

SYNTHIAM

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The Robot Program Episode 022: Detect Face and Wave - EZ-Script

This lesson will demonstrate how to use EZ-Script to have the robot wave once it detects a face. At the end of this lesson, readers will be able to enable facial detection and code a basic script using EZ-Script. Follow along with The Robot Program Episode 022: Detect Face and Wave - EZ-Script. View the video episode here: <https://www.ez-robot.com/Tutorials/Lesson/102>

Last Updated: 6/12/2018

📄 Professor E's Overview

This lesson demonstrates how to enable facial detection and how to trigger an action using **EZ-Script**.

Always start with a fully charged, disconnected robot. Load **EZ-Builder** and connect to the robot. Open the bare robot project, which provides a clean workspace without unnecessary controls.

Add the control for the camera and test the camera view. The camera will provide peripheral information (external input/output that can be used to provide information).

In the **Tracking** tab of the **Camera Device**, select **Script** and the execution checkbox. There are two different scenarios for when a tracking script will be executed- either when tracking begins or when tracking ends.

Click on the **Pencil** icon next to **Tracking Start** to access the **Blockly** workspace, and then change the tab to **EZ-Script**.

There are multiple ways to add code in the **EZ-Script** workspace. Right-click to view options, scroll through the **Cheat Sheet**, or start typing to be prompted by Intellisense. Line numbers are provided on the left-hand side for debugging and organization. It is recommended practice to use a consistent naming convention when coding.

Add the **ControlCommand(“Auto Position”, AutoPositionAction, “Wave”)** line of code, and then add **SayEZB** along with the desired text to be spoken. The text will be stored as a string of characters. Review the code to understand how it will be executed. Save the script and return.

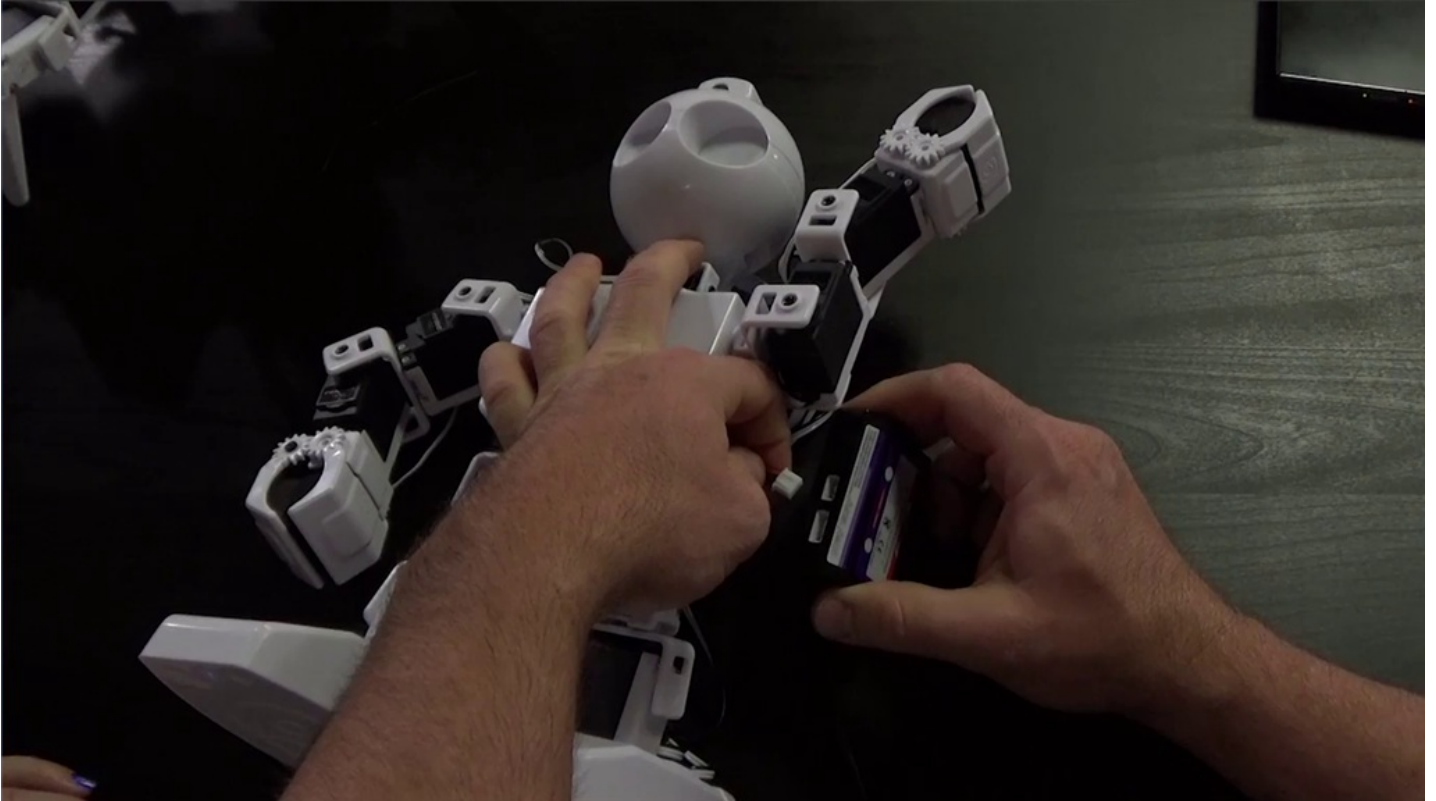
When a face is detected, the two lines of code will be executed, causing the robot to wave and speak the chosen text.

Remember to disconnect, power off, and charge the robot when finished.



Step 1

Learn how to use **EZ-Script** to make the robot wave when it recognizes a face. This example will use **Revolution JD**, but this exercise can also be done with **Revolution Six** and **Revolution Roli**. Always start with a fully charged robot and be sure to disconnect from the battery charger carefully.



Step 2

Power on the fully charged robot. Load the **EZ-Builder** software.



Step 3

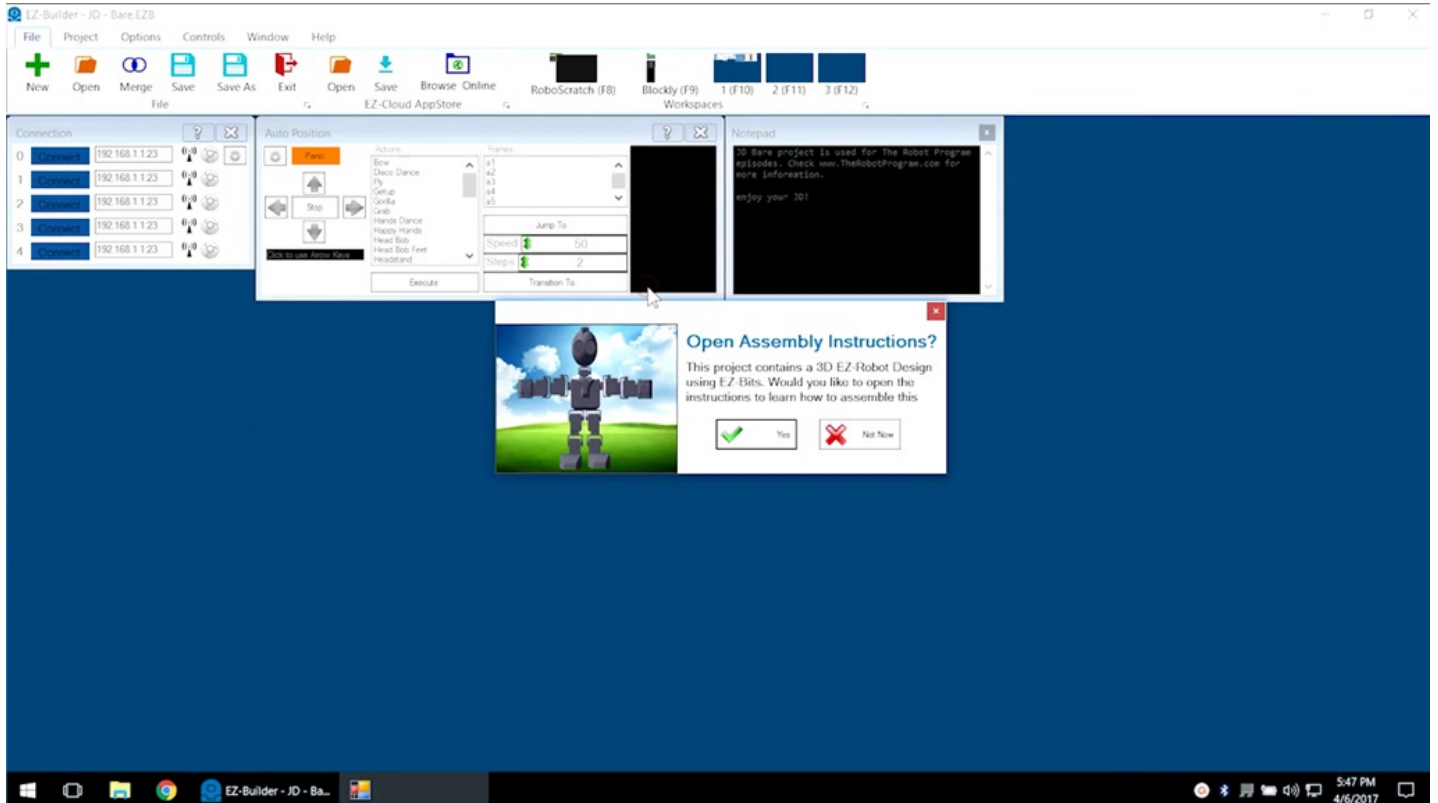
From **Example Projects**, open the bare project for the desired robot.

The screenshot shows the 'Open Project File' dialog box in the EZ-Builder software. The dialog is titled 'Open Project File' and shows the current directory as 'C:\Users\Public\Documents\EZ-Builder\Examples\'. The left sidebar contains 'EZ-Script Examples', 'Legacy Robots', and 'Model Templates'. The main area displays a grid of project thumbnails, each with a title, file size, number of controls, and an 'Open' button. The 'JD - Bare' project is highlighted with a mouse cursor.

Project Name	File Size	Controls	Notes
AdventureBot	6,326,414 Bytes	16 Controls and 19 EZ-Bits	AdventureBot is an easy to assemble ez robot built with EZ-Bits. This is the perfect robot for a beginner who wants to dabble in robotics without breaking the bank! The top mounted camera is a perfect addition for exploring ez robot vision features and remote control spy missions.
Battle Flipper	6,206,364 Bytes	9 Controls and 13 EZ-Bits	Prepare to battle! Place two or more of these battle flippers together and have them fight to the flip. Use the front servo lever to flip your opponents. Get creative and explore many accessories to create new fun and exciting games to share within our community.
JD - Bare	462,387 Bytes	3 Controls and 13 EZ-Bits	JD Bare project is used for The Robot Program episodes. View www.TheRobotProgram.com for more information.
JD	7,141,859 Bytes	12 Controls and 12 EZ-Bits	The Official Revolution JD example project. There is a great tutorial course on our website at www.ez-robot.com with information on getting your JD up and running.
Roli - Bare	325,061 Bytes	4 Controls and 13 EZ-Bits	Roli Bare project is used for The Robot Program episodes. Visit www.TheRobotProgram.com for more information.
Roli	4,933,888 Bytes	12 Controls and 13 EZ-Bits	Welcome to the Revolution Roli example project. There is a great tutorial course on our website at www.ez-robot.com with information on getting your Roli up and running.
Six - Bare	376,471 Bytes	3 Controls and 21 EZ-Bits	Six Bare project is used for The Robot Program episodes. Visit www.TheRobotProgram.com to get started.
Six	3,709,858 Bytes	16 Controls and 21 EZ-Bits	This is the EZ-Robot Revolution Six example starter project. There is a great tutorial course on our website at www.ez-robot.com with information on getting your Six up and running.

