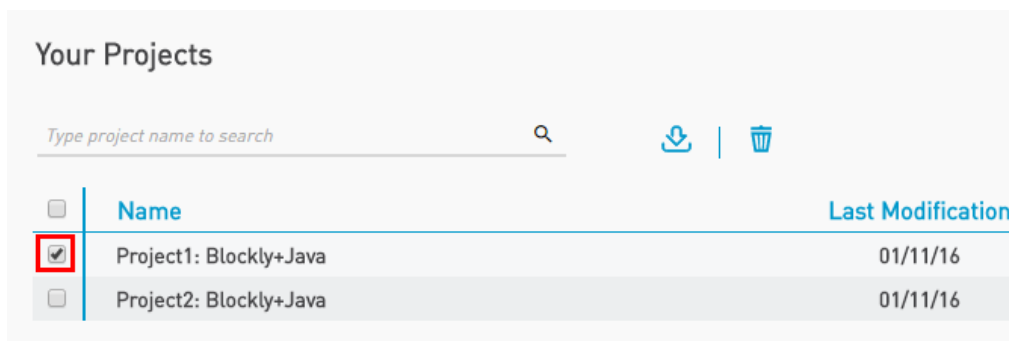


The project is deleted and the Projects page of the Home interface appears.

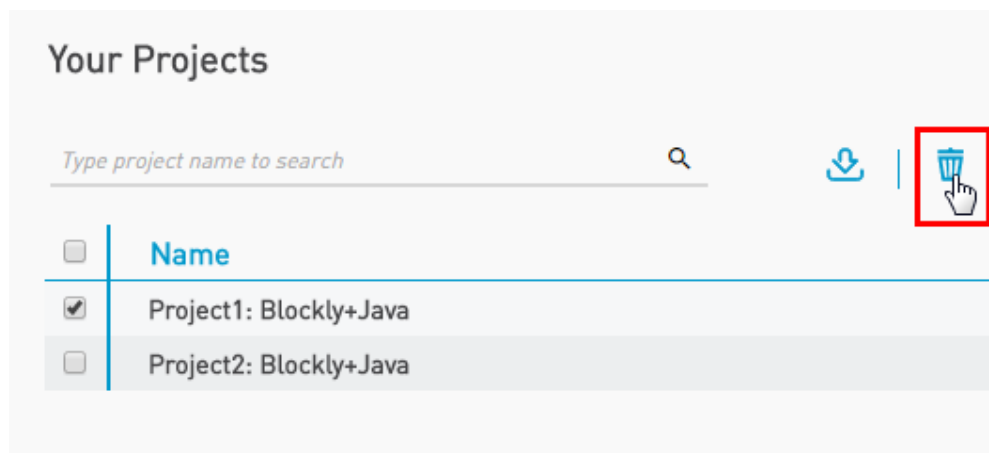
4.4.2. Deleting a Project from the Projects Page

To delete a project:

1. In the Projects page of the Home interface, select the checkbox for the project or projects that you want to delete.



2. Click the trashcan icon at the top of the page.



The Delete Project dialog box appears.

3. Click **Ok** to delete the project.

If more than one project was selected, a Delete Project dialog box will appear for each project.

5. Blocks Interface

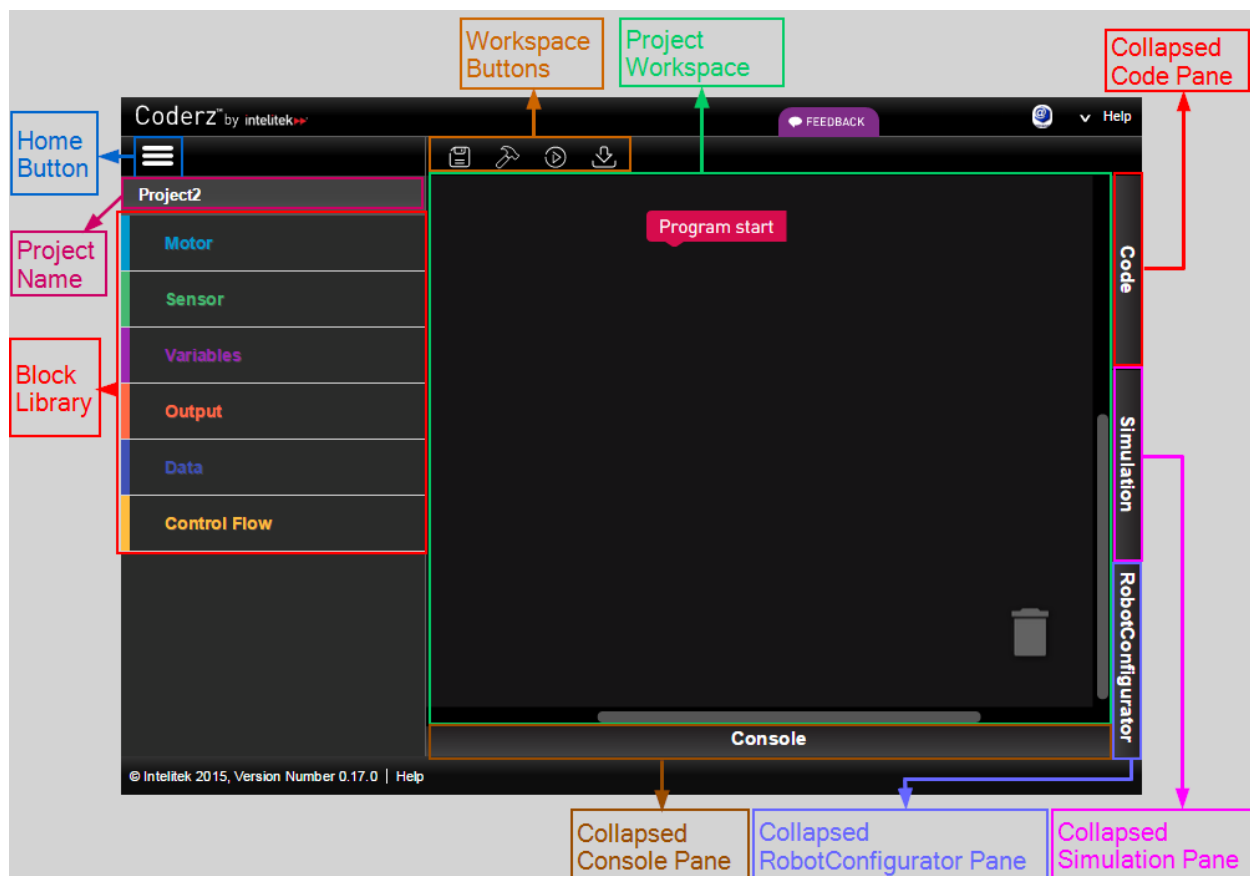
The Blocks interface offers the ability to write visual programs for controlling a robot.

This section introduces the Blocks interface and explains how to write programs using the Blocks method.

This section describes the following:





- Overview
- Adding Blocks
- Configuring Blocks
- Dragging Blocks
- Deleting Blocks
- Comments
- Context Options
- Block Library
- Code Pane

5.1. OVERVIEW



This section describes the elements of the Blocks interface. Refer to the image above for the location of these elements.

The Blocks interface contains the following elements:

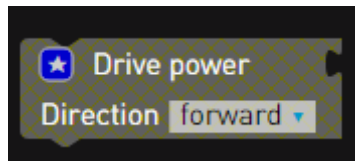
Name	Description
Home Button	Click the home button to return to the Welcome page of the Home interface.
Project Name	Displays the project name. Hover over the Project Name area to display the trashcan and pencil icons for deleting and renaming the project. For more information, refer to section 4.3 Renaming a Project and section 4.4 Deleting a Project above.
Block Library	Contains blocks for writing a program, divided by category. Click a category to display its blocks. Drag blocks from the Blocks Library to the Project Workspace to write your program. For more information, refer to section 5.2 Adding Blocks, below.
Workspace Buttons	<p>The following Workspace buttons are above the Project Workspace:</p> <p> Save: Saves the open project.</p> <p> Compile: Compiles the program, meaning that the program is checked, prepared and packaged so that it can be run on the robot. After clicking this button, the Console is displayed with information about compilation. If there are problems with the program, details of the problems are written to the console. If there are no problems with the program, a success message is written to the console.</p> <p> Run Simulation: Compiles the program and runs it in simulation. After clicking this button, the Simulation Pane expands and the simulated robot runs the program.</p> <p> Download to Robot: Downloads the program to a physical robot. The robot must be connected via a USB cable to the PC. For more information, refer to section Running a Program on a Robot, below.</p>
Project Workspace	Programs are written in the Project Workspace. Drag blocks from the Blocks Library to the Project Workspace to write your program. For more information on building programs in the Project Workspace, refer to the following sections.
Collapsed Code Pane	Expands the Code Pane. The Code pane displays the code behind the Blocks programs that you write. Any changes made in a Blocks program will dynamically change the code in the Code Pane.

Name	Description
Collapsed Simulation Pane	Expands the Simulation pane. The Simulation Pane contains a simulation of the robot as configured in the RobotConfigurator that can run programs. For more information, refer to section 7.1 Simulation, below.
Collapsed RobotConfigurator Pane	Expands the RobotConfigurator Pane . In this pane you can configure your robot and its ports. For more information, refer to section 7.2 RobotConfigurator, below.
Collapsed Console Pane	Expands the Console Pane. Program information including compilation details and program running details is written to the console. For more information, refer to section 7.3 Console, below.

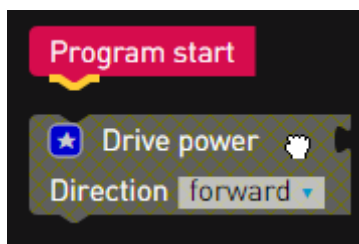
5.2. ADDING BLOCKS

Blocks programs are written by adding blocks to the program in the Program area, and configuring them.

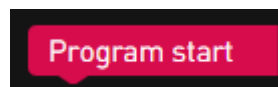
All program blocks must be attached to one another. If a block is not attached to the other blocks in a program, the block will be grayed out, indicating that it is disabled, and will be ignored when running the program.



Blocks have puzzle piece connectors. The shape of each block indicates which type of other block it can be connected to. When the connector of a block is dragged near to the connector of a compatible block, the connector of the block in the program is highlighted, indicating that the dragged block can be released and added to the program.

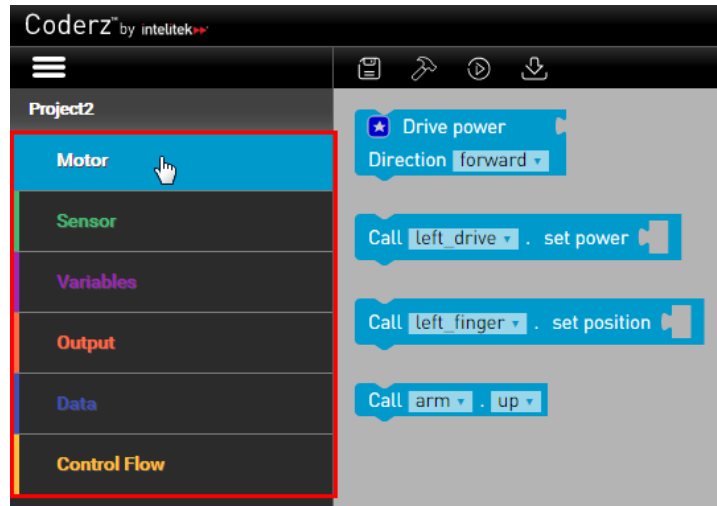


The first block in a program must be attached immediately below the Program start block that is included automatically in a new project.



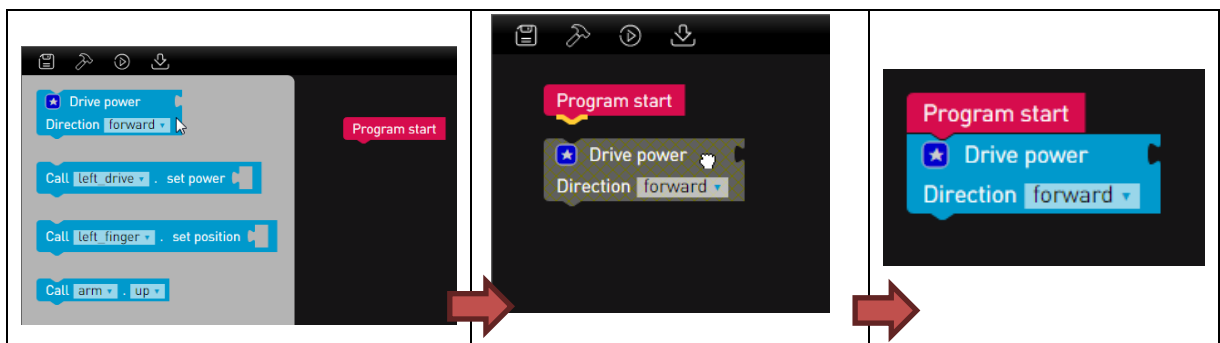
To add a block:

1. In the Block Library, click a Category to expand it.



A gray extension of the Blocks Library that contains the category's blocks appears.

