

# 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.

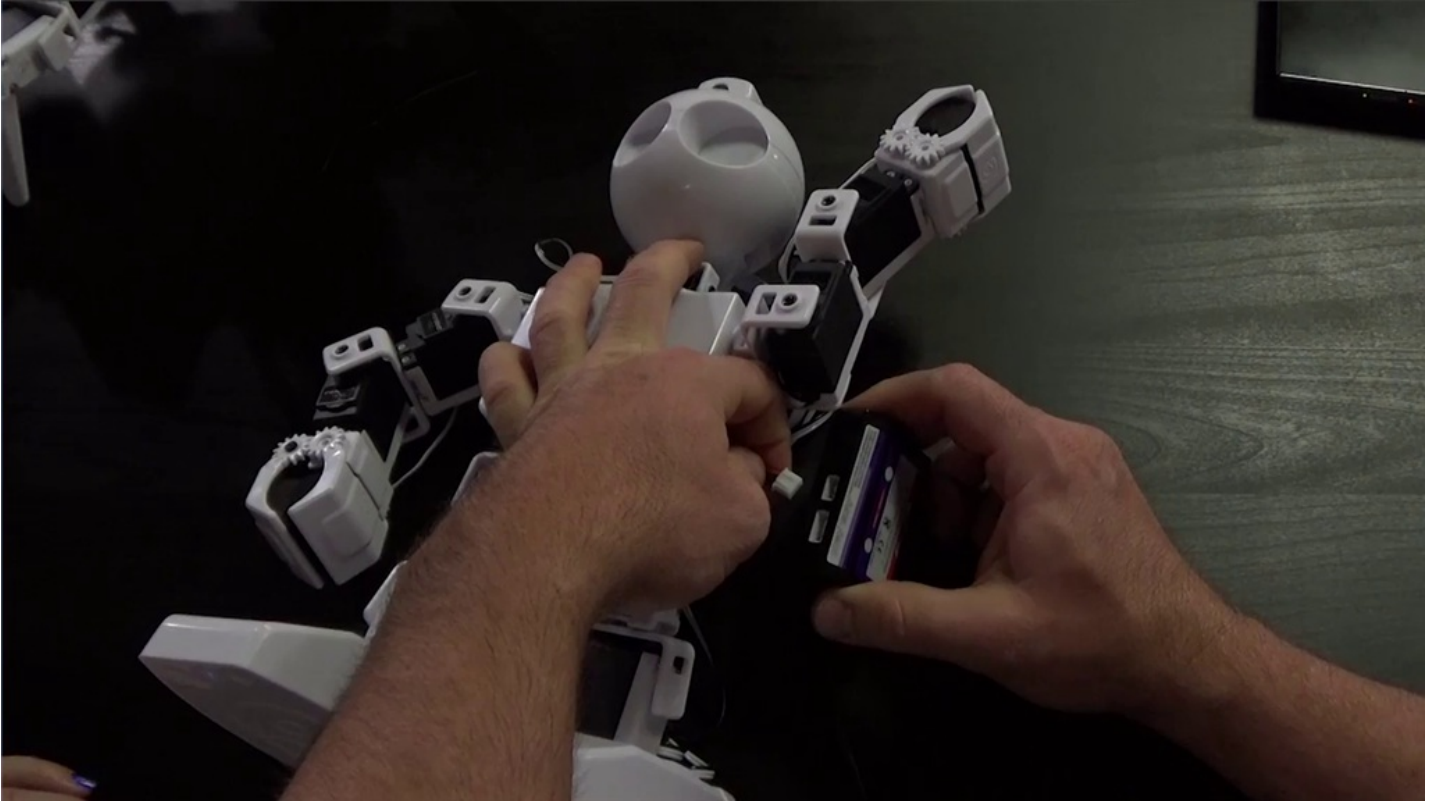
When a face is detected, the two lines of code will be executed, causing the robot to wave and speak the chosen text.

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.