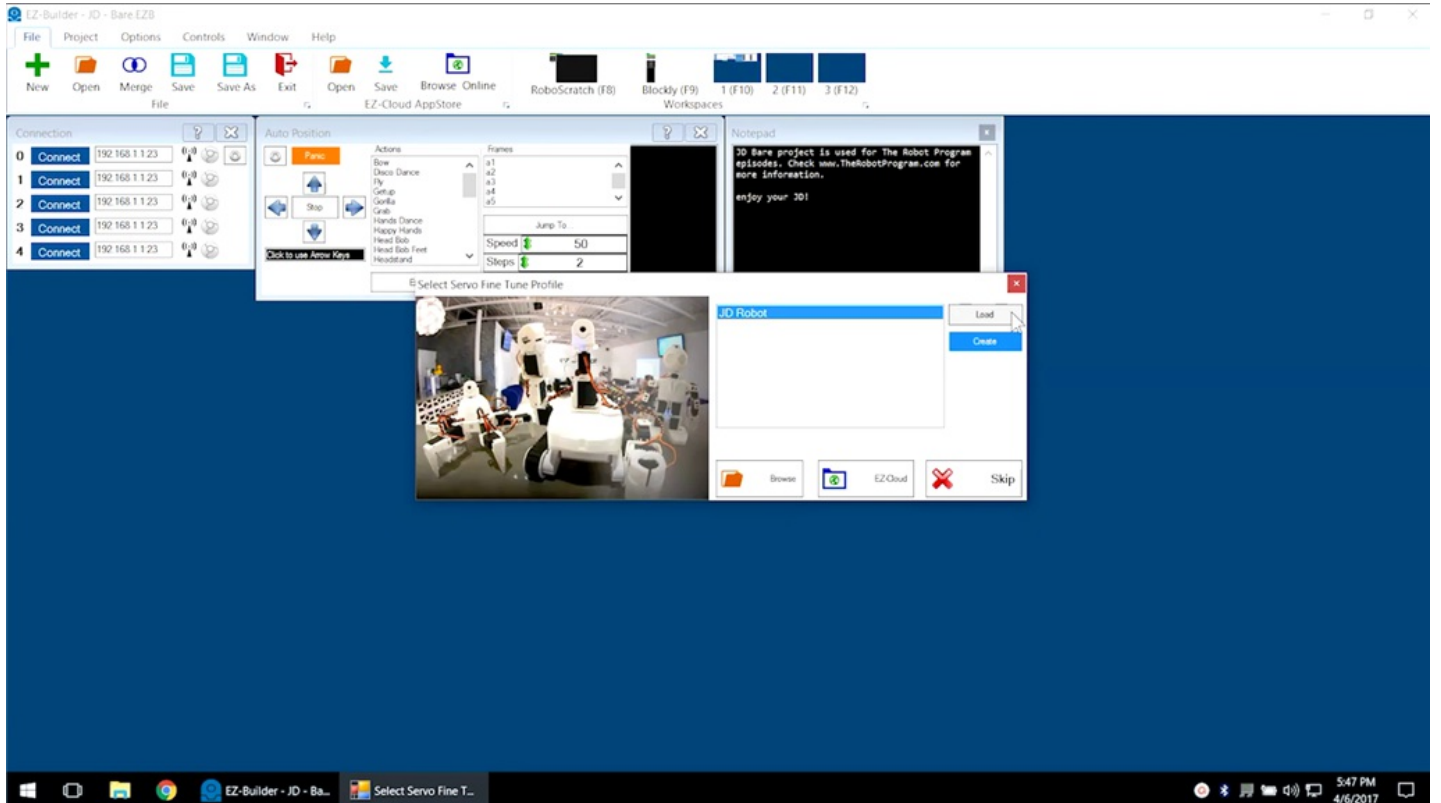
Step 4

Skip the build instructions. View past episodes for more build information.



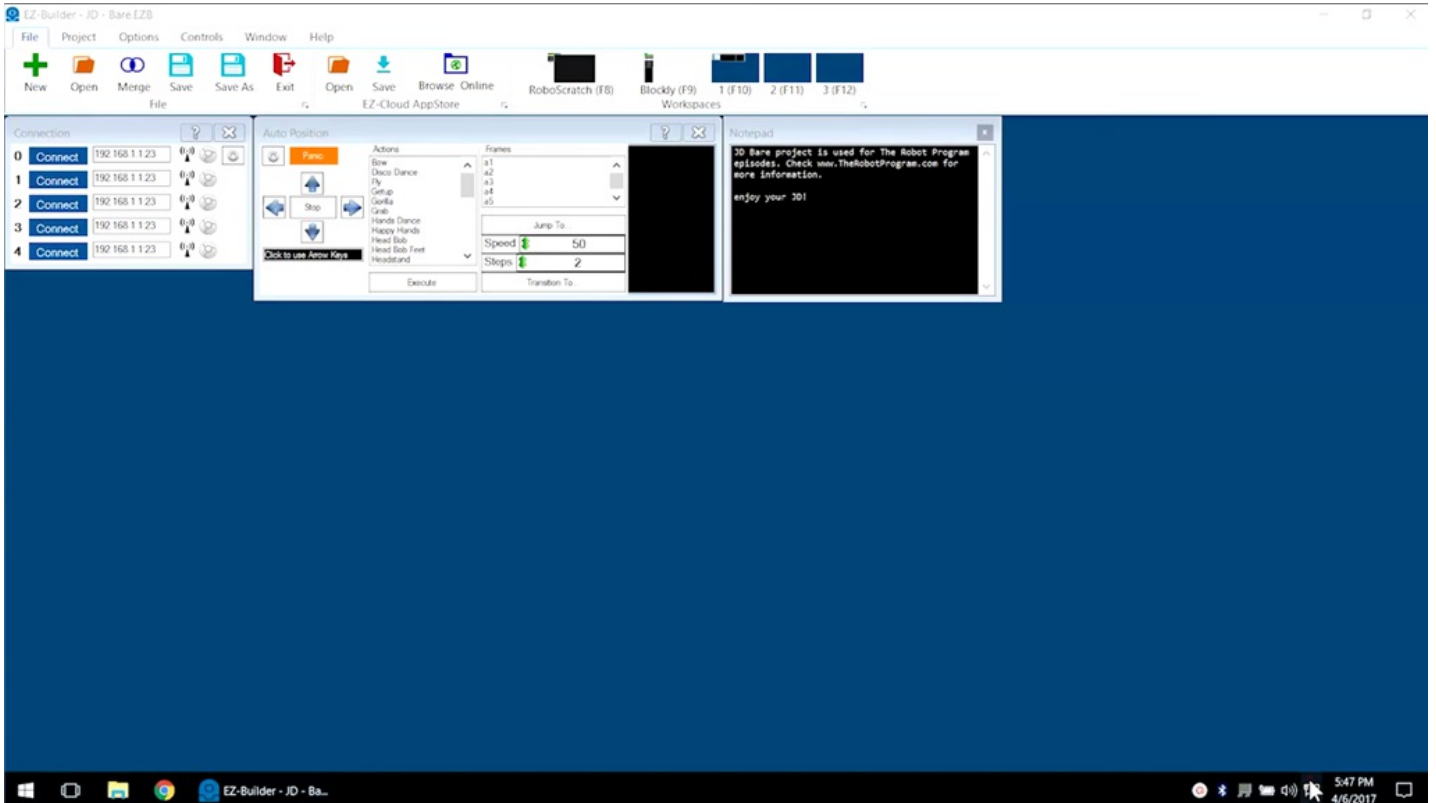
Step 5

If using **Revolution JD**, load the calibrated servo profile as necessary.



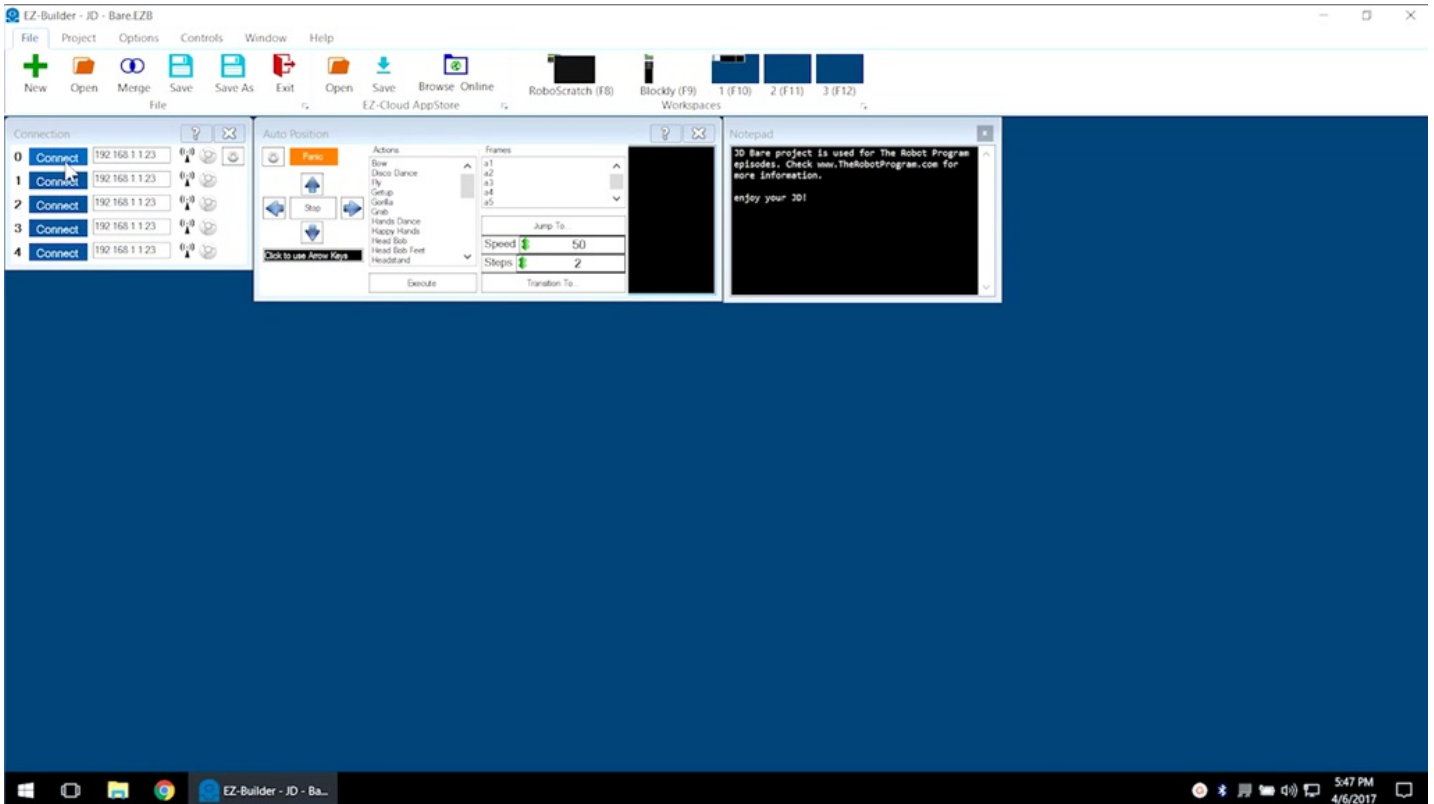
Step 6

The bare project provides a simplified starting workspace with minimal controls.