2. Click and drag a block into the program in the Program Workspace.



The block must be attached below or beside, or inserted into a compatible block in the program.

3. Release the block when the connector of the block that you are attaching the dragged block to is highlighted, indicating that it is compatible.

The block is added to the program.

5.3. CONFIGURING BLOCKS

Many blocks require configuration for them to serve their intended command in the program. Different blocks require different configuration. This section describes the configuration of the different types of blocks.

5.3.1. Text Input

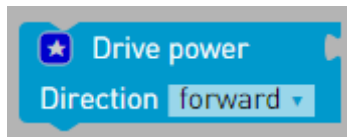
Some blocks require text input. Examples include the number and text blocks shown below.



Click in the field and type a value to add text or a number.


5.3.2. Drop-down Menu

Some blocks contain a drop-down menu, for example the Drive block shown below.



Click the drop-down menu and select an option as required.

5.3.3. Blue Star

There are two blocks that contain a  blue star icon that allow you to add additional parameters to the basic block or remove them.

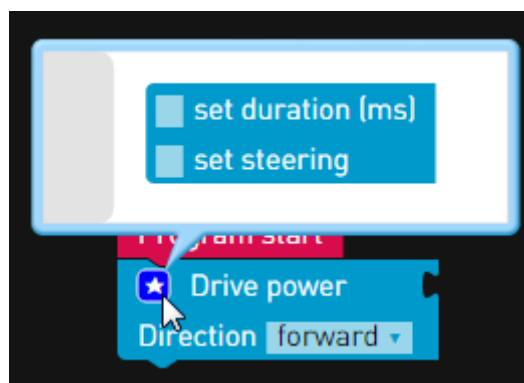
5.3.3.1. Drive Block

The Drive block has a blue star icon that allows you to set the duration or steering for the robot to drive.

To configure the duration or steering of the Drive block:

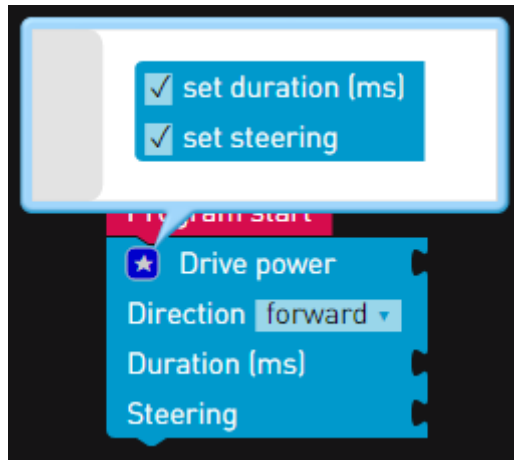
1. Click the Drive block's  blue star icon.


A pop-up window appears.



2. Select the desired options that you want to add to the block.

The options are dynamically added to the block.



3. Click the  blue star icon to close the pop-up window.

Repeat steps 1 and 2 and deselect the options to remove them from the block.

5.3.3.2. If..Do

The If..Do block allows you to create conditions in your program. For example, using this block you can introduce the statement, “If the right optical distance sensor detects a value of 100, drive straight,” into your program. The block has a blue star icon that also allows you to add else or else if conditions to the block.

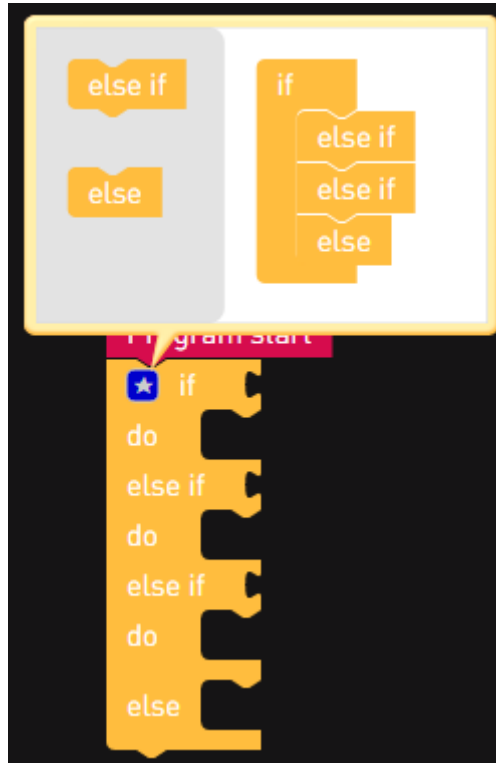
To add conditions to the If..Do block:

1. Click the If..Do block's  blue star icon.


A pop-up window appears.



2. Click either an else if block or an else block in the left gray area of the pop-up window, and drag and release it in place in the block on the right white area of the pop-up window. The conditions are dynamically added to the block. You may add several conditions.



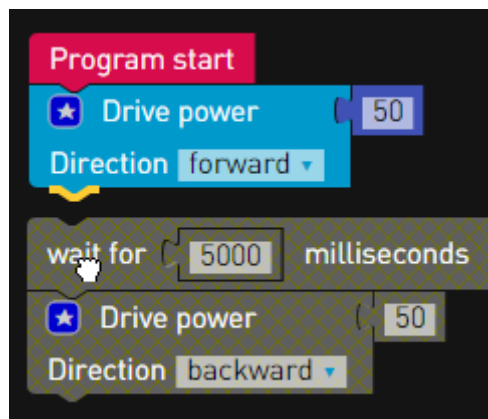
Click an else if or else block from the right white area of the pop-up window and drag and release it in the left gray area of the pop-up window to remove it from the block.

3. Click the  blue star icon to close the pop-up window.

5.4. DRAGGING BLOCKS

Click and drag a block to move it within a program.

Clicking and dragging a block that is not the last block will drag all connected blocks that are attached below and beside it.



5.5. DELETING BLOCKS

There are two ways to delete blocks as described in the following subsections.

5.5.1. Trashcan

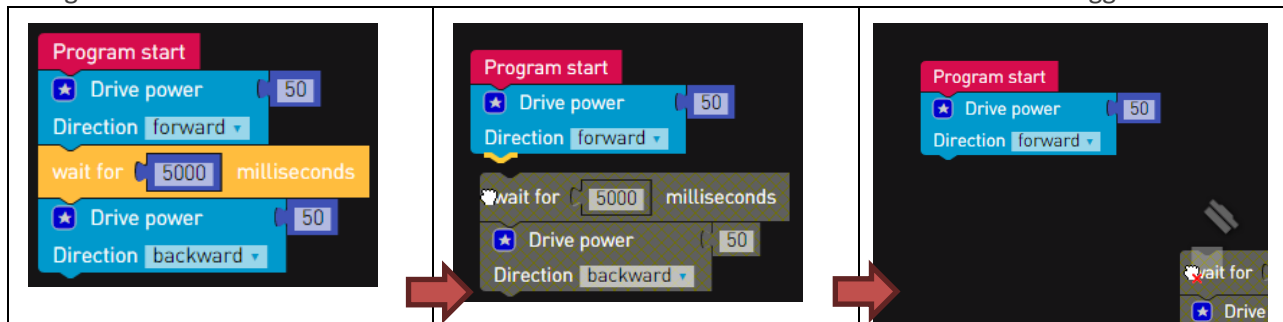
5.5.1.1. Deleting a Single Block

Drag a block onto the trashcan and release it to delete the block.



5.5.1.2. Deleting a Group of Blocks

Drag a block that has connected blocks below or beside it to the trashcan to delete all dragged block.



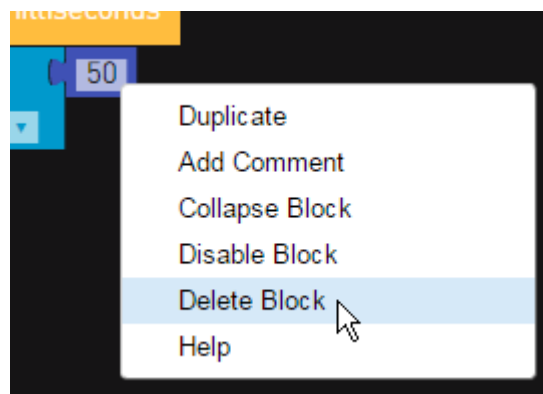
5.5.2. Context Menu

Right-clicking a block opens a context menu, whose options will depend on the block clicked.

5.5.2.1. Deleting a Single Block

To delete a block using its context menu:

1. Right-click a block.
2. Click **Delete Block**.

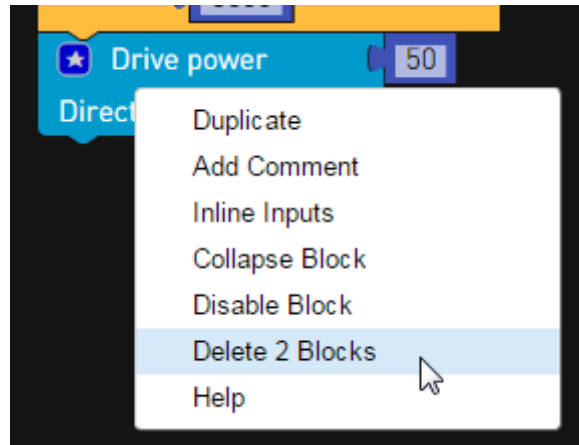


The block is deleted.

5.5.2.2. Deleting a Group of Blocks

To delete a group of blocks using a context menu:

1. Right-click a block that has one or more block connected horizontally.
2. Click Delete 2 blocks.



The group of blocks is deleted.

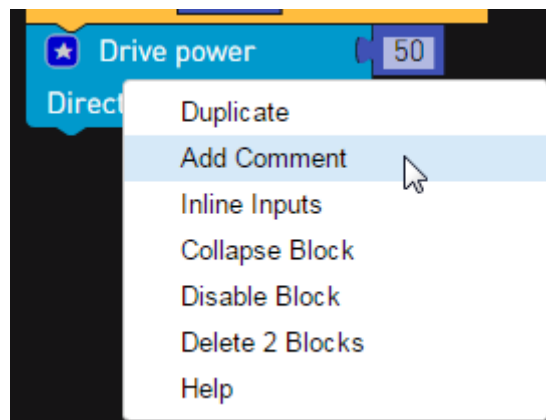
5.6. COMMENTS

Adding comments to a program is good practice and very useful for explaining the program to others, or reminding yourself of the purpose of how the program works.

5.6.1. Adding a Comment

To add a comment to a block:

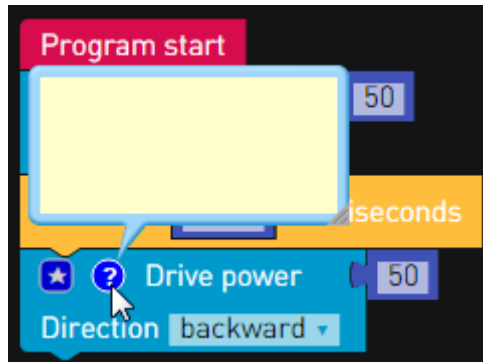
1. Right click a block.
2. Click **Add Comment**.



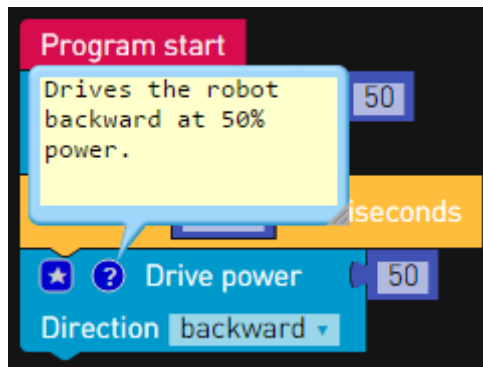
A  Comment icon is added to the block.

3. Click the  Comment icon.

A pop-up window appears, in which you can add comments to the block.