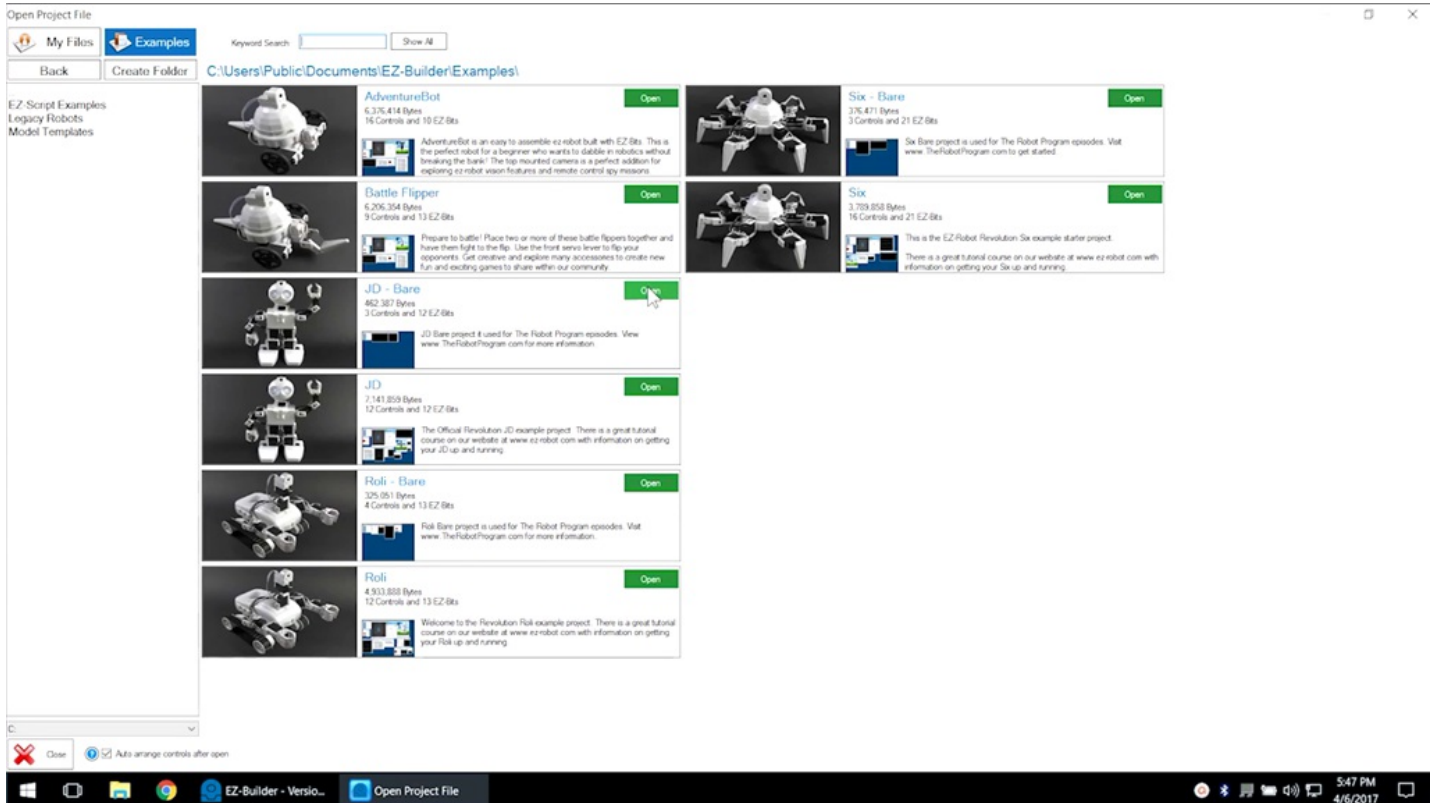
## Step 2

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



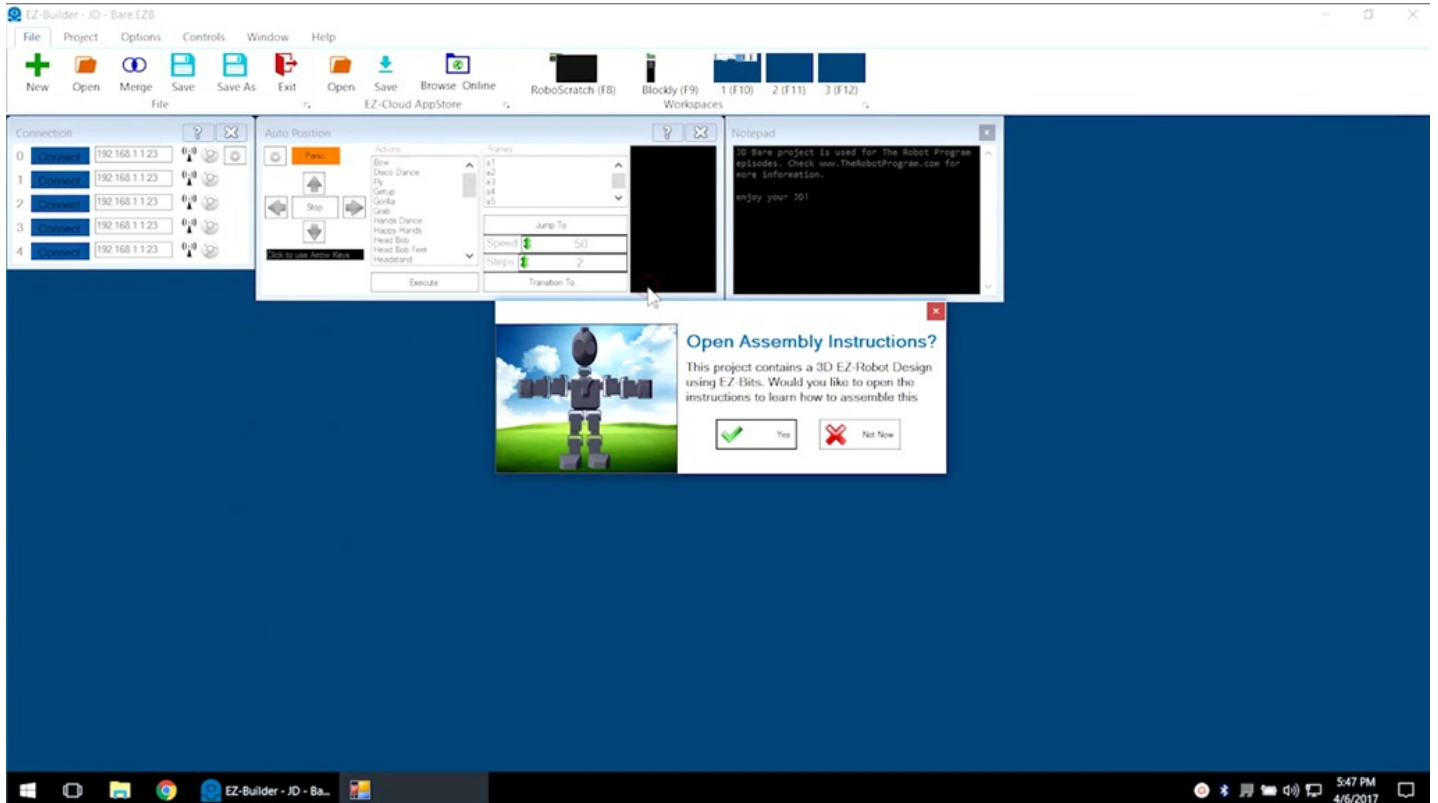