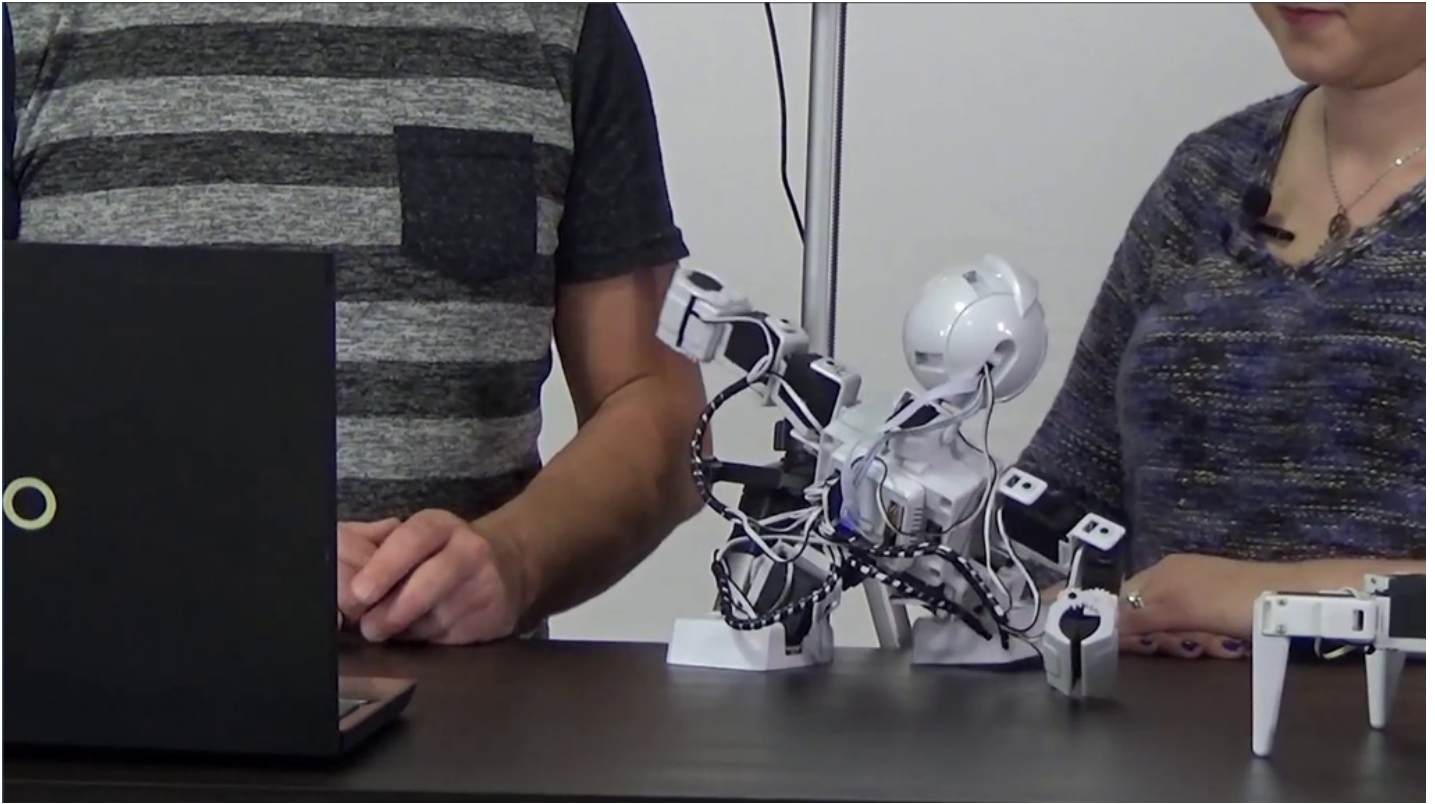
Step 7

Use **Wi-Fi** to connect to the **EZ-B** and click on the blue **Connect** button. The robot will move into the initialization position.



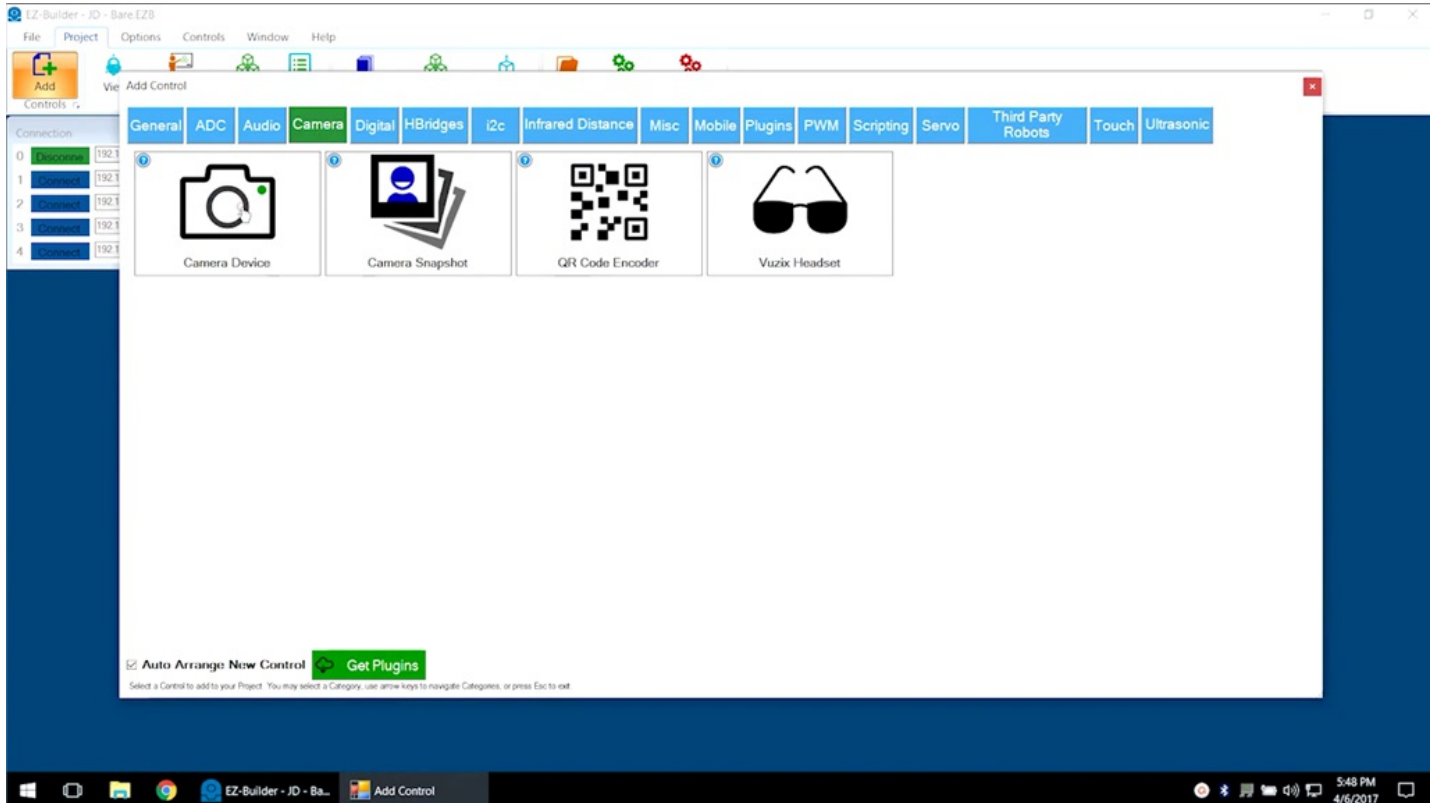
Step 8

If using **Revolution JD**, execute **Stand From Sit** in the **Auto Position** control window to bring the robot to a standing position.



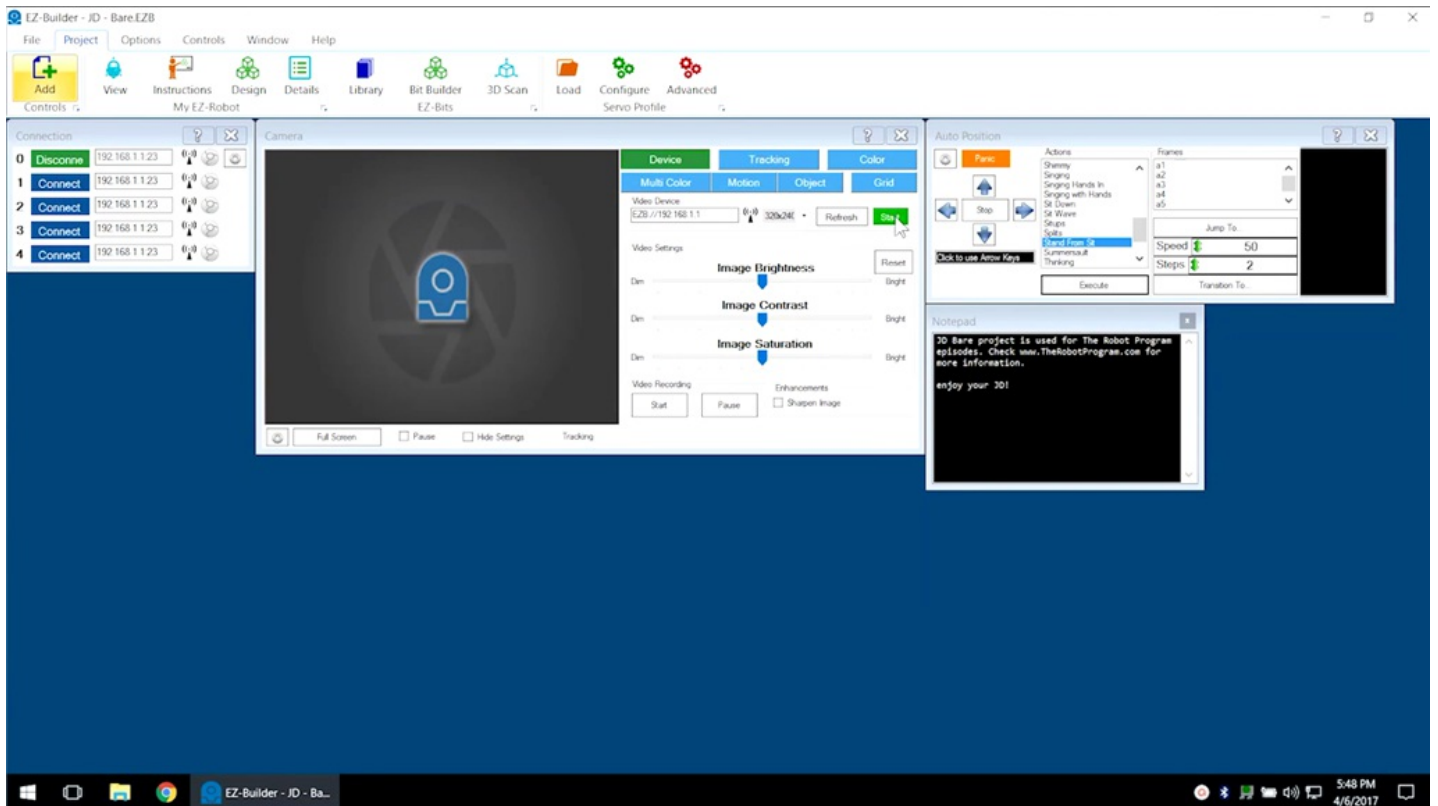
Step 9

Select **Project** -> **Add Controls** -> **Camera** -> **Camera Device** to add the camera controls.