4. Click in the pop-up window.
5. Type a comment.



6. Click the  Comment icon again.

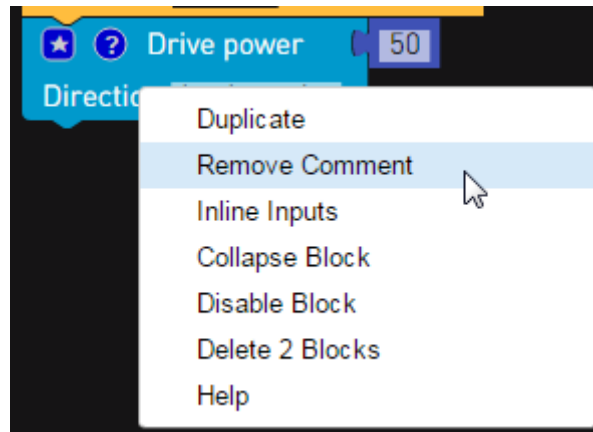
The comment pop-up is closed.

You can view the comment again by clicking the  Comment icon.

5.6.2. Removing a Comment

To remove a comment:

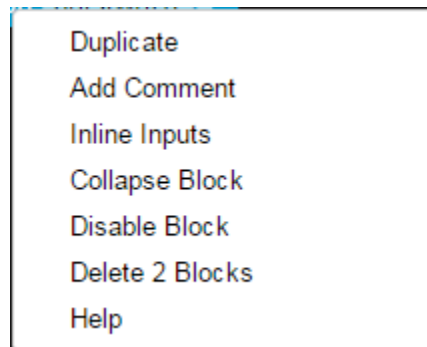
1. Right-click a block that has a comment.
2. Click **Remove Comment**.



The comment is removed.

5.7. CONTEXT OPTIONS

This section describes the options in a context menu that are displayed when right-clicking a block.




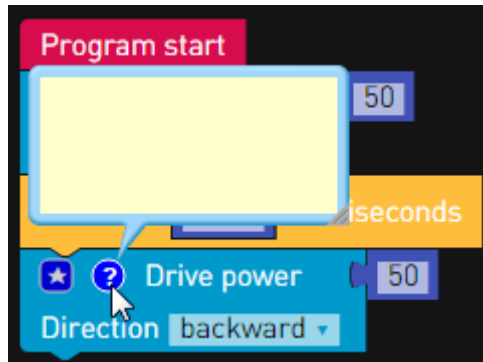
5.7.1. Duplicate

Click **Duplicate** to duplicate a block and all those horizontally connected to the block that you right-clicked.

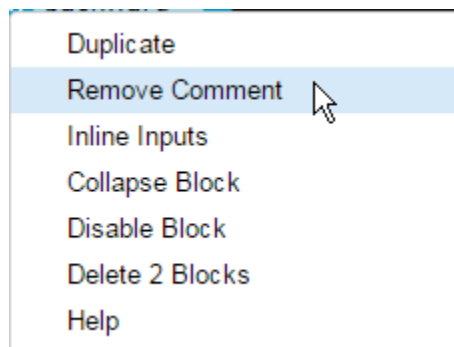
5.7.2. Add Comment / Remove Comment

Click **Comment** to add a  Comment icon to the block.

Click the  Comment icon to display a pop-up window in which you can add comments to the block. For more information, refer to section 5.6.1 Adding a Comment, above.



When a block has a Comment, the block's context menu has a Remove Comment option instead. Click Remove Comment to delete the comment.

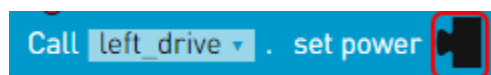


For more information, refer to section 5.6.2 Removing a Comment, above.

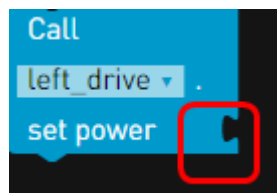
5.7.3. Inline Inputs / External Inputs

This option allows you to toggle the appearance of a block to one of the following:

- **Inline Inputs** (default for most blocks): Input blocks, such as data, are set within the block.



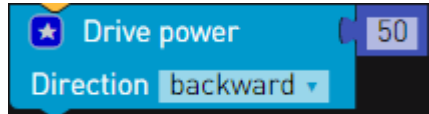

- **External Inputs**: Input blocks stick to the right end of the block.



Your code is not affected when changing to or from either of these two configurations. The changes are purely aesthetic and allow you to modify the appearance of the code so that it is easier to understand.

5.7.4. Collapse Block / Expand Block

This option collapses or expands the current block and those that are horizontally attached.

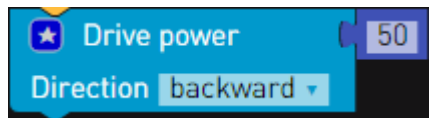
Expand Block	Collapse Block
	

It is useful to collapse blocks when a program is long and difficult to read. Collapsing blocks shortens a program so that it is easier to read and see the entire program. On the other hand, while blocks are collapsed, information is hidden.

The context menu option changes depending on the current setting.

5.7.5. Disable Block / Enable Block

This option disables or enables the current block and those that are horizontally attached.

Enable Block	Disable Block
	

Disabled blocks are ignored by the program. Instead of deleting blocks that you do not want but may need later, you can disable them and enable them when needed.

The context menu option changes depending on the current setting.

5.7.6. Delete Block

Click **Delete Block** to delete a block and those that are horizontally attached. For more information, refer to section 5.5 Deleting Blocks, above.

5.7.7. Help

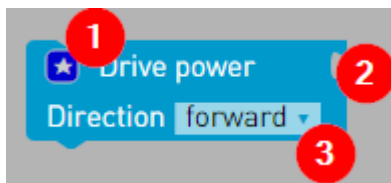

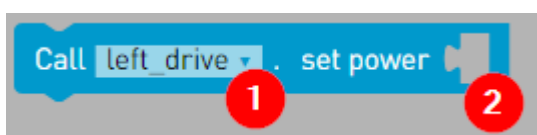


Click **Help** to display information about the block and an example program that uses the block.

5.8. BLOCK LIBRARY


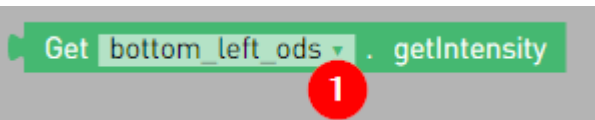
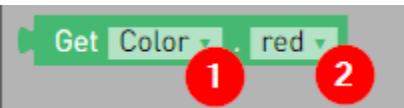
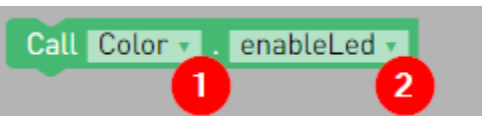
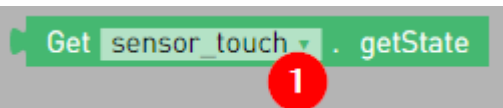
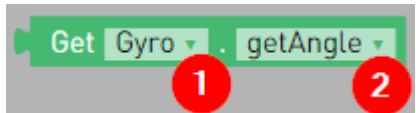
The Block Library contains the blocks that are used to write programs, divided by category. This section describes each block.

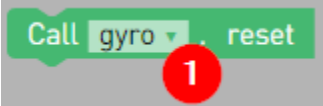

 *Note: Available blocks in your interface depend on your robot's configuration.*

5.8.1. Motor Blocks

Block	Description	Configuration
	Drives a robot (rotates both motors).	<ol style="list-style-type: none"> Click the  blue star icon to add additional parameters: <ul style="list-style-type: none"> Duration: How long the robot should drive for (milliseconds). Steering: The steering value for the drive. 0 drives the robot straight. A positive number turns the motor to the right. A negative number turns the robot to the left. The greater the magnitude of the number, the shorter the turn radius. The turn radius is also dependent on the drive power. <p>For more information, refer to section 5.3.3.1 Drive Block, above.</p> Add a number block to define the power (%) for the robot to drive at. A value of 100 rotates the wheel motors at full speed. Select the direction to drive in (forward/backward).
	Rotates a single motor.	<ol style="list-style-type: none"> Select which motor to rotate. Add a number block to define the power (%) for motor rotation.
	Sets the position of a servo. Servos are motors that can be set at specific rotation angles. They are used to control the gripper.	<ol style="list-style-type: none"> Select which servo to control. Each servo controls one of the gripper fingers. Add a number block to define the position to move the servo to.
	Raises or lowers an armMotor.	<ol style="list-style-type: none"> Select which armMotor to control. Select either up or down.

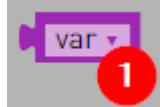
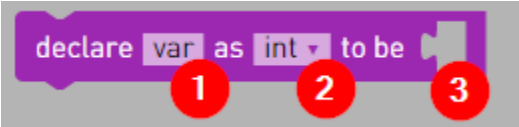

5.8.2. Sensor Blocks

Block	Description	Configuration
	Returns the distance of an object in front of the robot's ultrasonic distance sensor.	<ol style="list-style-type: none"> 1. Select the ultrasonic sensor to check. 2. Select whether to detect distance in inches or meters.
	Returns the light intensity detected by the robot's light sensor or Optical Distance Sensor.	<ol style="list-style-type: none"> 1. Select the sensor to check.
	Returns "1" if the defined color is detected, or False "0" if it is not.	<ol style="list-style-type: none"> 1. Select the color sensor to check. 2. Select the color to check.
	Enables or disables the LED on a color sensor.	<ol style="list-style-type: none"> 1. Select the color sensor to check. 2. Select enableLed to enable the LED or disableLed to disable it.
	Returns the state of the robot's bumper switch or touch sensor (pressed/not pressed).	<ol style="list-style-type: none"> 1. Select the bumper switch or touch sensor to check.
	Returns: <ul style="list-style-type: none"> • the angle of the robot's gyro, relative to its position when the program started. The angle continues past 360° or -360° infinitely. • the rate at which the angle of the gyro changes. 	<ol style="list-style-type: none"> 1. Select the gyro to check. 2. Select getAngle to check the angle of the robot's gyro, relative to its position when the program started or getRate to check the rate at which the angle changes.

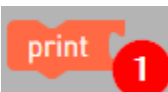
Block	Description	Configuration
	Resets the value of a sensor.	1. Select the sensor to reset.
	Returns the value of a sensor.	1. Select the sensor to check.

5.8.3. Variables Blocks



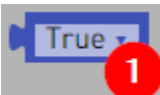
A variable is like a placeholder for a value of some sort. This value may be changed.


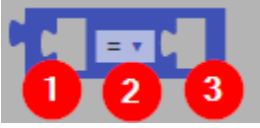

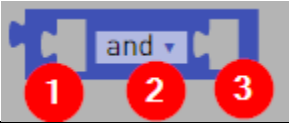
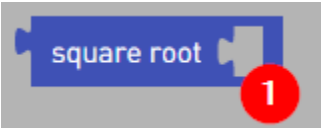


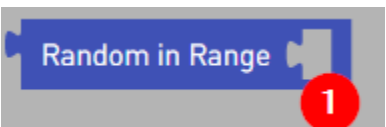
Block	Description	Configuration
	Calls a variable.	1. Select which variable to call.
	Creates a variable.	1. Define a name for the variable. 2. Select the variable type (int, float, String, bool). 3. Insert a number block to define the value for the variable.
	Changes the value of a variable.	1. Select the variable to change. 2. Insert a number block to define a new value for the variable.

5.8.4. Output Blocks


Block	Description	Configuration
	Prints a message to the top line of the robot's LCD display.	1. Add a text or number block. Its contents will be printed to the robot's LCD display.

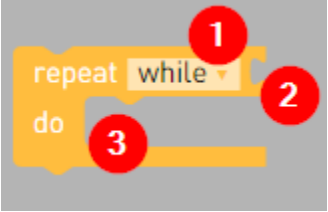


5.8.5. Data Blocks

Block	Description	Configuration
	Contains a number.	1. Type a numerical value. The value can be any real number including negative or rational numbers.
	Contains text.	1. Type text in the field.
	Represents a Boolean value (True/False).	1. Select True or False.

Block	Description	Configuration
	Performs a mathematical operation between two numbers.	<ol style="list-style-type: none"> 1. Insert a number block. 2. Select an operation (addition, subtraction, multiplication, exponentiation). 3. Insert a number block.
	Checks the relationship between two numbers and returns a Boolean value.	<ol style="list-style-type: none"> 1. Insert a number block. 2. Select a relationship to check (equal, not equal, less than, less than or equal to, more than, more than or equal to). 3. Insert a number block.
	Negates a number.	<ol style="list-style-type: none"> 1. Add a number block. The result of the two blocks together is the negative value of the number block.
	Checks two conditions and returns a Boolean value.	<ol style="list-style-type: none"> 1. Insert a number block. 2. Select the conditions (and, or, not, exclusive or). 3. Insert a number block.
	Performs a square root operation.	<ol style="list-style-type: none"> 1. Insert a number block. The result of the two blocks is the square root of the number block.
	Performs exponentiation.	<ol style="list-style-type: none"> 1. Insert a number block for the base. 2. Insert a number block for the exponent.
	Returns the absolute value of a number.	<ol style="list-style-type: none"> 1. Insert a number block.
	Returns a random number between 0 and the inserted number block.	<ol style="list-style-type: none"> 1. Insert a number block to define the maximum possible value for the random number.