# Step 3

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



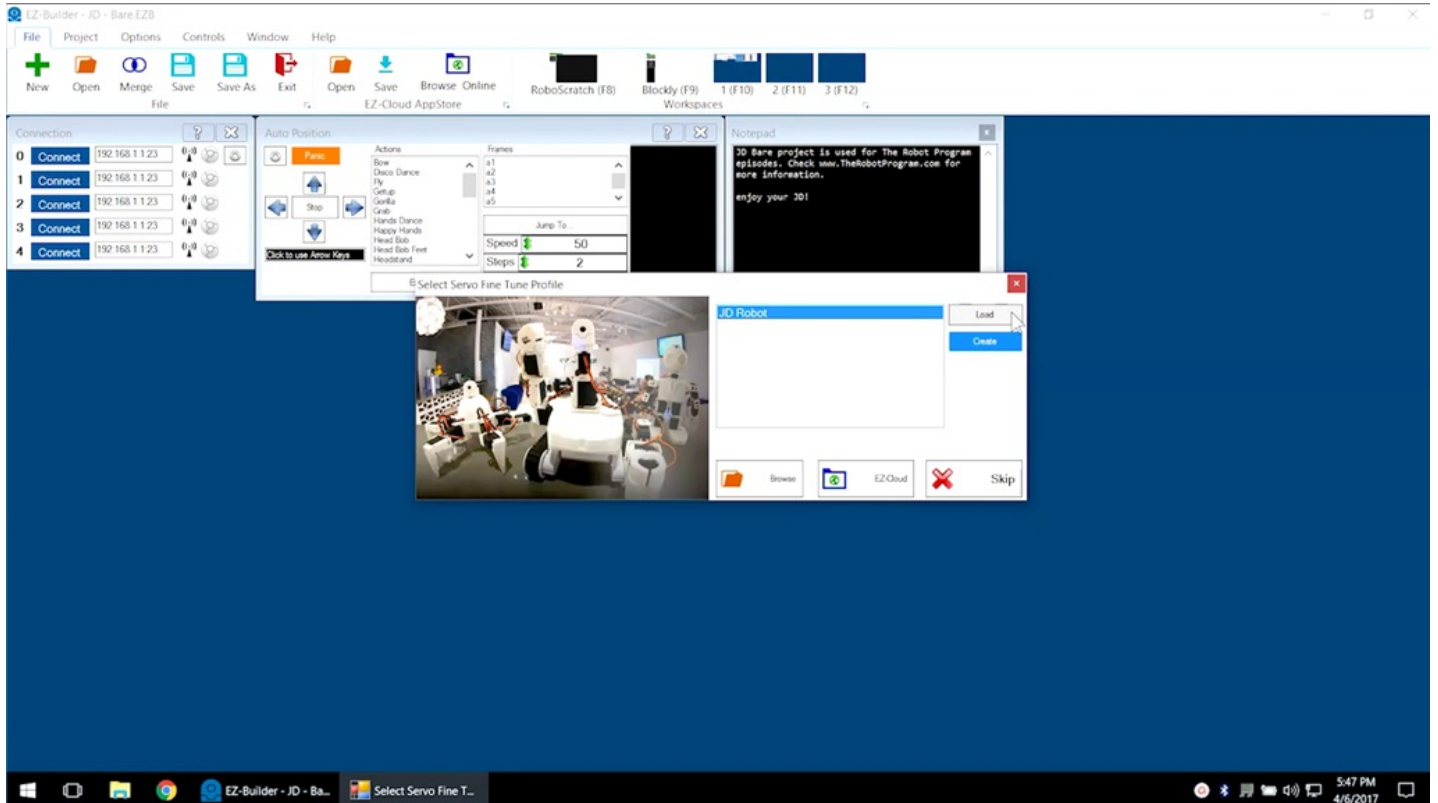
# Step 4