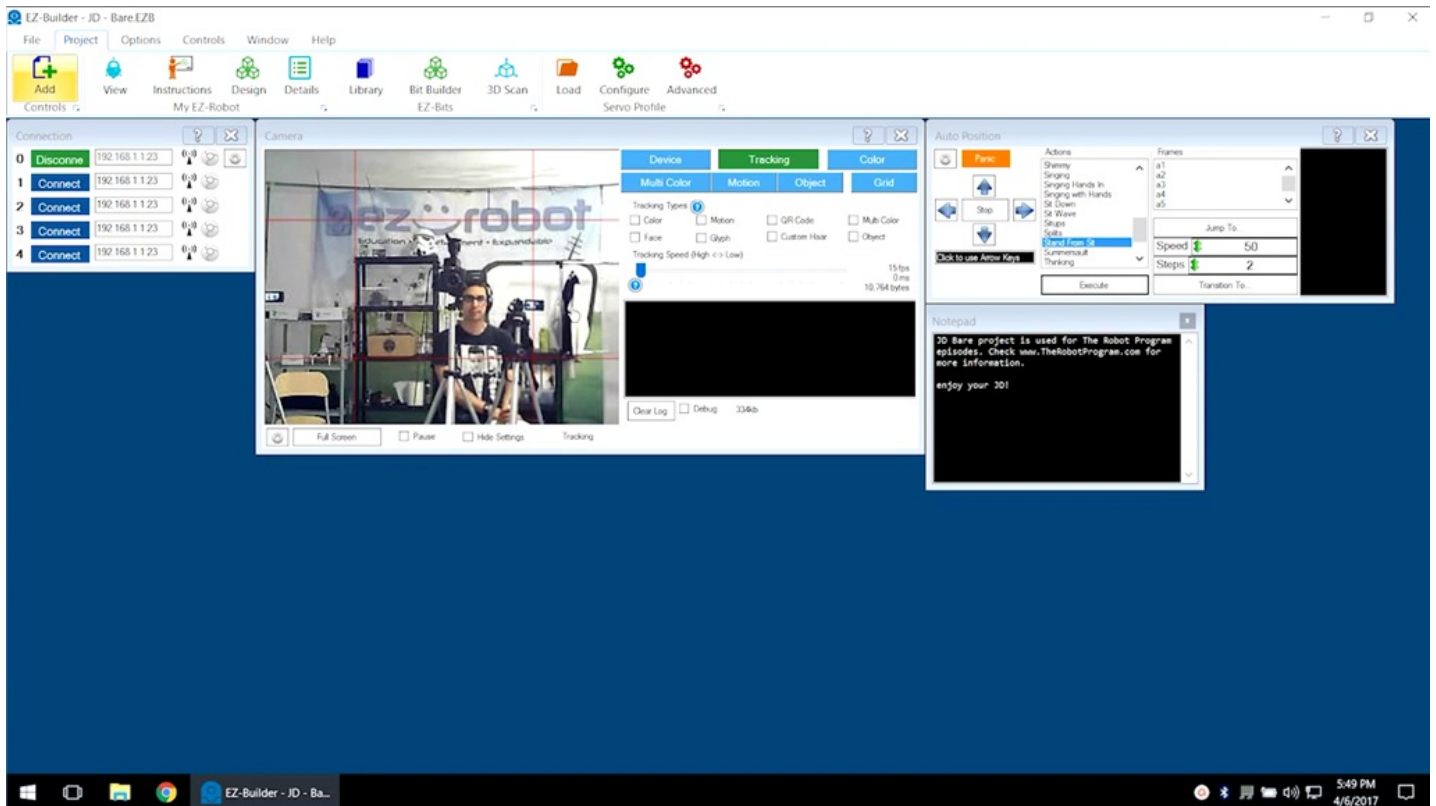
Step 10

Push the green **Start** button to connect to the camera. The camera will provide peripheral information that will be used within the program.



Step 11

Select the **Tracking** tab. There are several types of tracking available, including object, face, and color.



Step 12

Click on the **Gear Icon** to access the tracking configuration settings.

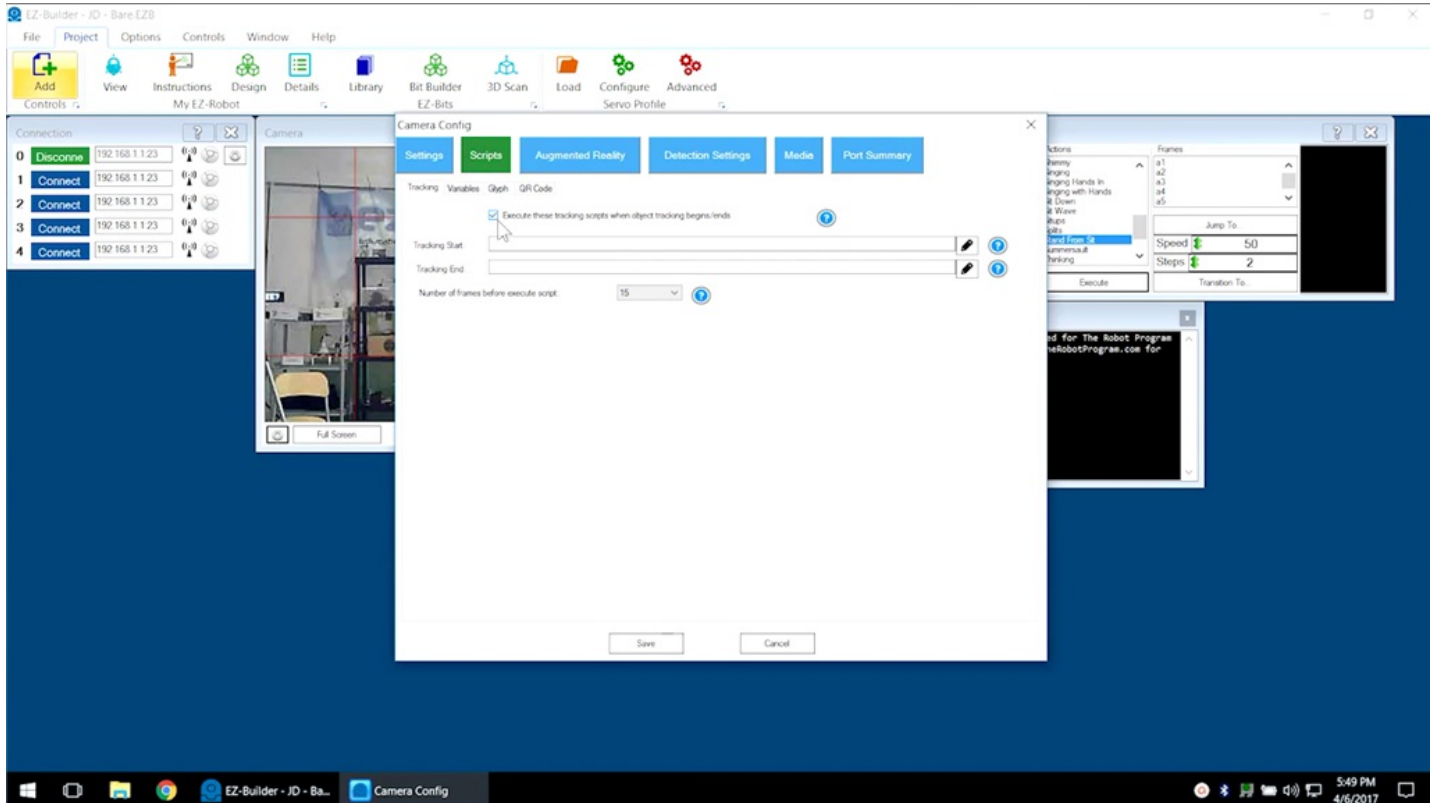
The screenshot displays the EZ-Builder software interface for a robot project. The main window is titled "EZ-Builder - JD - Bare.EZB" and features a menu bar (File, Project, Options, Controls, Window, Help) and a toolbar with icons for Add, View, Instructions, Design, Details, Library, Bit Builder, 3D Scan, Load, Configure, and Advanced. The interface is divided into several panels:

- Connection Panel:** Lists four connection points, all with the IP address 192.168.1.123 and a "Connect" button.
- Camera Panel:** Shows a live video feed of a robot in a workshop. The robot has a camera mounted on top. The panel includes a "Tracking" tab with sub-tabs for "Multi Color", "Motion", "Object", and "Grid". Under "Tracking Types", there are checkboxes for Color, Face, and Motion. Under "Object", there are checkboxes for QR Code, Multi Color, Custom Haar, and Object. A "Tracking Speed (High < > Low)" slider is set to 14fps. A "Clear Log" button and "Debug" checkbox are at the bottom.
- Auto Position Panel:** Contains a "Frame" section with a list of frames (a1, a2, a3, a4, a5) and a "Jump To" dropdown. Below this are "Speed" (set to 50) and "Steps" (set to 2) sliders, and a "Transition To" dropdown. An "Execute" button is at the bottom.
- Notepad Panel:** A small window with the text: "3D Bare project is used for The Robot Program episodes. Check www.TheRobotProgram.com for more information. enjoy your 3D!"

The Windows taskbar at the bottom shows the time as 5:49 PM on 4/6/2017.

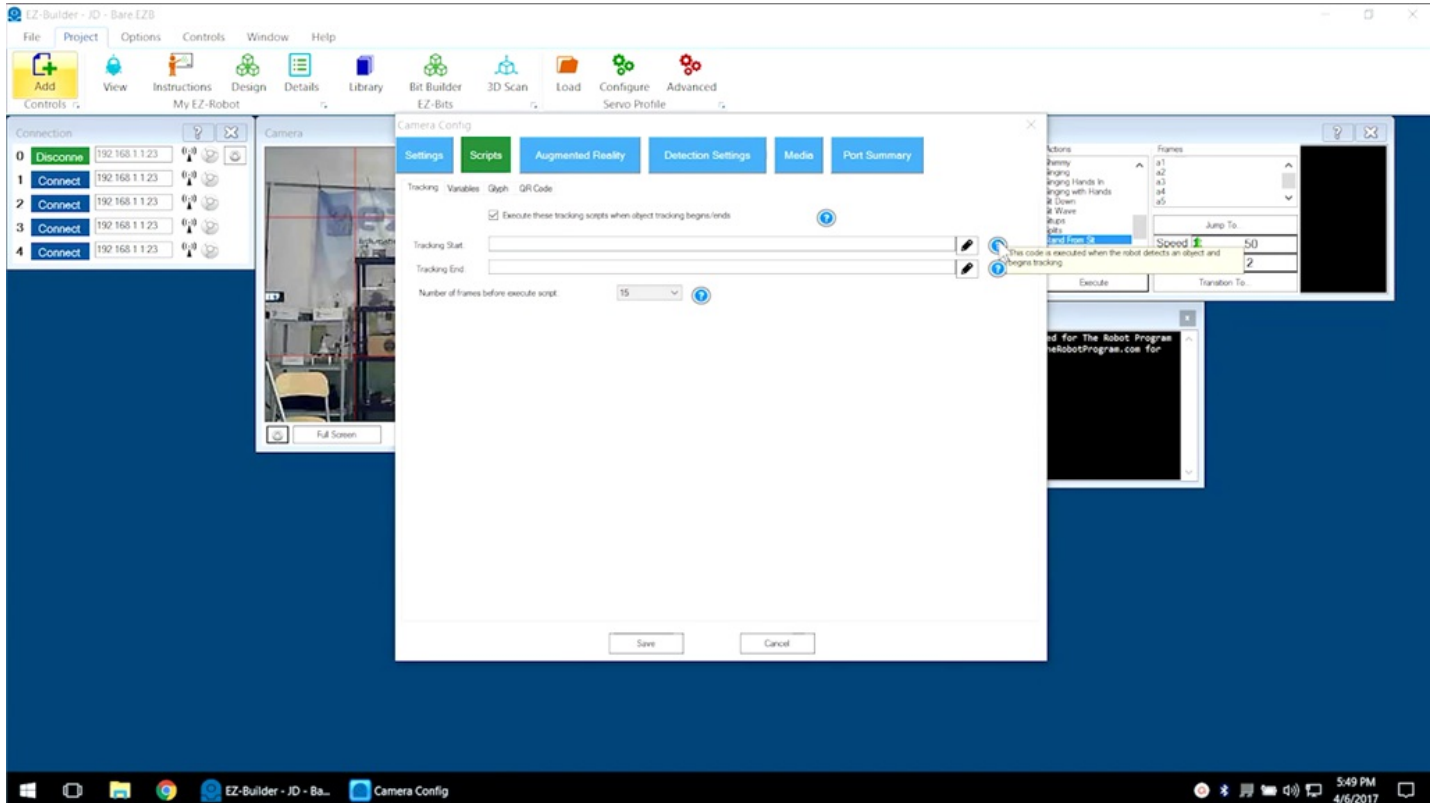
Step 13

Click the **Script** tab and select the script execution checkbox.