5.8.6. Control Flow Blocks

Block	Description	Configuration
	Repeats a single block or multiple blocks in a loop a defined number of times.	<ol style="list-style-type: none"> 1. Insert a number block to define the number of times to repeat the loop. 2. Insert a single block or multiple blocks to repeat in a loop.

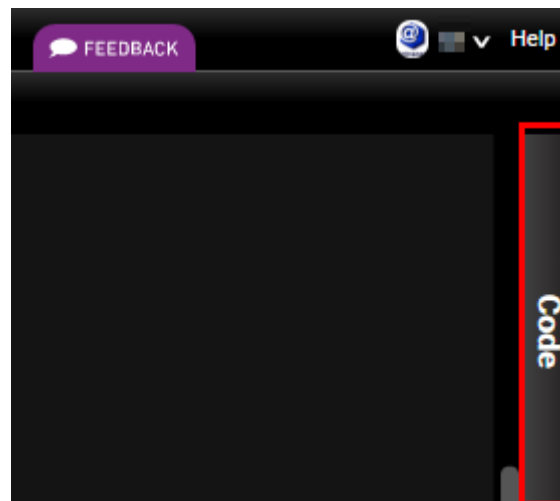
Block	Description	Configuration
	Repeats a single block or multiple blocks in a loop while or until a condition is true.	<ol style="list-style-type: none"> 1. Select while to repeat the loop while a condition is true, or until to repeat the loop while the condition is false. 2. Add a condition to check. 3. Insert a single block or multiple blocks to repeat in a loop.
	Repeats a single block or multiple blocks in a loop if a condition is true. Alternate conditions can be added as described in section 5.3.3.2 If..Do, above.	<ol style="list-style-type: none"> 1. Add a condition to check. 2. Insert a single block or multiple blocks to repeat in a loop.
	Pauses program execution for a defined time. This block does not affect the robots current behavior. It pauses the program from continuing to execute the next commands until the defined time has expired.	<ol style="list-style-type: none"> 1. Insert a number block for the time (milliseconds) to pause.

5.9. CODE PANE

The Code pane displays the code behind the Blocks program that you write. Any changes made in a Blocks program will dynamically change the code in the Code Pane.

5.9.1. Expanding the Code Pane

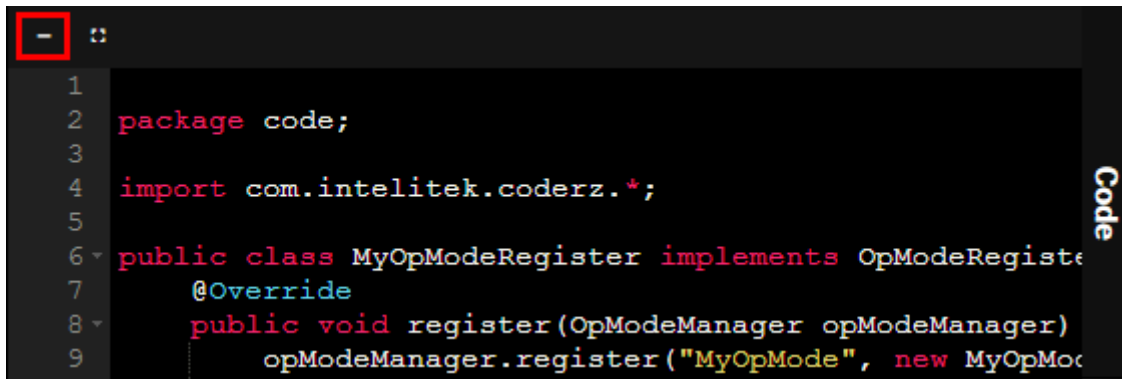
To expand the Code pane, on the top-right of the Blocks interface, click the collapsed Code pane.



5.9.2. Collapsing the Code Pane

To collapse the Code pane, click one of the following:

- The Code pane minimize button.



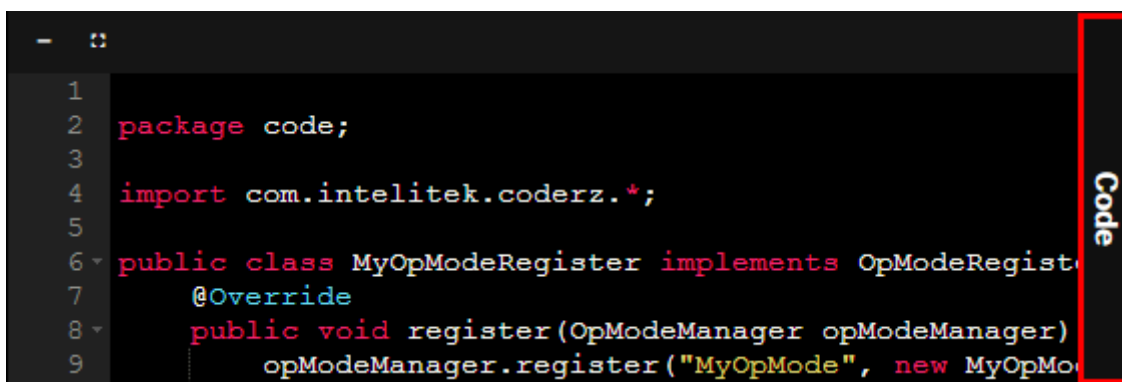
The screenshot shows the Coderz IDE interface. At the top left, there is a toolbar with a minus sign and a maximize button (two overlapping squares). The maximize button is highlighted with a red square. Below the toolbar, the Code pane displays the following Java code:

```
1  
2 package code;  
3  
4 import com.intelitek.coderz.*;  
5  
6 public class MyOpModeRegister implements OpModeRegister {  
7     @Override  
8     public void register(OpModeManager opModeManager)  
9         opModeManager.register("MyOpMode", new MyOpMode());  
}
```

On the right side of the Code pane, the word "Code" is written vertically.

or

- The Code bar.

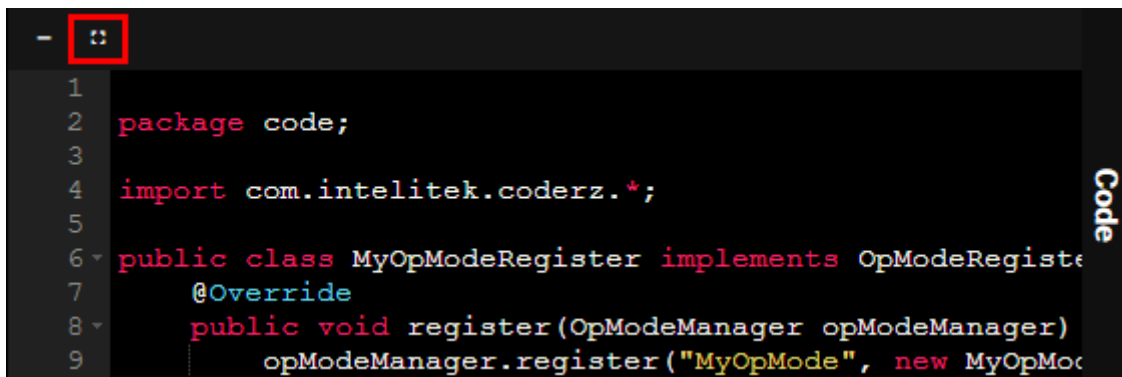


The screenshot shows the Coderz IDE interface. At the top left, there is a toolbar with a minus sign and a maximize button (two overlapping squares). The Code bar, which is a vertical bar on the right side of the Code pane, is highlighted with a red rectangle. The Code bar contains the word "Code" written vertically.

5.9.3. Maximizing / Restoring the Code Pane

The Code pane can be maximized. Doing so hides the Project Workspace area completely.

To maximize the Code pane, click the Full Screen button.



The screenshot shows the Coderz IDE interface. At the top left, there is a toolbar with a minus sign and a maximize button (two overlapping squares). The maximize button is highlighted with a red square. The Code pane is shown in full screen mode, displaying the same Java code as in the previous screenshot. On the right side of the Code pane, the word "Code" is written vertically.

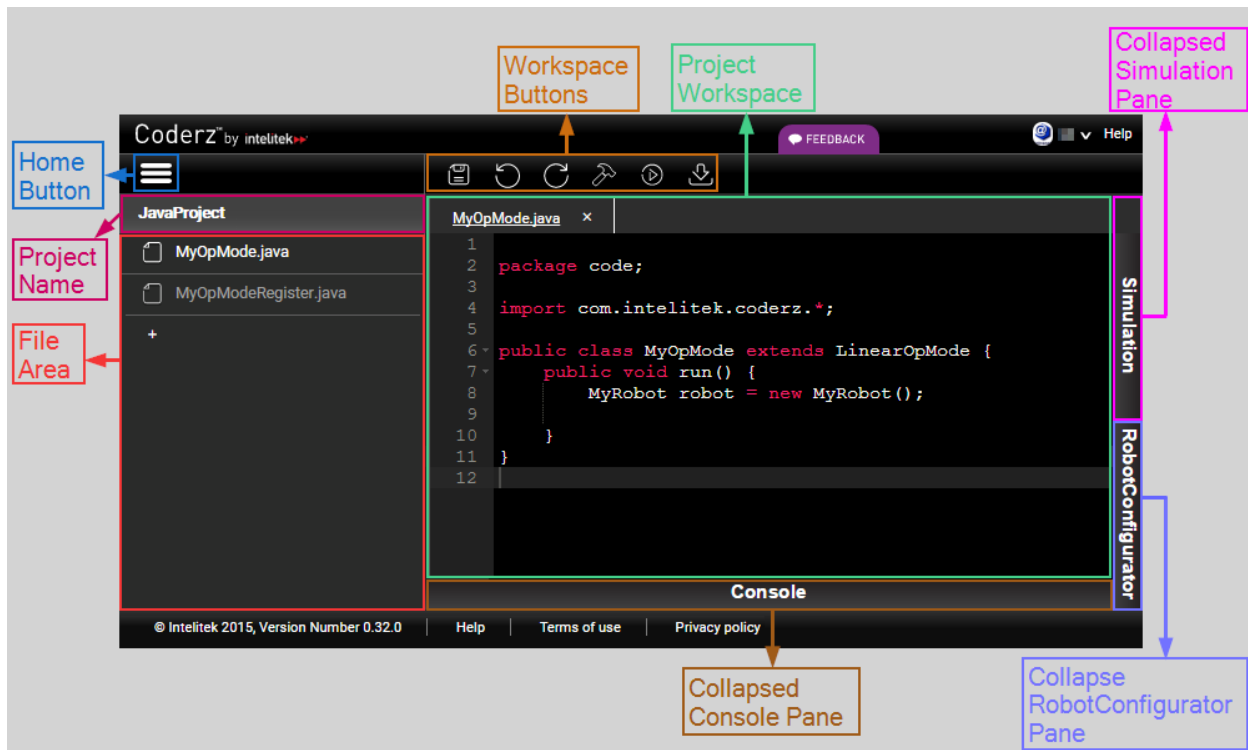
To restore the Code pane to its original width, click the Full Screen button again.

6. Code Interface

This section describes the following:

- Overview
- Managing Files
- Commenting
- Search
- Autocomplete
- Java Commonly Used Functions
- Java Sample Programs







6.1. OVERVIEW



This section describes the elements of the code interface. Refer to the image above for the location of these elements.

The code interface contains the following elements:

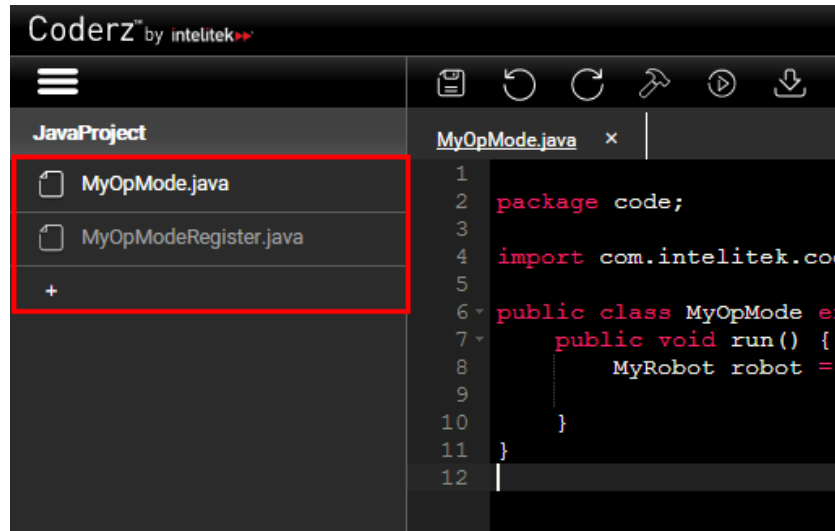
Name	Description
Home Button	Click the home button to return to the Welcome page of the Home interface.