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



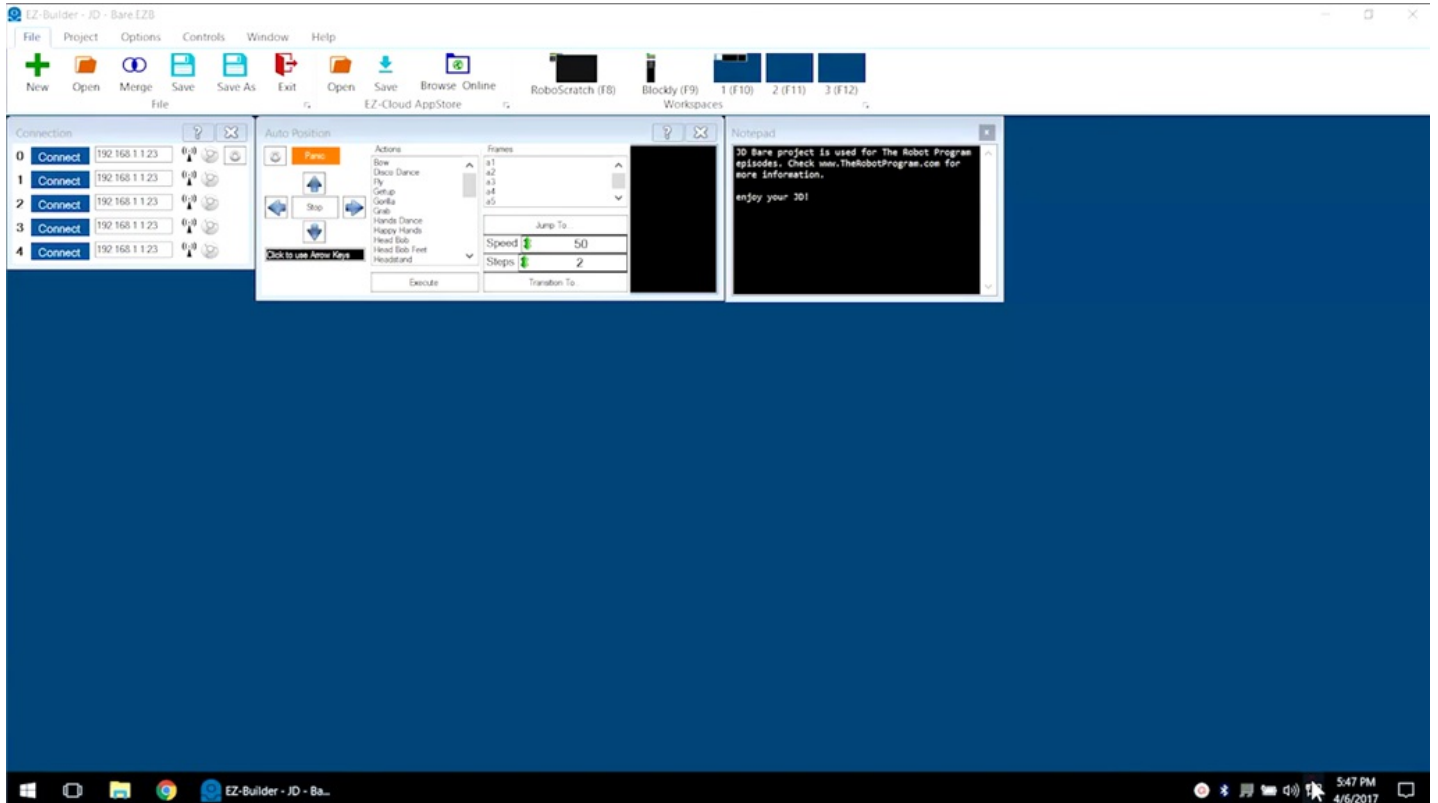
## Step 5

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