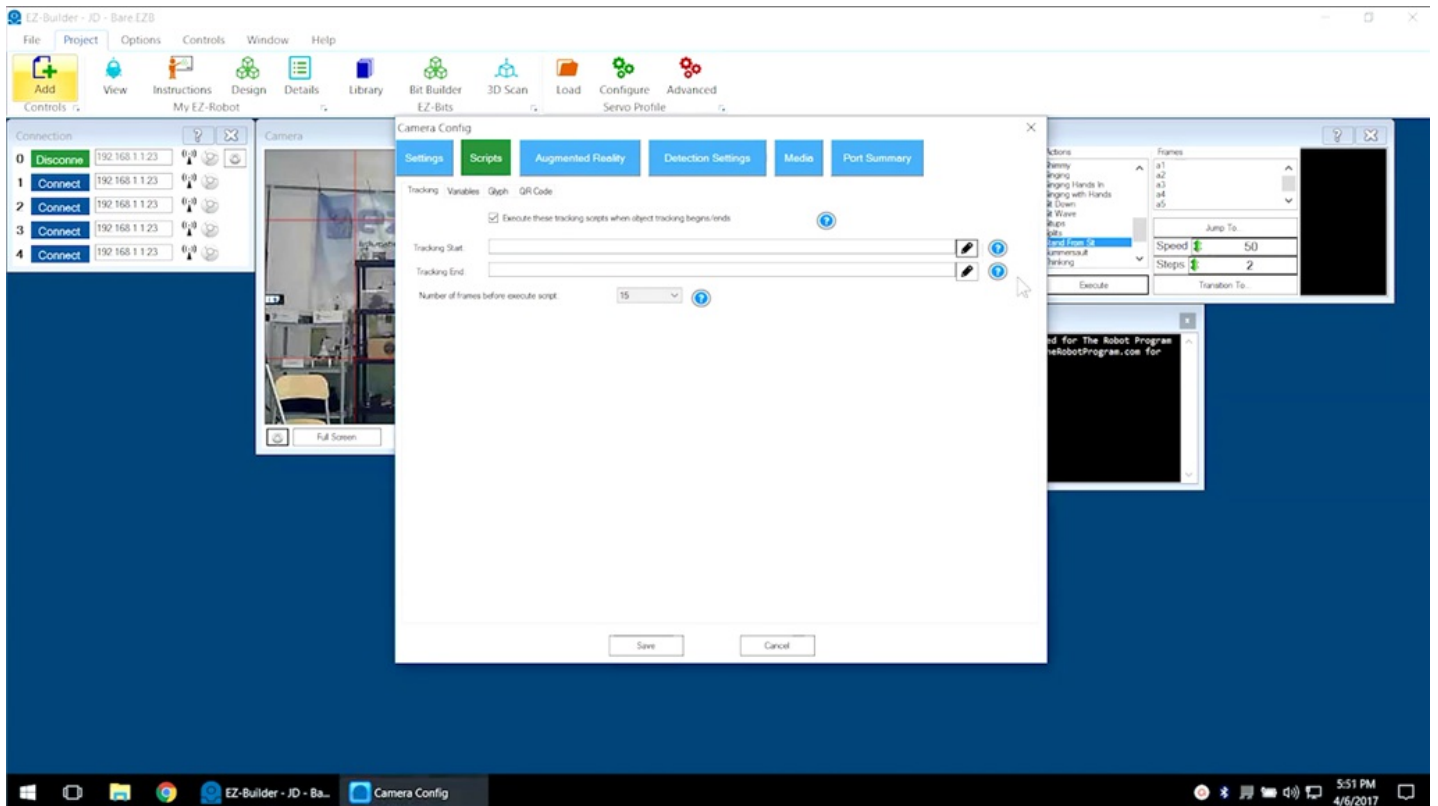
Step 14

Hovering over any blue question mark will provide more information about an **EZ-Builder** feature.



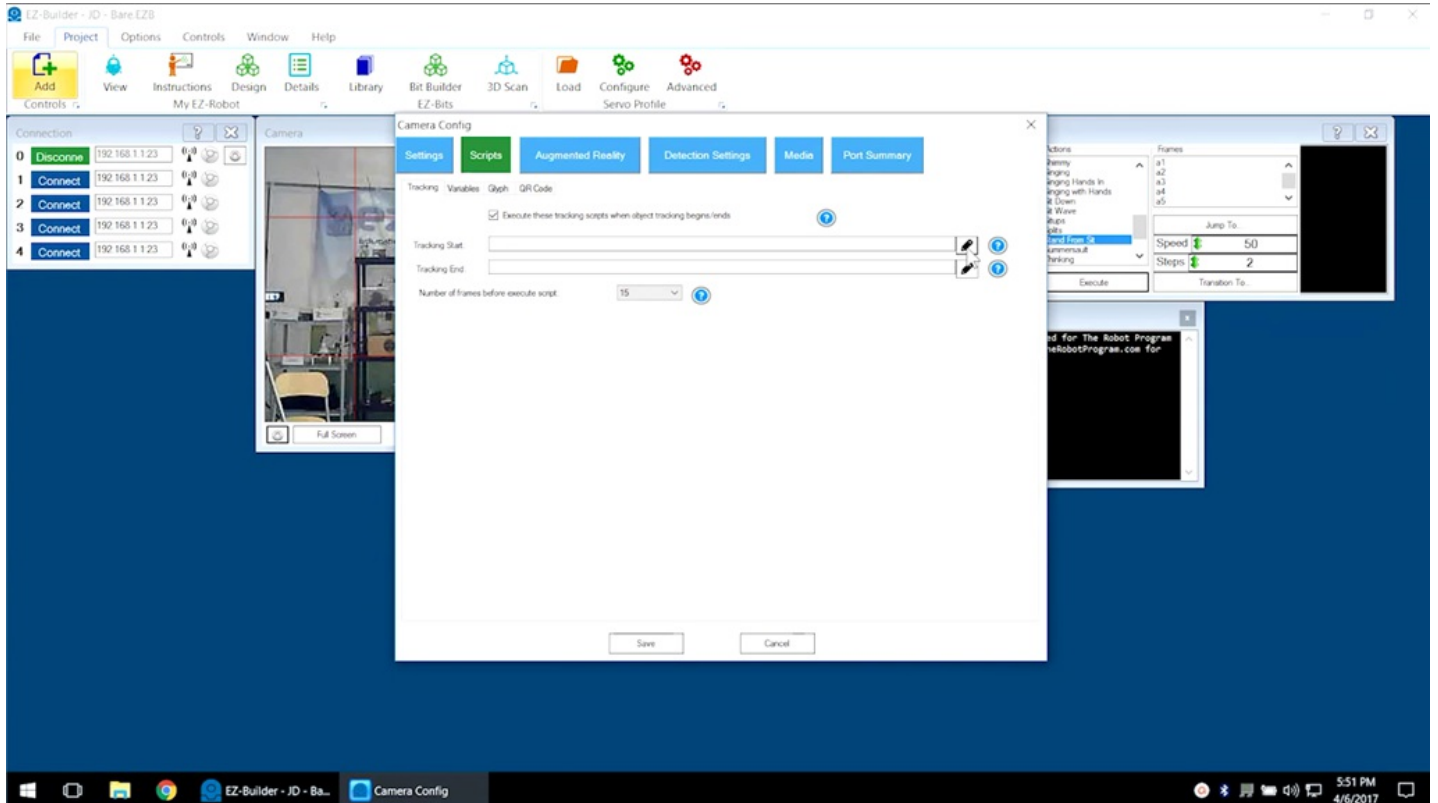
Step 15

A **Tracking Start** script will execute once a face is detected. A **Tracking End** script will execute when tracking has stopped.



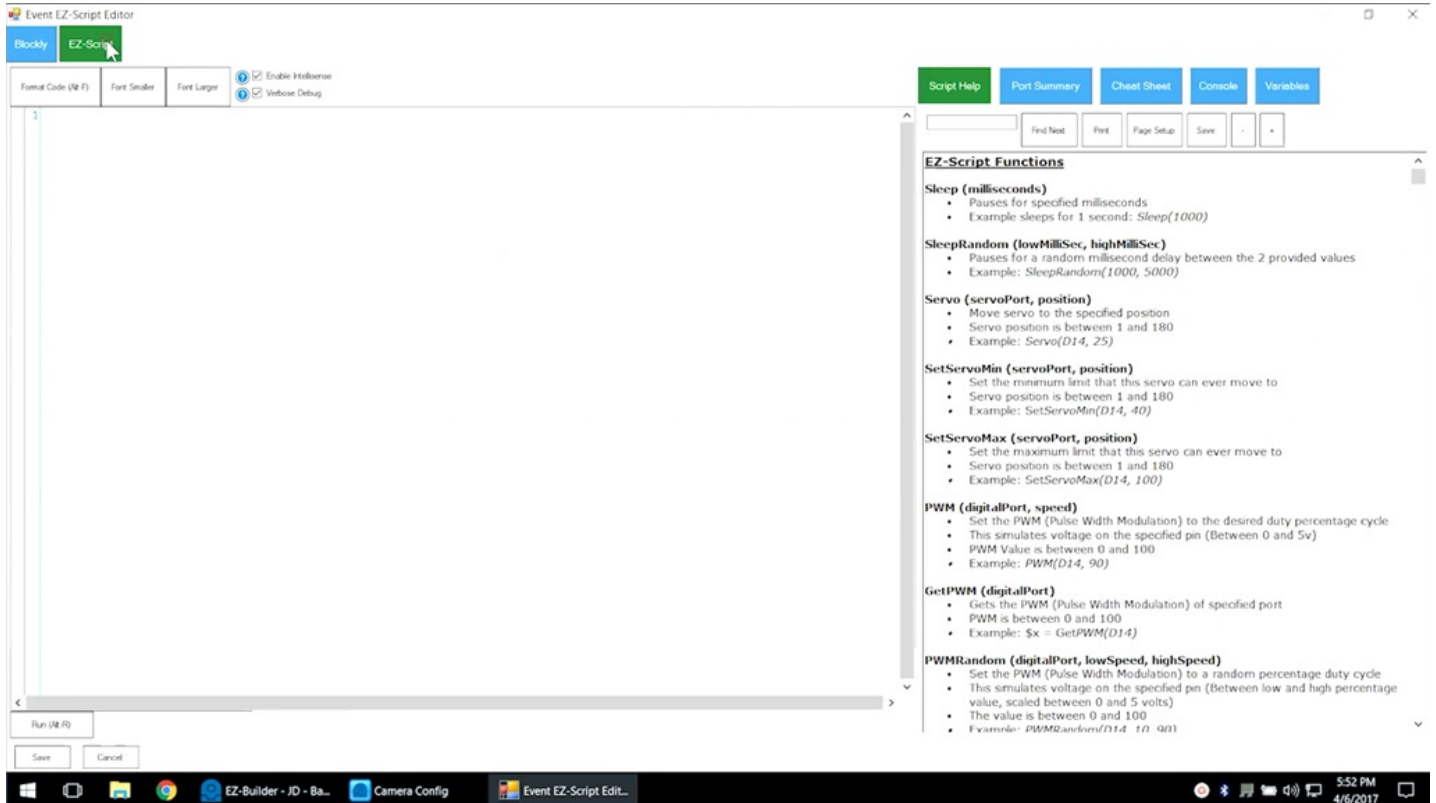
Step 16

Click on the **Pencil Icon** to access the script editor. Close the **Blockly** prompt.