Name	Description
Project Name	The name of the project is displayed in the Project Name area. Hover over the Project Name area to display the trashcan and pencil icons for deleting and renaming the project. For more information, refer to section 4.3 Renaming a Project and section 4.4 Deleting a Project above.
File Area	The File area contains all programs in the project.
Workspace Buttons	<p>The following Workspace buttons are above the Project Workspace:</p> <p> Save: Saves the open project.</p> <p> Undo: Undoes an action.</p> <p> Redo: Redoes an action that was undone.</p> <p> Compile: Compiles the program. After clicking this button, the Console is displayed with information about compilation. If there are problems with the program, details of the problems are written to the console. If there are no problems with the program, a success message is written to the console.</p> <p> Run Simulation: Compiles the program and runs it in simulation. After clicking this button, the Simulation Pane expands and the simulated robot runs the program.</p> <p> Download to Robot: Downloads the program to a physical robot. The robot must be connected via a USB cable to the PC. For more information, refer to section Running a Program on a Robot, below.</p>
Project Workspace	Programs are written in the Project Workspace.
Collapsed Simulation Pane	Expands the Simulation pane. The Simulation Pane contains a simulation of the robot as configured in the RobotConfigurator that can run programs. For more information, refer to section 7.1 Simulation, below.
Collapsed RobotConfigurator Pane	Expands the RobotConfigurator Pane. In this pane you can configure your robot and its ports. For more information, refer to section 7.2 RobotConfigurator, below.
Collapsed Console Pane	Expands the Console Pane. Program information including compilation details and program running details is written to the console. For more information, refer to section 7.3 Console, below.

6.2. MANAGING FILES

A Java project can contain multiple files.

Project files appear as a list in the File Area.



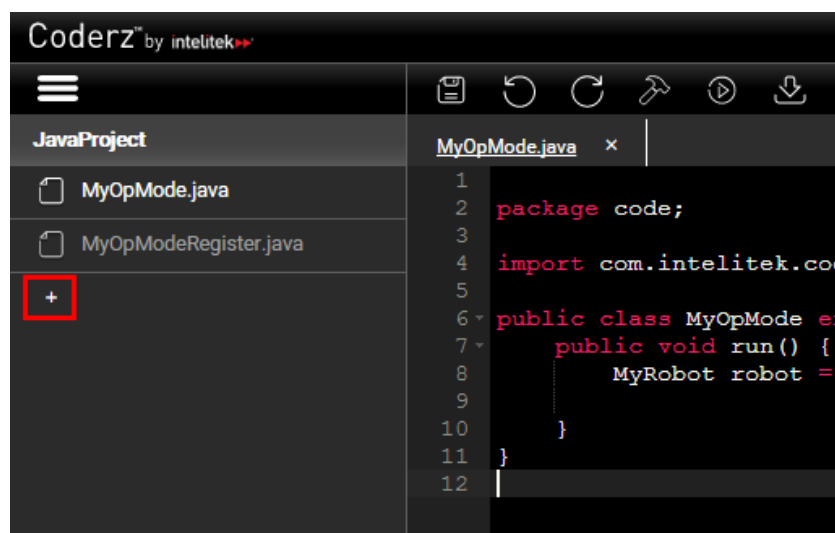
This section describes the following:

- Adding Files
- Renaming a File
- Opening/Closing a File
- Deleting a File

6.2.1. Adding Files

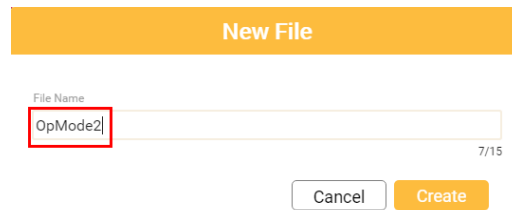
To add a file to a project:

1. Below the list of existing files in the File Area, click the + icon.



The New File dialog box appears.

2. In the File Name field, name the file.



New File

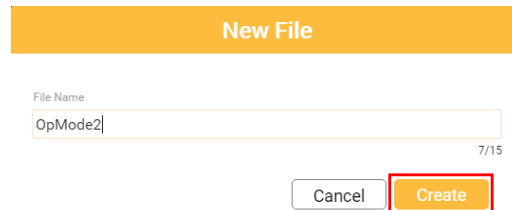
File Name

OpMode2

7/15

Cancel Create

3. Click **Create**.



New File

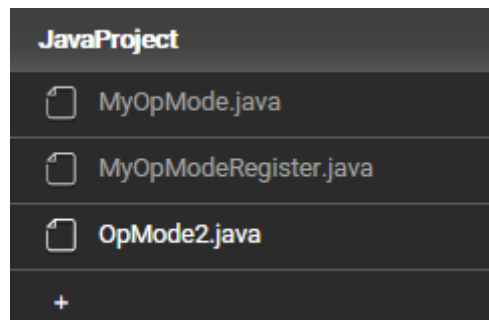
File Name

OpMode2

7/15

Cancel Create

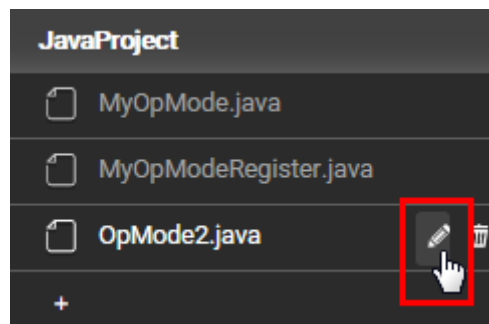
The file is created and the new .java file appears in the File Area.



6.2.2. Renaming a File

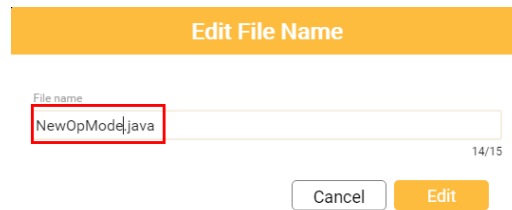
To rename a file:

1. In the File Area, hover over the filename and click the pencil icon.

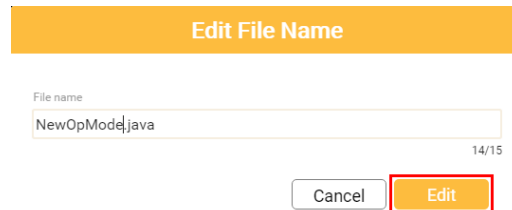


The Edit File Name dialog box appears.

2. In the File name field, rename the file.



3. Click **Edit**.



The file is renamed.

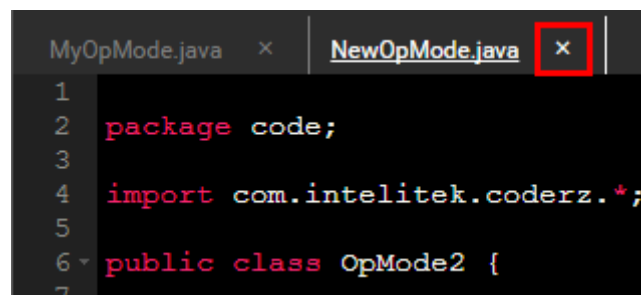
6.2.3. Opening/Closing a File

Open files appear as tabs at the top of the Project Workspace.

To open a file, in the File Area click the name of a file.



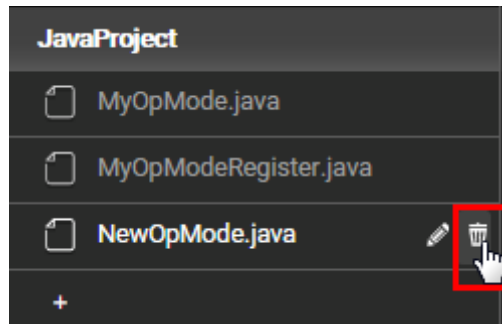
To close a file, on the file's tab, click the x.



6.2.4. Deleting a File

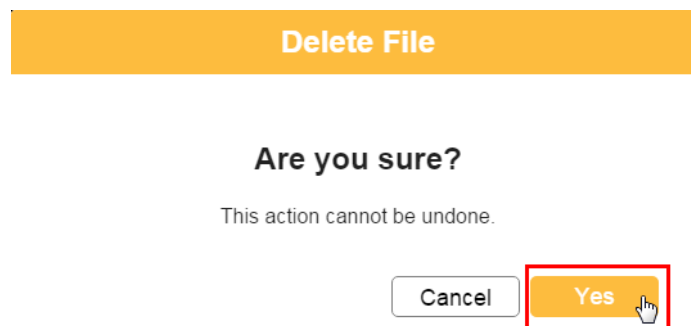
To delete a file:

1. In the File Area, hover over the filename and click the trashcan icon.



The Delete File dialog box appears.

2. Click Yes.



The file is deleted.

6.3. COMMENTING

Adding comments to a program is good practice and very useful for explaining the program to others, or reminding yourself of the purpose of how the program works.

Comments are ignored when the program is executed.

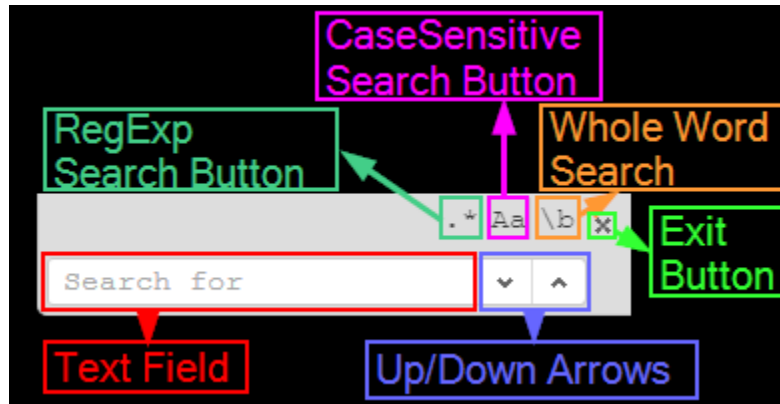
To add a comment, add two forward slashes followed by the comment.



6.4. SEARCH

You can search within the code in the Project Workspace using the Search box. This section describes the Search box and how to search for a String.

6.4.1. Search Box



This section describes the elements of the Search box. Refer to the image above for the location of these elements.

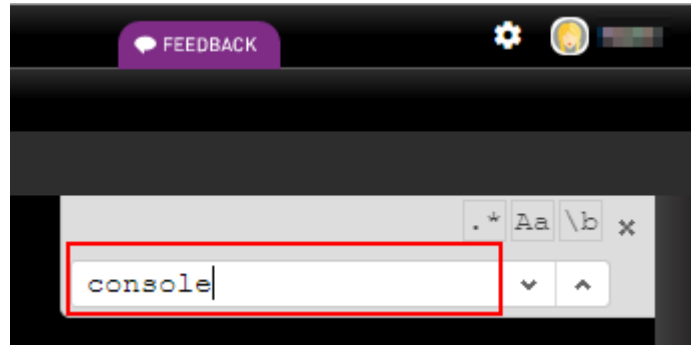
The Search box contains the following elements:

Name	Description
Text Field	In the Text Field, enter the String to search for.
Up/Down Arrows	Click v to search upward in the program or ^ to search downward.
Exit Button	Click X to close the Search box.
RegExp Search Button	Click the RegExp Search button to allow regular expressions in the search. For example, an asterisk can be used to represent any character.
CaseSensitive Search Button	Click the CaseSensitive Search button to make the search case sensitive.
Whole Word Search	Click the Whole Word Search button to only search for whole words. When enabled, if the search String is part of a word, it will be ignored in a search.