## Step 6

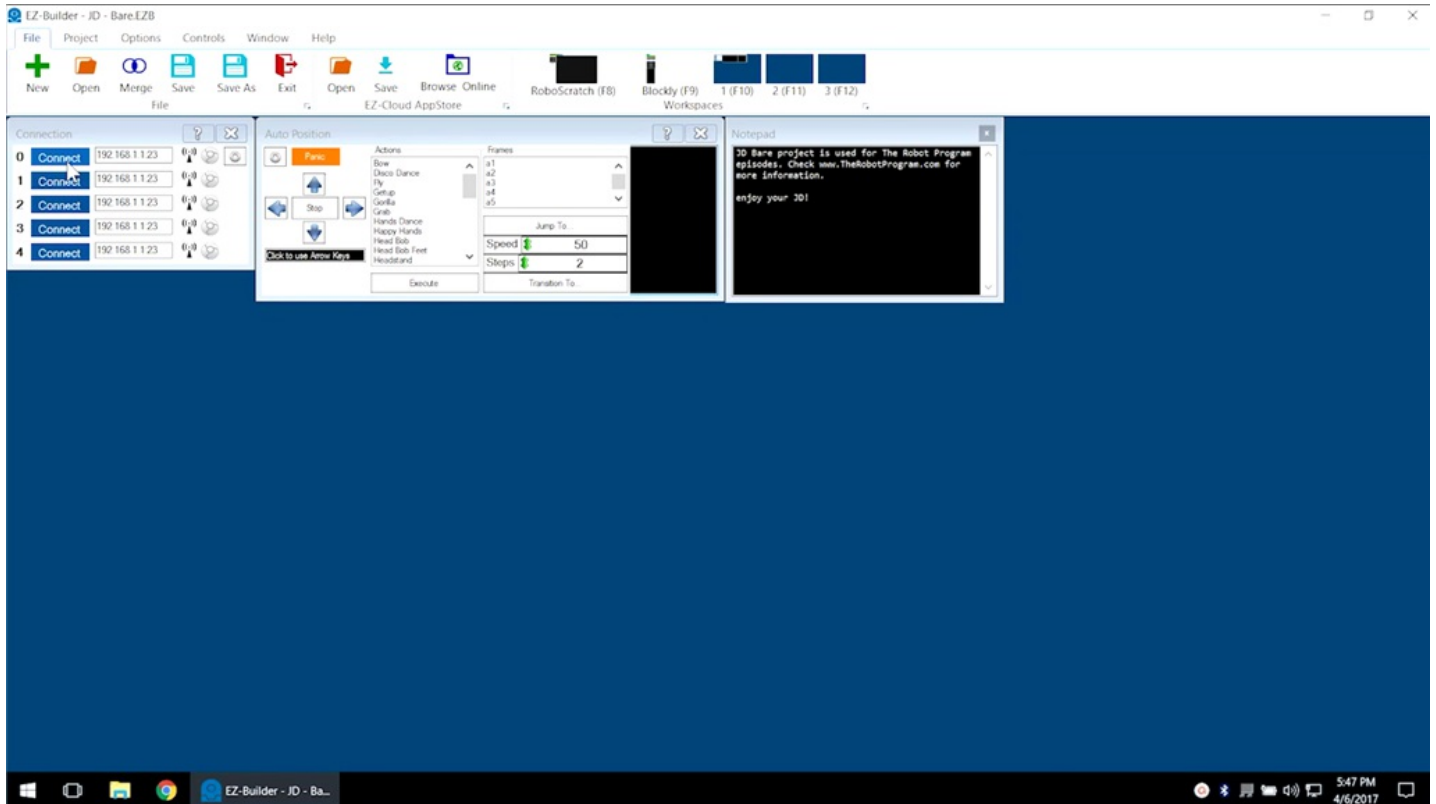
The bare project provides a simplified starting workspace with minimal controls.