Step 17

Click on the **EZ-Script** tab to change script editors.



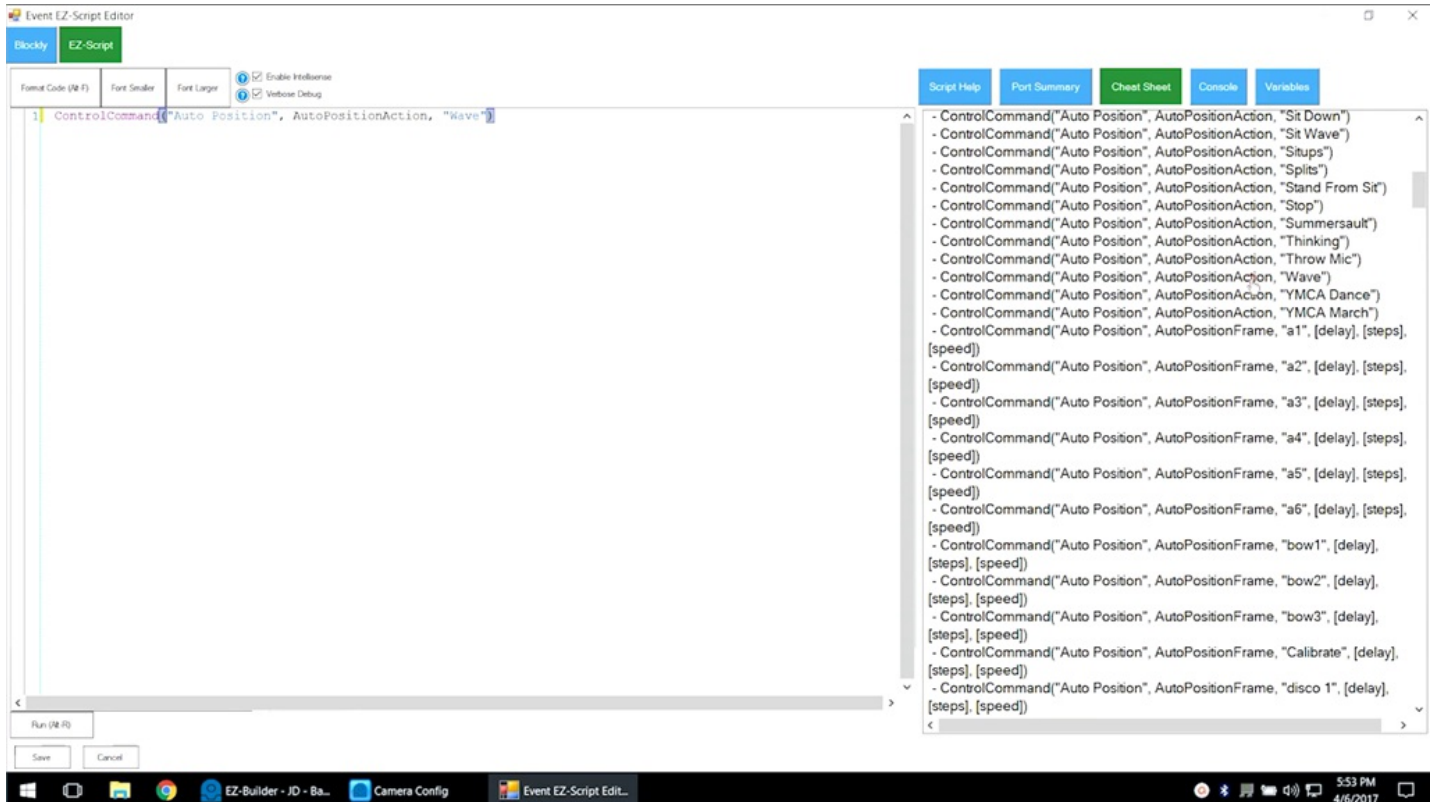
Step 18

Right-click in the editing space to view available project controls. Scroll down and add the desired command.

The screenshot shows the Event EZ-Script Editor interface. On the left, a context menu is open over the script editor, listing options: Copy, Cut, Paste, Auto Position (highlighted), Camera, Connection, and Notepad. The main editor area displays a list of project controls, each starting with `ControlCommand("Auto Position", AutoPositionAction, "ActionName")`. The `"Wave"` command is highlighted. On the right, a panel titled "EZ-Script Functions" is open, showing a list of functions with their descriptions and examples. The functions listed are: Sleep (milliseconds), SleepRandom (lowMilliSec, highMilliSec), Servo (servoPort, position), SetServoMin (servoPort, position), SetServoMax (servoPort, position), PWM (digitalPort, speed), GetPWM (digitalPort), and PWMRandom (digitalPort, lowSpeed, highSpeed). The Windows taskbar at the bottom shows the time as 5:53 PM on 4/6/2017.

Step 19

The **Cheat Sheet** can also be used to add code. Scroll and click on **ControlCommand("Auto Position", AutoPositionAction, "Wave")**. This line of code will tell the **AutoPosition** control to run the **Wave** action.



The screenshot displays the Event EZ-Script Editor interface. The main script area contains the following code:

```
ControlCommand("Auto Position", AutoPositionAction, "Wave")
```

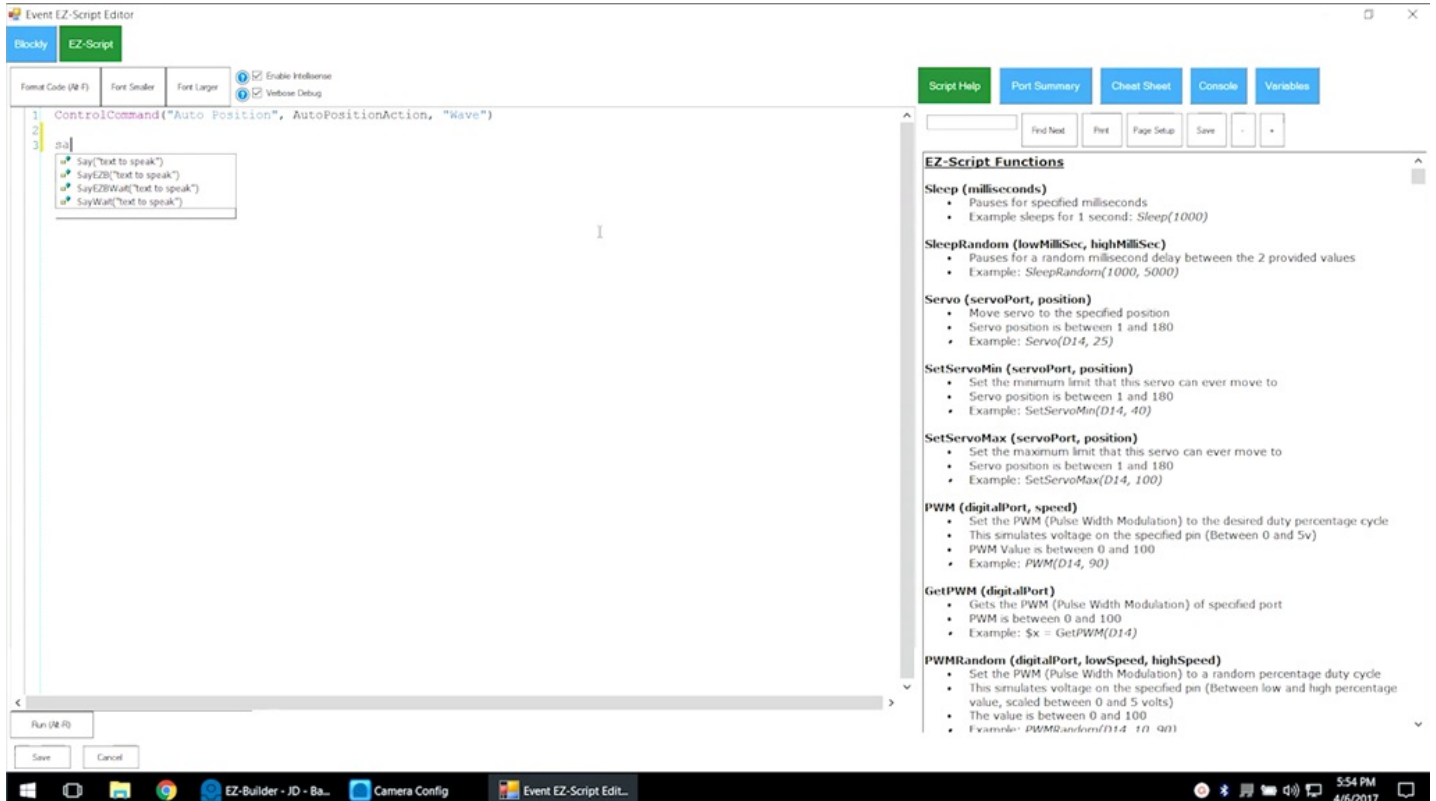
The Cheat Sheet panel on the right lists various actions and frames available for the "Auto Position" control. The "Wave" action is highlighted in green, indicating it is selected. The Cheat Sheet panel includes tabs for Script Help, Part Summary, Cheat Sheet, Console, and Variables. The Cheat Sheet panel lists the following actions and frames:

- ControlCommand("Auto Position", AutoPositionAction, "Sit Down")
- ControlCommand("Auto Position", AutoPositionAction, "Sit Wave")
- ControlCommand("Auto Position", AutoPositionAction, "Situps")
- ControlCommand("Auto Position", AutoPositionAction, "Splits")
- ControlCommand("Auto Position", AutoPositionAction, "Stand From Sit")
- ControlCommand("Auto Position", AutoPositionAction, "Stop")
- ControlCommand("Auto Position", AutoPositionAction, "Summersault")
- ControlCommand("Auto Position", AutoPositionAction, "Thinking")
- ControlCommand("Auto Position", AutoPositionAction, "Throw Mic")
- ControlCommand("Auto Position", AutoPositionAction, "Wave")
- ControlCommand("Auto Position", AutoPositionAction, "YMCA Dance")
- ControlCommand("Auto Position", AutoPositionAction, "YMCA March")
- ControlCommand("Auto Position", AutoPositionFrame, "a1", [delay], [steps], [speed])
- ControlCommand("Auto Position", AutoPositionFrame, "a2", [delay], [steps], [speed])
- ControlCommand("Auto Position", AutoPositionFrame, "a3", [delay], [steps], [speed])
- ControlCommand("Auto Position", AutoPositionFrame, "a4", [delay], [steps], [speed])
- ControlCommand("Auto Position", AutoPositionFrame, "a5", [delay], [steps], [speed])
- ControlCommand("Auto Position", AutoPositionFrame, "a6", [delay], [steps], [speed])
- ControlCommand("Auto Position", AutoPositionFrame, "bow1", [delay], [steps], [speed])
- ControlCommand("Auto Position", AutoPositionFrame, "bow2", [delay], [steps], [speed])
- ControlCommand("Auto Position", AutoPositionFrame, "bow3", [delay], [steps], [speed])
- ControlCommand("Auto Position", AutoPositionFrame, "Calibrate", [delay], [steps], [speed])
- ControlCommand("Auto Position", AutoPositionFrame, "disco 1", [delay], [steps], [speed])

The Windows taskbar at the bottom shows the following applications: EZ-BUILDER - JD - Ba..., Camera Config, and Event EZ-Script Edit... The system clock indicates 5:33 PM on 4/6/2017.