6.4.2. Search for a String

To search for a String:

1. Press **Control** and **F** simultaneously.
The Search box appears.
2. Type a search string in the field.



3. Press V to search upward in the program or ^ to search downward.

6.5. AUTOCOMPLETE

When adding the first of any of the following pairs to a program, the second is automatically added:

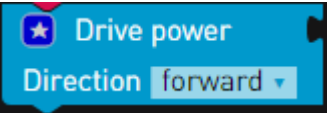
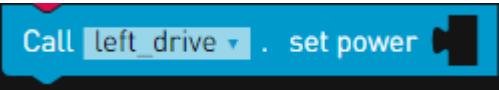


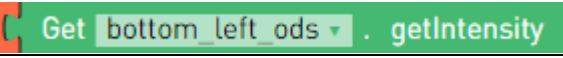
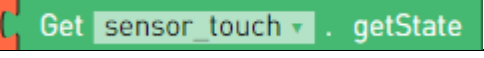
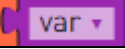
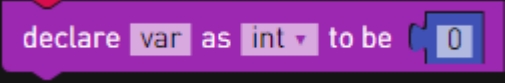
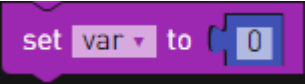

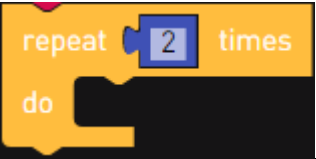
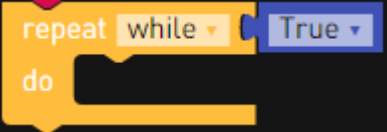
- Round brackets: ()
- Braces: { }
- Quotation marks: " "


6.6. JAVA COMMONLY USED FUNCTIONS

This section provides the Java code for commonly used functions.

The full list of the Java functions, parameters and their descriptions for Coderz can be found here:
<http://ec2-54-213-86-65.us-west-2.compute.amazonaws.com/java-doc/index.html>.

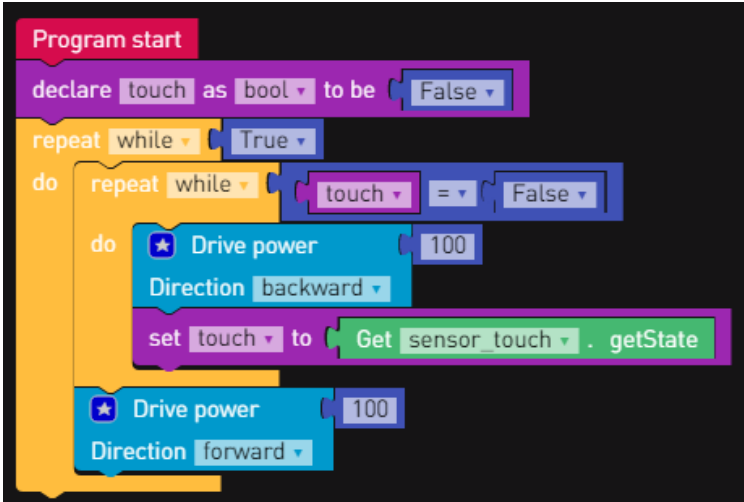
The table below shows blocks from the Blocks interface and the equivalent Java code.

Category	Block Function and Parameter Blocks	Equivalent Java Code and Parameters
Motor		<code>robot.drive(, Direction.Forward);</code>
Motor		<code>robot.getLeft_drive().setPower();</code>
Motor		<code>robot.getLeft_finger().setPosition();</code>
Motor		<code>robot.getArm().up();</code>
Sensor		<code>robot.getBottom_left_ods().getIntensity()</code>
Sensor		<code>robot.getSensor_touch().getState()</code>
Variables		<code>var2;</code>
Variables		<code>int var2 = 0;</code>
Variables		<code>var2 = 0;</code>
Output		<code>Console.print(0);</code>
Control Flow		<pre>for (int __index__1 = 0; __index__1 < 2; __index__1++) { } </pre>
Control Flow		<code>while (true) {}</code>

Control Flow		<pre>if () {} else if (false) {} else {}</pre>
--------------	---	---

6.7. JAVA SAMPLE PROGRAMS

This section provides some sample programs that demonstrate the implementation of some common Coderz Java functions.

Program 1	
Description: The state of the robot's Bumper Switch is written to a variable. While the Bumper Switch is not pressed, the robot reverses.	
Blocks Program	Equivalent Java Program
	<pre> public void run() { MyRobot robot = new MyRobot(); boolean touch = false; while (true) { while (touch == false) { robot.drive(100, Direction.Backward); touch = robot.getSensor_touch().getState(); } robot.drive(100, Direction.Forward); } } </pre>

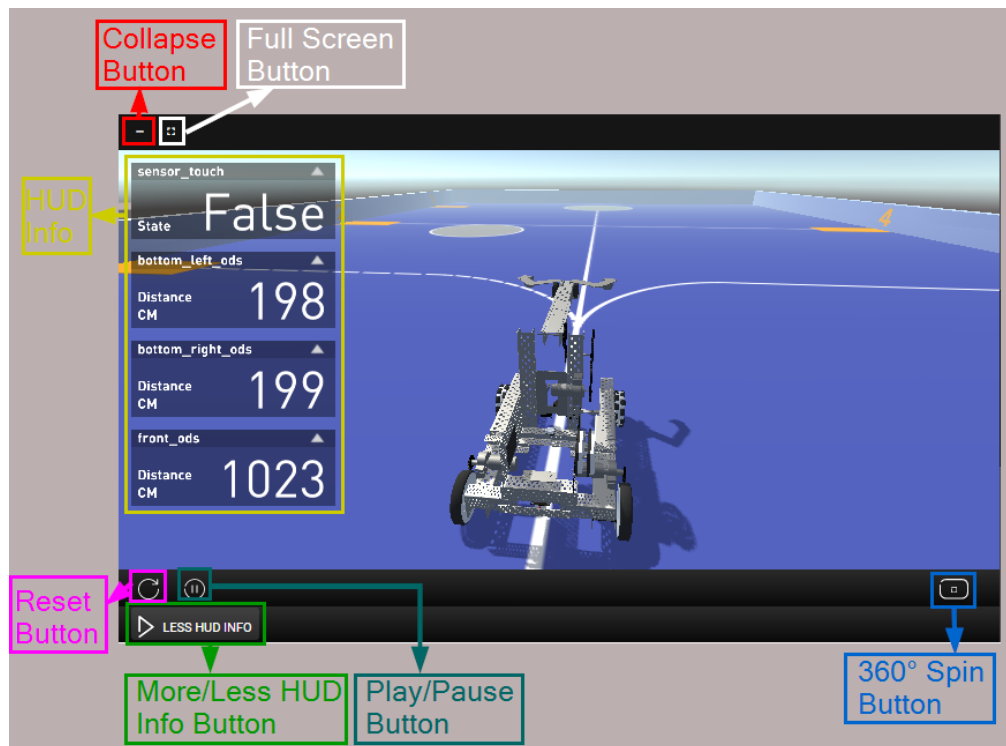
7. Project Interface Panes

This section describes the panes that are common to all project interfaces.

7.1. SIMULATION

The Simulation Pane contains a simulation of the robot as configured in the RobotConfigurator that can run programs.

7.1.1. Overview



This section describes the elements of the Simulation pane. Refer to the image above for the location of these elements.

The Simulation pane contains the following elements:

Name	Description
HUD Info	Displays sensor values. This area can be shown or hidden by clicking the More/Less HUD Info button.
Collapse Button	Collapses the Simulation pane.
Full Screen Button	Maximizes the Simulation pane and hides the Project Workspace area completely. To restore the Simulation pane to its original width, click the Full Screen button again.

Name	Description
Simulator	The Simulator contains the actual simulation of the robot. For information about controlling the Simulator, refer to section 7.1.2 Control, below. The Simulator scene can be changed using the RobotConfigurator. For more information, refer to section 7.2.1 Overview, below.
Reset Button	Resets the Simulator.
More/Less HUD Info button	Shows or hides the HUD Info area.
Play/Pause Button	Plays or pauses a program running in the Simulator.
360° Spin Button	Spins the Simulation view around the robot.

7.1.2. Control

This section describes the following control operations in the Simulator:

- Zoom
- Pan
- Reset

7.1.2.1. Zoom

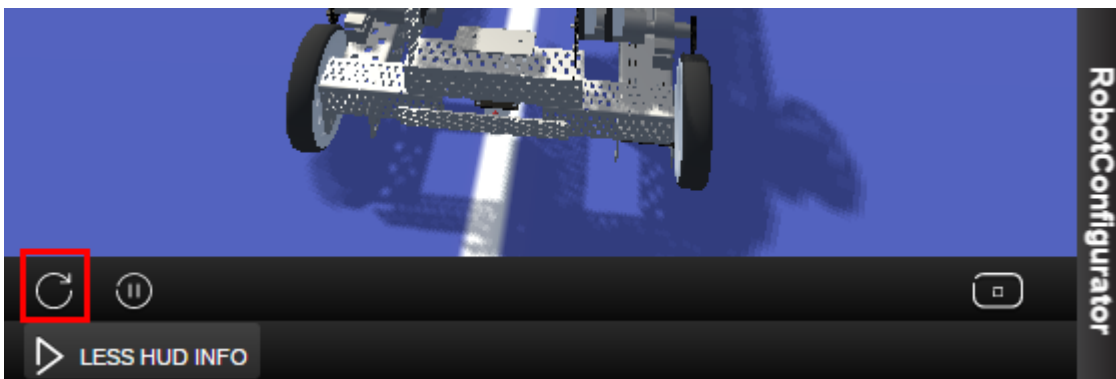
To zoom in or out in the Simulator, with the cursor on the Simulator scroll the mouse scroll wheel up and down.

7.1.2.2. Pan

To pan in the Simulator, click in the Simulator and move your mouse around.

7.1.2.3. Reset

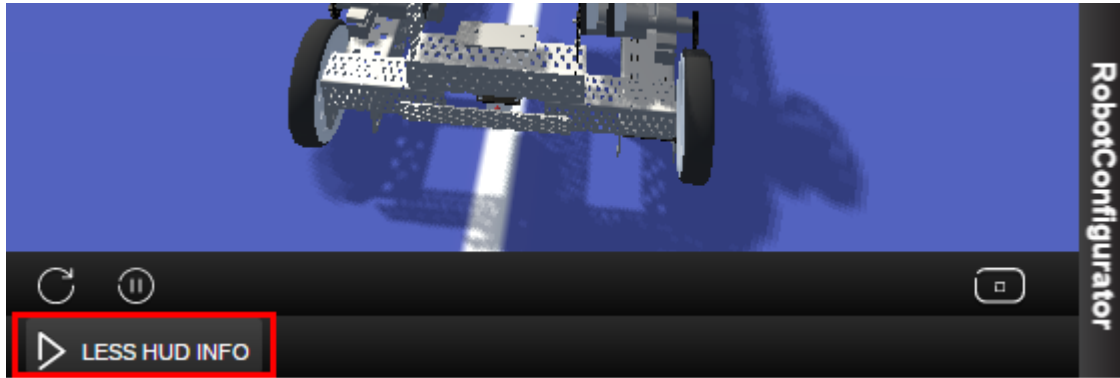
To reset the Simulator, click the Reset button.



7.1.3. HUD Info

The HUD Info area displays sensor values. It is useful to have the HUD Info area open and to pay attention to the sensor values while a program is running. It can help to fine-tune a program or to check why a program is not running as expected.

To show or hide the HUD Info area, click the More/Less HUD Info button.