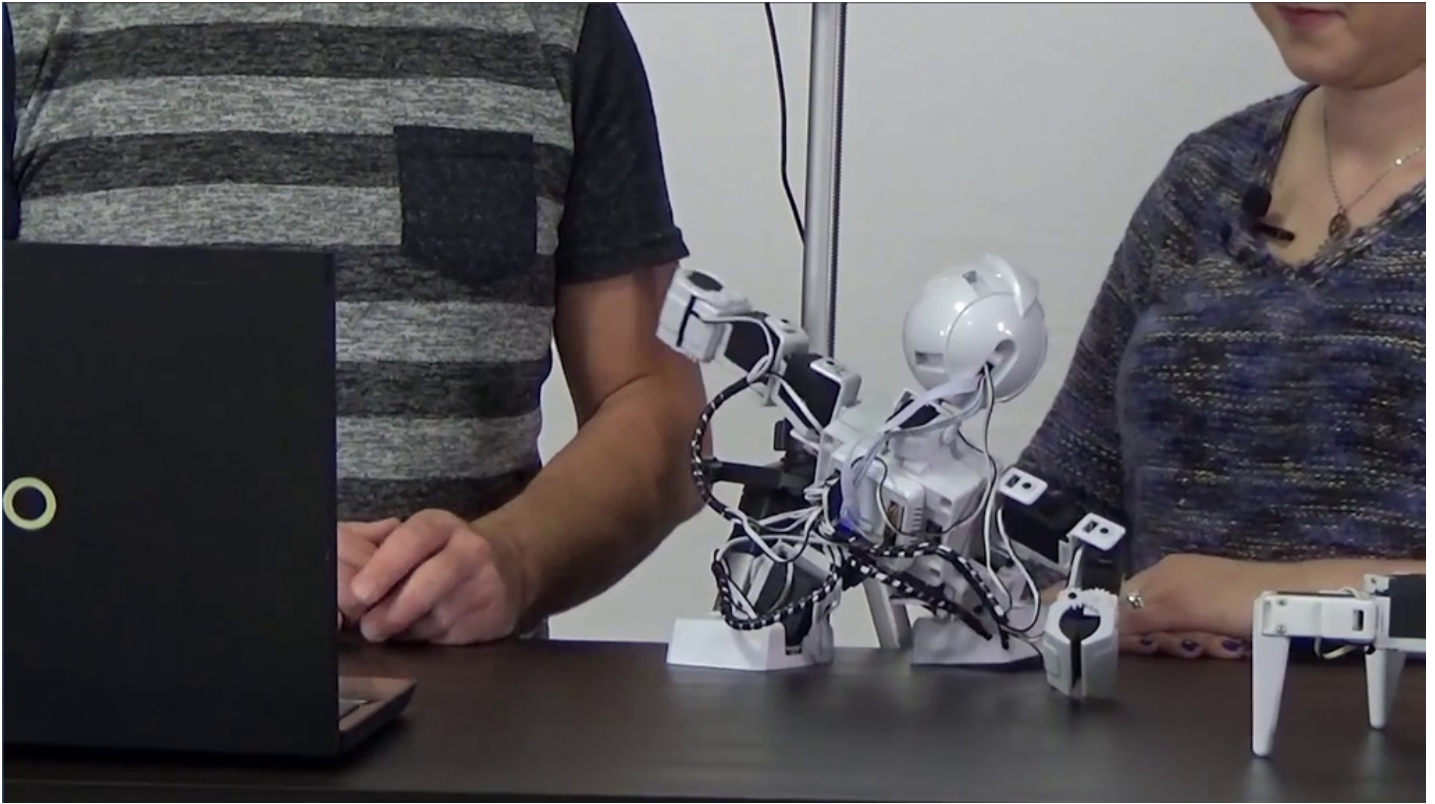
## Step 7

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