Step 20

On a new line, start typing `say`. The **Intellisense** feature will prompt the available options.



Step 21

Select **SayEZB** and add the desired text to be converted into speech.

The screenshot shows the Event EZ-Script Editor interface. The main script area contains the following code:

```
1 ControlCommand("Auto Position", AutoPositionAction, "Wave")
2
3 sayezb("I see you")
4
```

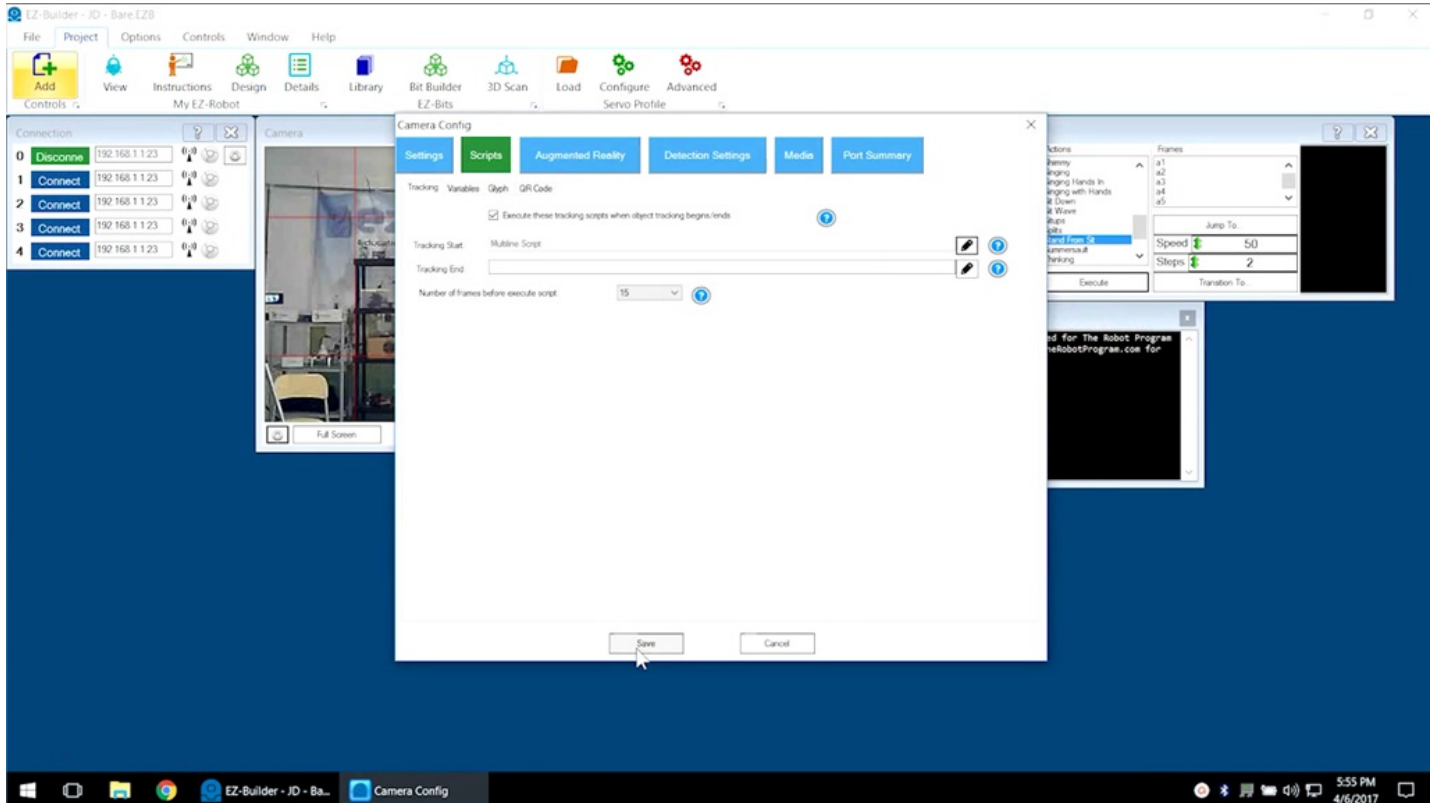
The right-hand pane displays the "EZ-Script Functions" list:

- Sleep (milliseconds)**
 - Pauses for specified milliseconds
 - Example sleeps for 1 second: `Sleep(1000)`
- SleepRandom (lowMilliSec, highMilliSec)**
 - Pauses for a random millisecond delay between the 2 provided values
 - Example: `SleepRandom(1000, 5000)`
- Servo (servoPort, position)**
 - Move servo to the specified position
 - Servo position is between 1 and 180
 - Example: `Servo(D14, 25)`
- SetServoMin (servoPort, position)**
 - Set the minimum limit that this servo can ever move to
 - Servo position is between 1 and 180
 - Example: `SetServoMin(D14, 40)`
- SetServoMax (servoPort, position)**
 - Set the maximum limit that this servo can ever move to
 - Servo position is between 1 and 180
 - Example: `SetServoMax(D14, 100)`
- PWM (digitalPort, speed)**
 - Set the PWM (Pulse Width Modulation) to the desired duty percentage cycle
 - This simulates voltage on the specified pin (Between 0 and 5v)
 - PWM Value is between 0 and 100
 - Example: `PWM(D14, 90)`
- GetPWM (digitalPort)**
 - Gets the PWM (Pulse Width Modulation) of specified port
 - PWM is between 0 and 100
 - Example: `$x = GetPWM(D14)`
- PWMRandom (digitalPort, lowSpeed, highSpeed)**
 - Set the PWM (Pulse Width Modulation) to a random percentage duty cycle
 - This simulates voltage on the specified pin (Between low and high percentage value, scaled between 0 and 5 volts)
 - The value is between 0 and 100
 - Example: `PWMRandom(D14, 10, 90)`

The Windows taskbar at the bottom shows the time as 5:54 PM on 4/6/2017.

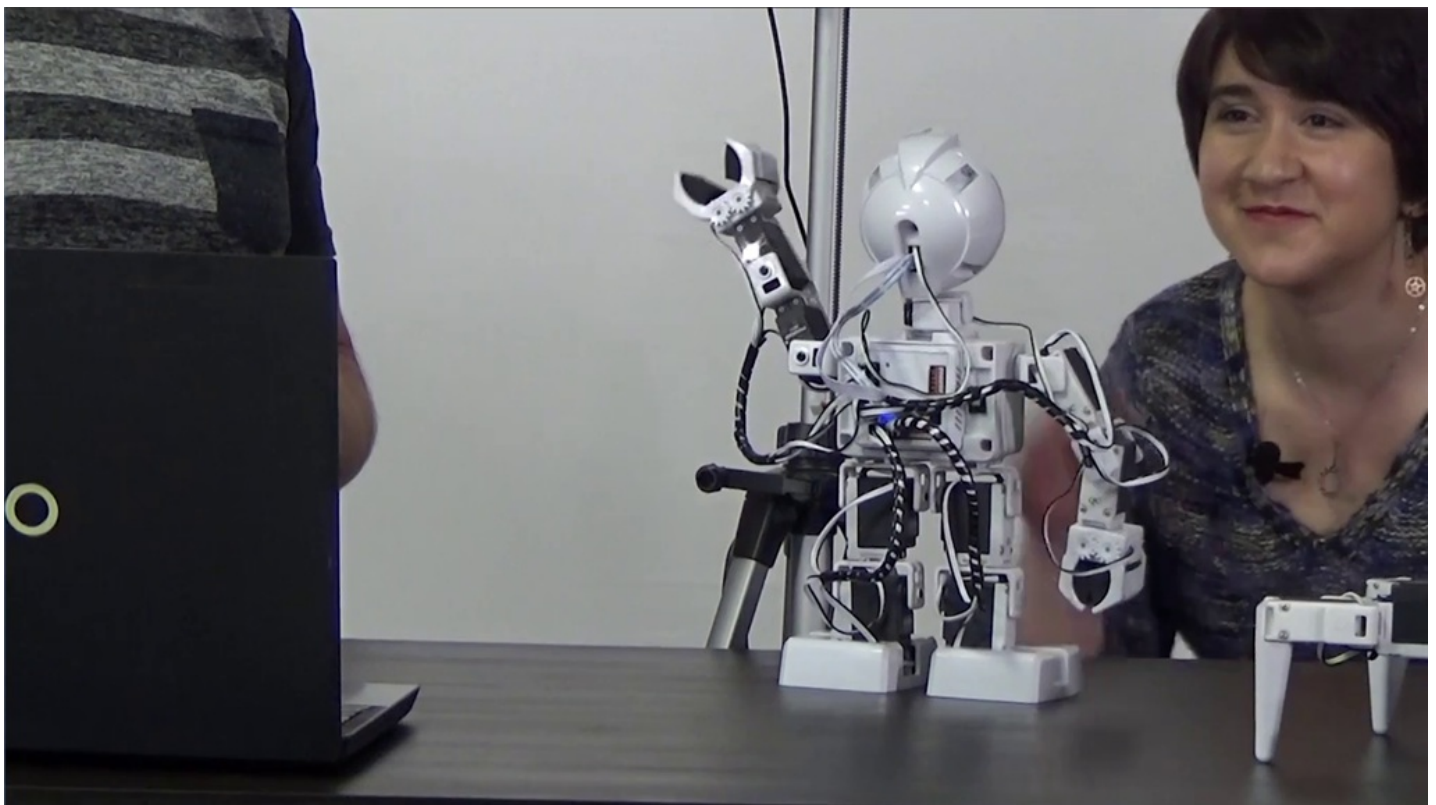
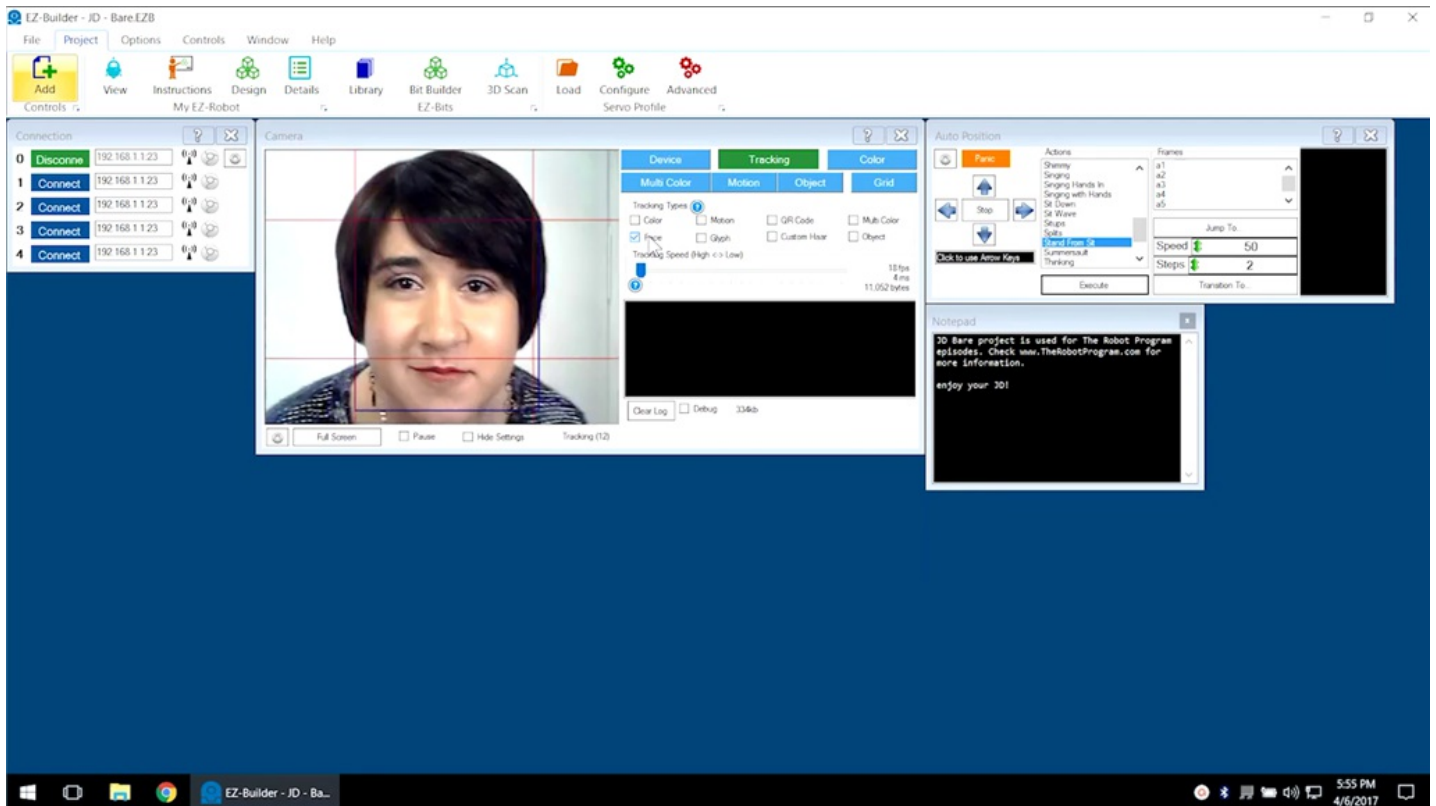
Step 22