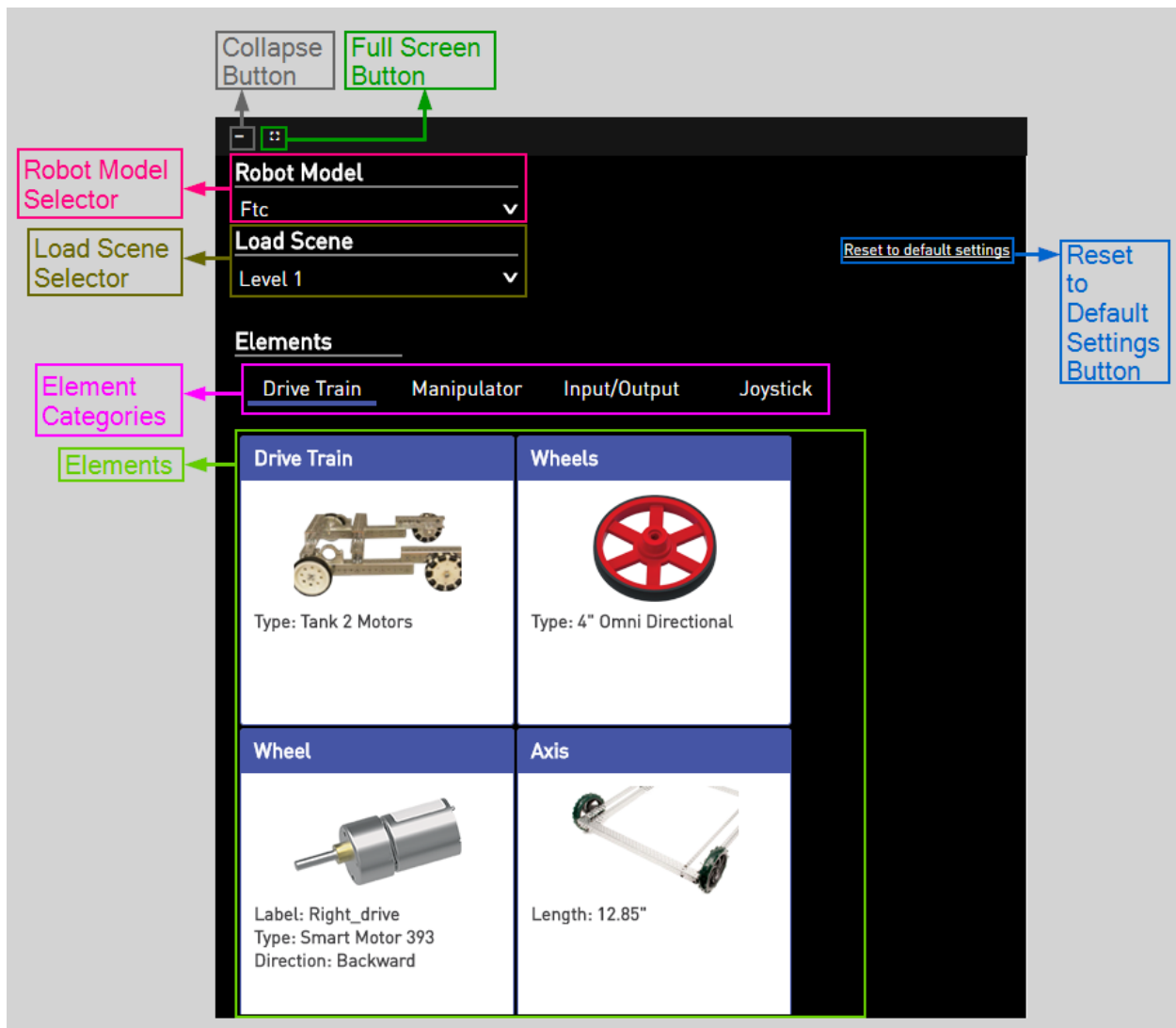
7.2. ROBOTCONFIGURATOR

A project must be configured for your physical robot so that the program knows what elements it has and where relevant, what ports they are connected to. You can configure your robot using the RobotConfigurator.

This section describes the following:

- Overview
- Adding an Element
- Editing an Element
- Deleting an Element



7.2.1. Overview



This section describes the elements of the RobotConfigurator pane. Refer to the image above for the location of these elements.

The RobotConfigurator pane contains the following elements:

Name	Description
Collapse Button	Collapses the RobotConfigurator pane.
Full Screen Button	Maximizes the RobotConfigurator pane, while hiding the Project Workspace area completely. To restore the RobotConfigurator pane to its original width, click the Full Screen button again.
Robot Model Selector	Select your robot from the robot builds in the drop-down menu.
Load Scene Selector	Select a scene for the Simulation from the scenes in the drop-down menu.
Element Categories	Elements are divided by category. Click a category to display its elements.

Name	Description
Elements	<p>Each Element Category's elements appear when the category name is clicked.</p> <p>Some elements have the following icons on the top-right:</p>  <ul style="list-style-type: none"> Click the trashcan icon to delete the element. Click the pencil icon to configure the element's name and the port that it is connected to.  <p>Some Element Categories have an icon beside its elements. Click the icon to add a new element.</p>
Reset to Default Settings Button	Resets the configuration to its default.

7.2.2. Adding an Element

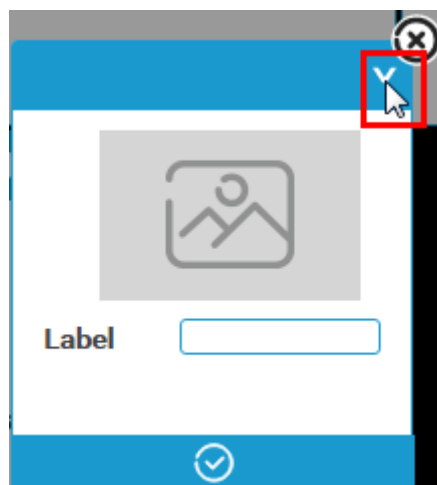
For some Element Categories you can add elements.

To add an element:

1. Click the  icon.

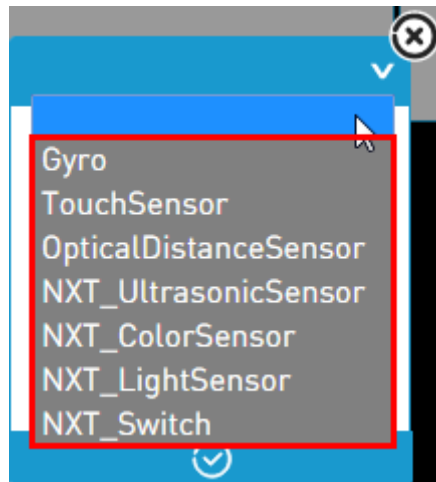
The Select element window appears.

2. Click the  icon.

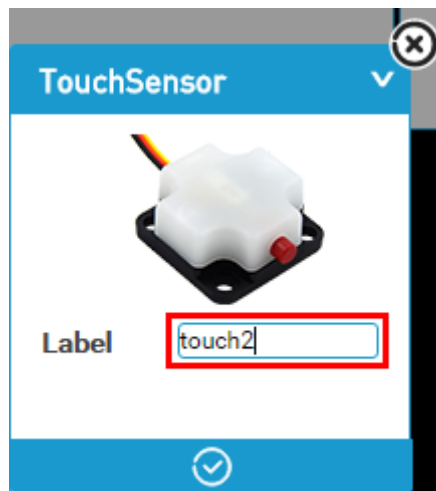


A drop-down list appears.

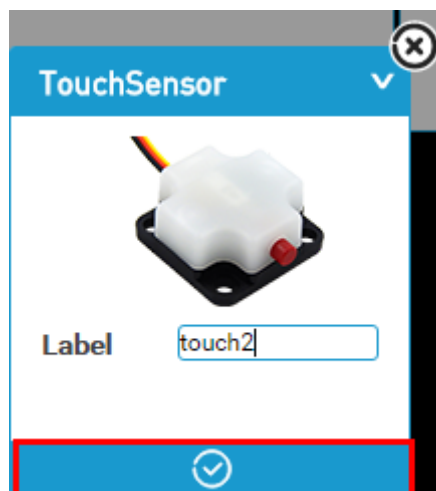
3. Select an element.



4. In the Label field, name the element.



5. Click the  icon.

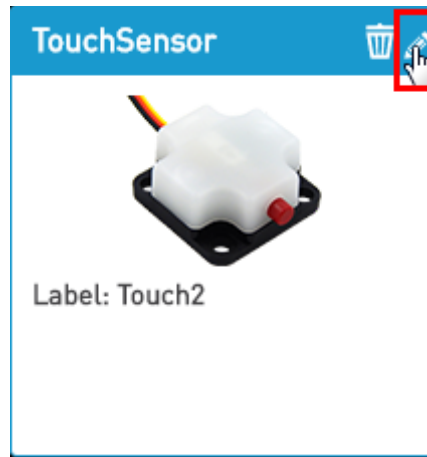


The element is added.

7.2.3. Editing an Element

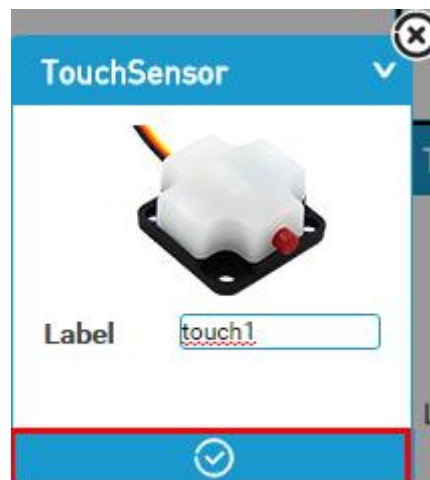
To edit an element:

1. On the top-right of an element, click the pencil icon.



2. Make the required changes to the element.

3. Click the  icon.

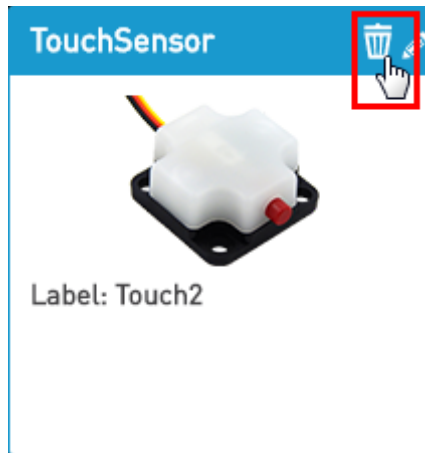


The changes are saved.

7.2.4. Deleting an Element

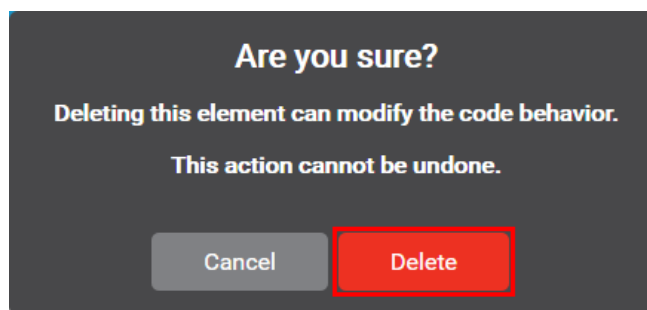
To delete an element:

1. On the top-right of an element, click the trashcan icon.



The Are you sure? dialog box appears.

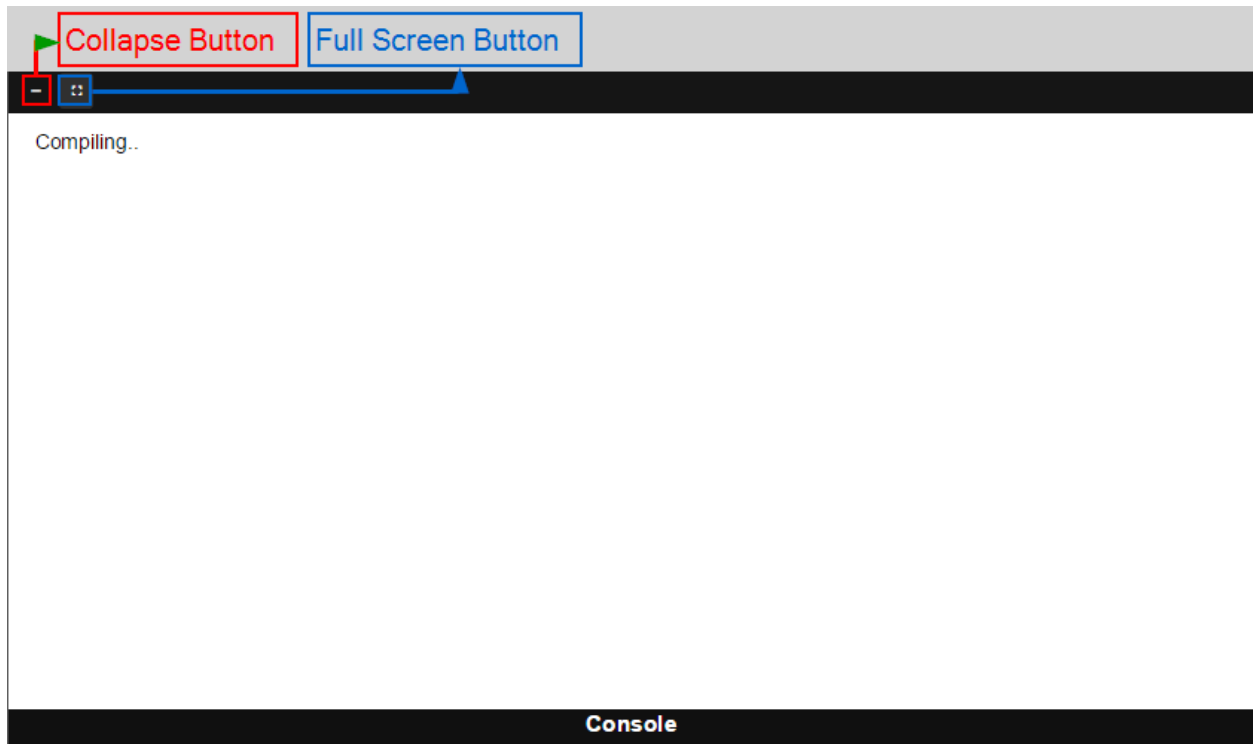
2. Click Delete to confirm that you want to delete the element.



The element is deleted.

7.3. CONSOLE

Program information including compilation details and program running details is written to the console.



This section describes the elements of the Console pane. Refer to the image above for the location of these elements.

The Console pane contains the following elements:

Name	Description
Collapse Button	Collapses the Console pane.
Full Screen Button	Maximizes the Console pane and hides the Project Workspace area completely. To restore the Console pane to its original size, click the Full Screen button again.

8. Running a Program on a Robot

Programs can be downloaded to your FTC robot from either of the project interfaces (Blocks, Java). The program is included in an FTC Robot Controller app which is installed on the Robot Controller Android device. Your program can then be run from the Driver Station as described in this section.

The programs will only run on an FTC robot like the one in the Coderz simulation. The robot's configuration will have to match the configuration in the Robot Configurator pane for the project that contains the program.

For information about building an FTC robot and using the FTC Robot Configurator and FTC Device Driver Android devices and apps, refer to the FTC Robot Building Resources:

<http://www.firstinspires.org/node/5181>.


8.1. PREPARING THE ROBOT CONTROLLER ANDROID DEVICE

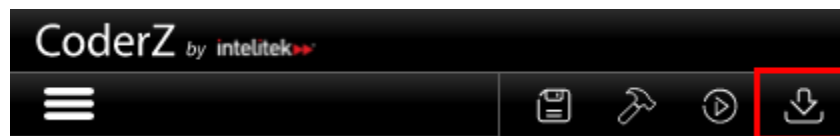
To install a Robot Controller app with your Coderz program (.apk file), you will first need to change the setting on your Android device to allow installation of non-market applications by selecting the checkbox next to "Unknown Sources" in the following location: Settings > Security or Settings > Security & Screen Lock.



8.2. DOWNLOADING TO A ROBOT

To download a Robot Controller app with your program to a robot:

1. If the program you want to run on your robot is not already open, open it.
2. Click the  Download to Robot button.



Note: The first time you download a program, you will be prompted to download an application called the Robot Downloader. Download and unzip the Zip file, and then run the setup to install the application.

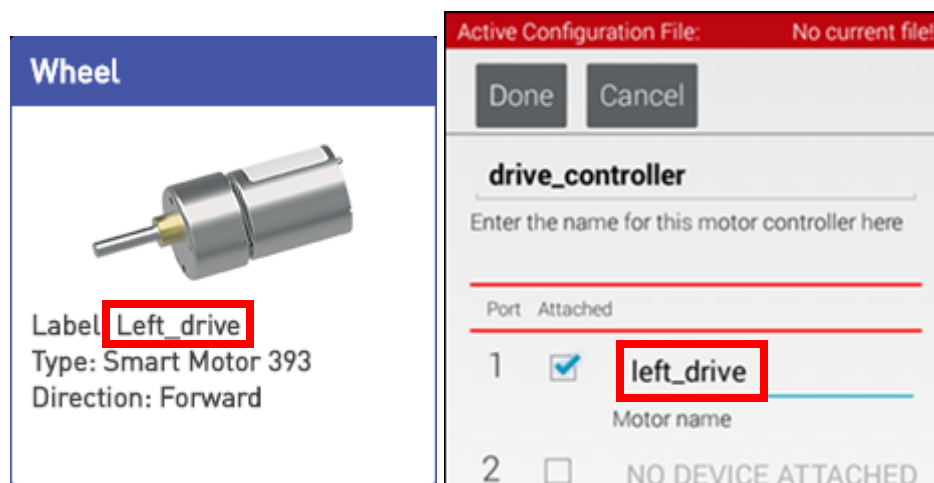
The program compiles and an .apk file is downloaded to your computer.

3. Attach an Android device to your computer with a USB cable.
4. Copy the published .apk file over to the Android device. Make a note of where you move the file to.
5. Locate the file using a file explorer and run it to install the app on your Android Device.

8.3. CONFIGURING THE ROBOT

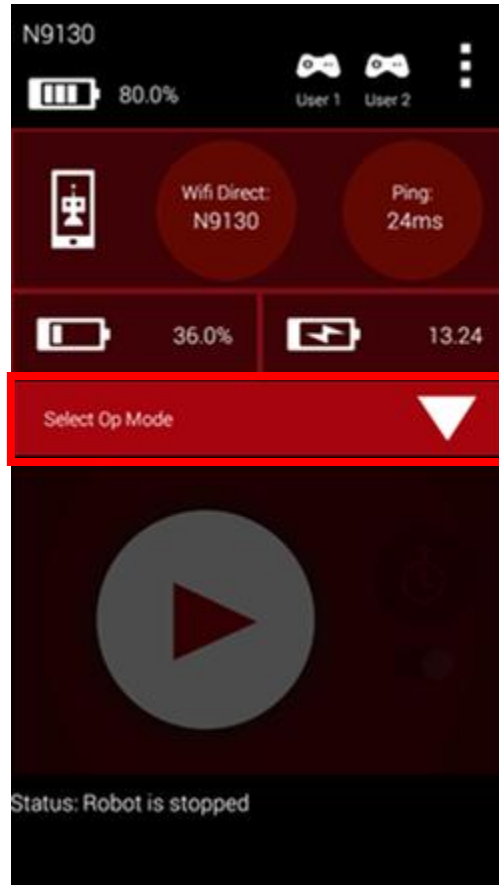
Before running your program, with the Robot Controller app installed and the Robot Controller Android device connected to your robot you must configure the hardware.

Motors and sensors must be named exactly as they are in the properties for their components in App Inventor.



8.4. RUNNING THE PROGRAM

To run the program you must pair the Driver Station Android device with the Robot Controller. Once paired, you will be able to run your program by pressing Select Op Mode and selecting the name of your program.



9. Classes

Teacher accounts have an additional Classes icon on the left of the Home Interface.



Clicking the icon displays the Classes page.

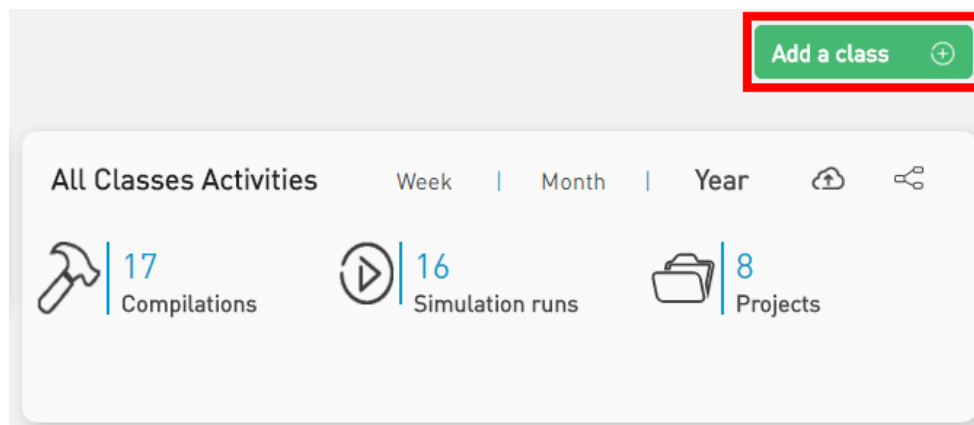
The Classes page contains the following areas:

- **Your Classes:** Lists your classes. Click a class to see class settings and statistics, details of enrolled students, and to enroll additional students.
- **All Classes Activities:** Displays global statistics for all of your classes, including the number of compilations, simulations runs and projects across all classes. Statistics can be filtered by week, month or year, and can be exported and shared using the icons on the top-right of the area.

9.1. CREATING A CLASS

To create a Coderz class:

1. On the Classes page of the Home interface, click **Add a Class**.



2. Define the time, name, semester and year for the class.

STEP 1

Add a Class

Class Time

Choose a day ▼

Choose time ▼

Class Name

Semester

Choose a semester ▼

Year

Choose a year ▼

Next >

3. Click **Next**.

STEP 1

Add a Class

Class Time

Monday ▼

08:00 AM ▼

Class Name

Programming 101

Semester

Winter ▼

Year

2015 ▼

Next >

- If you do not already have a completed CSV file with student details, click **Download template** and add the details for the students that you want to enroll into the course. Each student's details must occupy its own row, and must be in the format: first name, last name, email address. Save the file once the students' details have been added.

STEP 2
Add a Class

● **Upload a CSV File**
Make sure the file you are about to upload contains First name, Last name and Email.

Upload File **Download template**

● **Import Class from LearnMate (Coming soon...)**

Import File

< Previous Next >

- Click **Upload File**.

STEP 2
Add a Class

● **Upload a CSV File**
Make sure the file you are about to upload contains First name, Last name and Email.

Upload File Download template

● **Import Class from LearnMate (Coming soon...)**

Import File

< Previous Next >

- Navigate to and select the completed CSV file with the student's details.

File name:

7. Click **Next**.

STEP 2
Add a Class

✓

●

Upload a CSV File
Make sure the file you are about to upload contains First name, Last name and Email.
[Upload File](#) [Download template](#)

●

Import Class from LearnMate (Coming soon...)
[Import File](#)

< Previous

Next >


8. The class is created. Click **Done** to open the Class page for the new class.

Success :)

✓

✓

You have just created this new class:



Class Name: **Programming 101**
Students: 5
Time: 08:00 AM

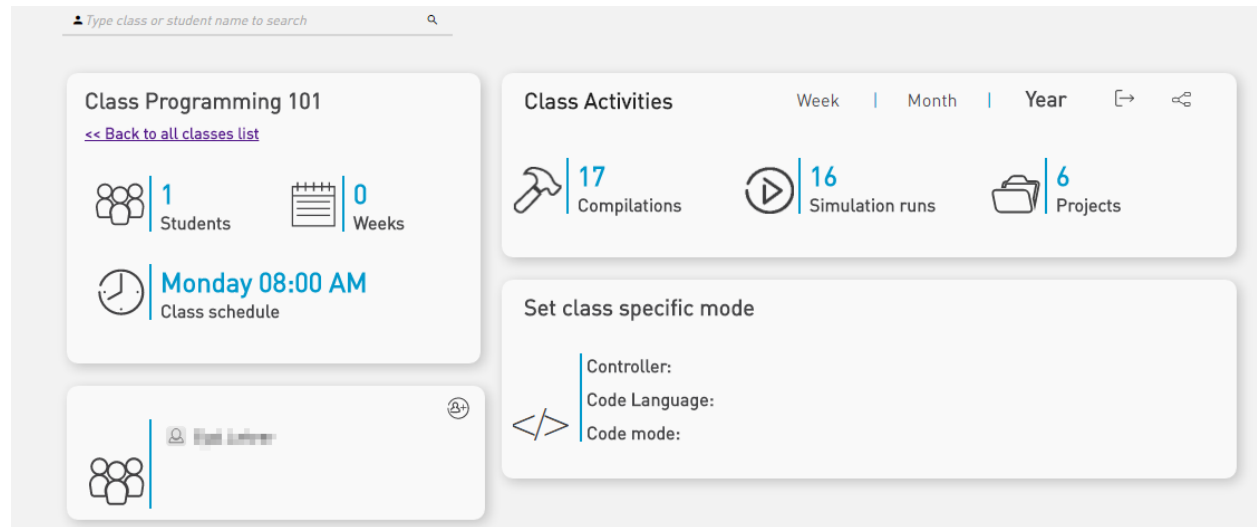
[More information on how to manage your class](#)









Done

9.2. MANAGING A CLASS

The Class page displays information about a class. You can access a class page by clicking the class name in the Class page of the Home interface.

This section describes the elements of the Class page.



Item	Description
	Search: Type a student name to search for the student.
Class Programming 101	Class Name: Hover over the class name and click the pencil icon to edit the name.
 1 Students	Number of Students: Hover over the number of students and click the pencil icon to upload a CSV file to add more students to the course.
 Monday 08:00 AM Class schedule	Class Schedule: Hover over the class schedule and click the pencil icon to edit the schedule.
	Add a Student. Click this button to add an individual student to the class.
 Mr Brown	Student Name: Click a student name to display the student's class activities. These activities can be filtered by day/month/year and can be exported or shared.
 17 Compilations  16 Simulation runs  6 Projects	Class Activities: Displays class activities. These activities can be filtered by day/month/year and can be exported or shared.
 Controller: Code Language: Code mode:	Class Specific Mode: Hover over any of the three items and click the pencil icon to define the controller, code language or code mode for the class.