Save the code and return. The script will execute for any selected tracking type.



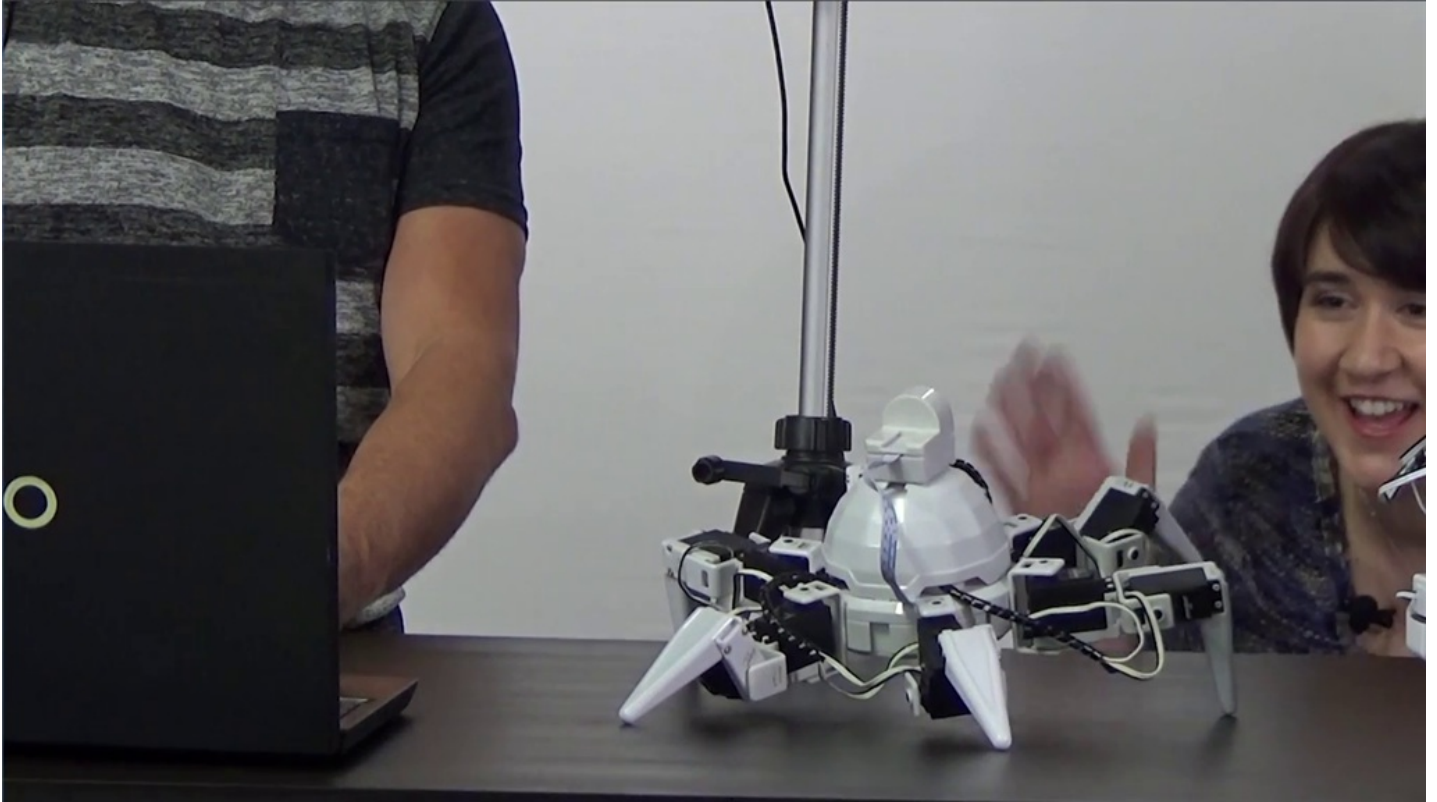
Step 23

Select the **Face** checkbox to begin tracking and test the script. Once the robot detects a face, it will speak and complete the wave action.



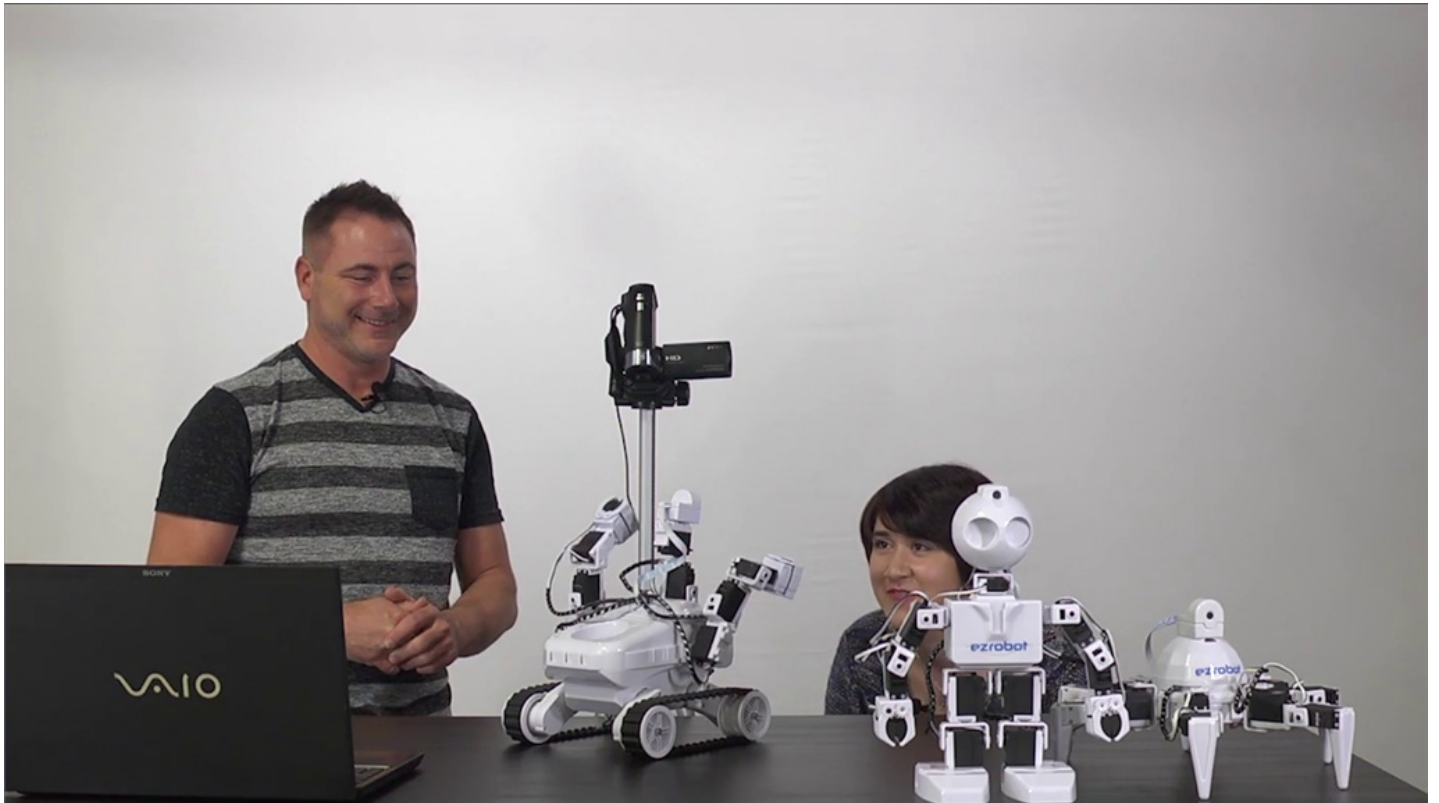
Step 24

Revolution Six will execute the same steps.



Step 25

Revolution Roli will execute the same steps.



Quiz

Question #1 When does a "Tracking Start" event script begin execution?

Question #2 What does the following line of code do?

```
``` ControlCommand("Auto Position", AutoPositionAction, "Wave") ```
```

**Question #3** Which tracking type must be enabled for this activity?

View the answers to this quiz at [www.ez-robot.com/Tutorials/Lesson/102](http://www.ez-robot.com/Tutorials/Lesson/102).

Visit [www.TheRobotProgram.com](http://www.TheRobotProgram.com) for more episodes.