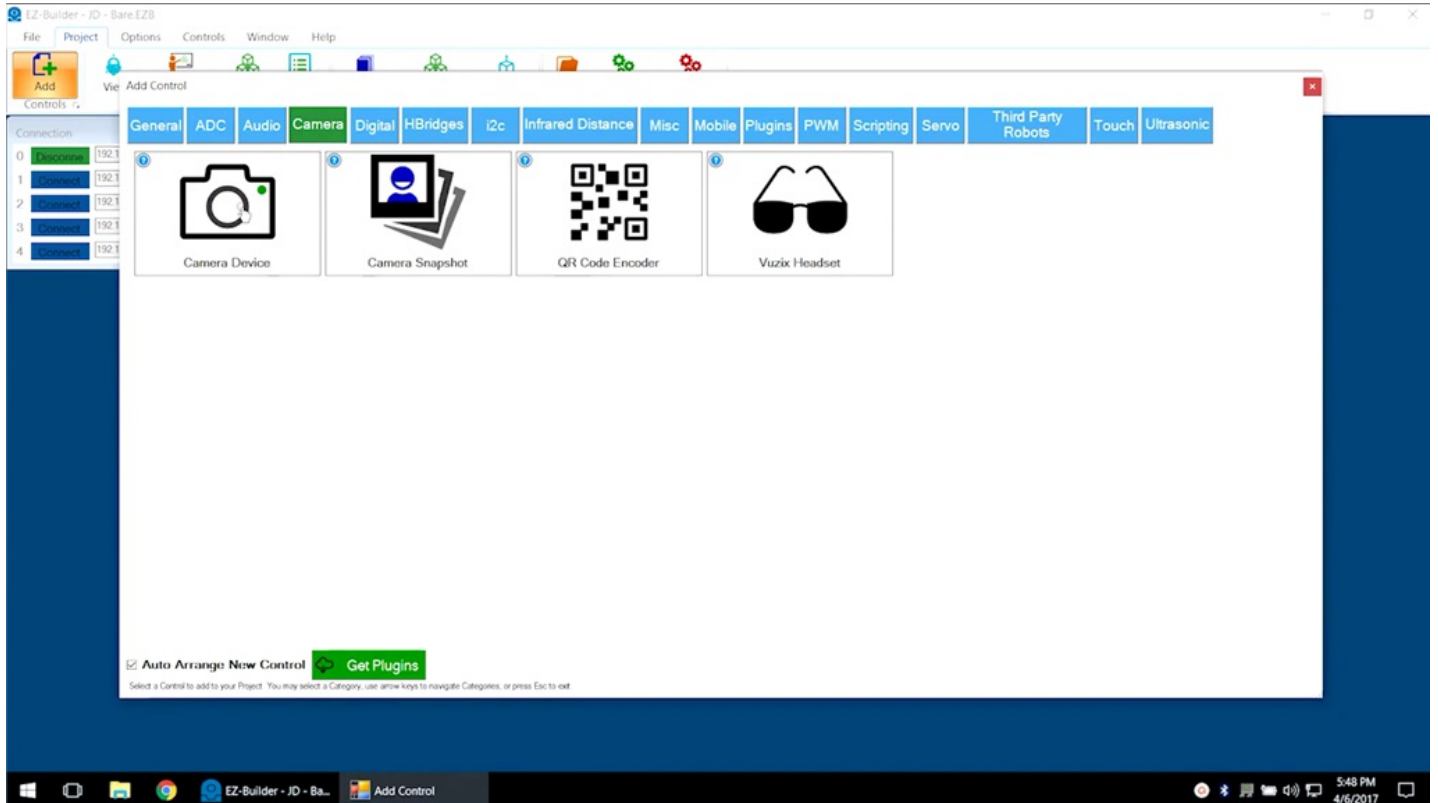
## Step 8

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



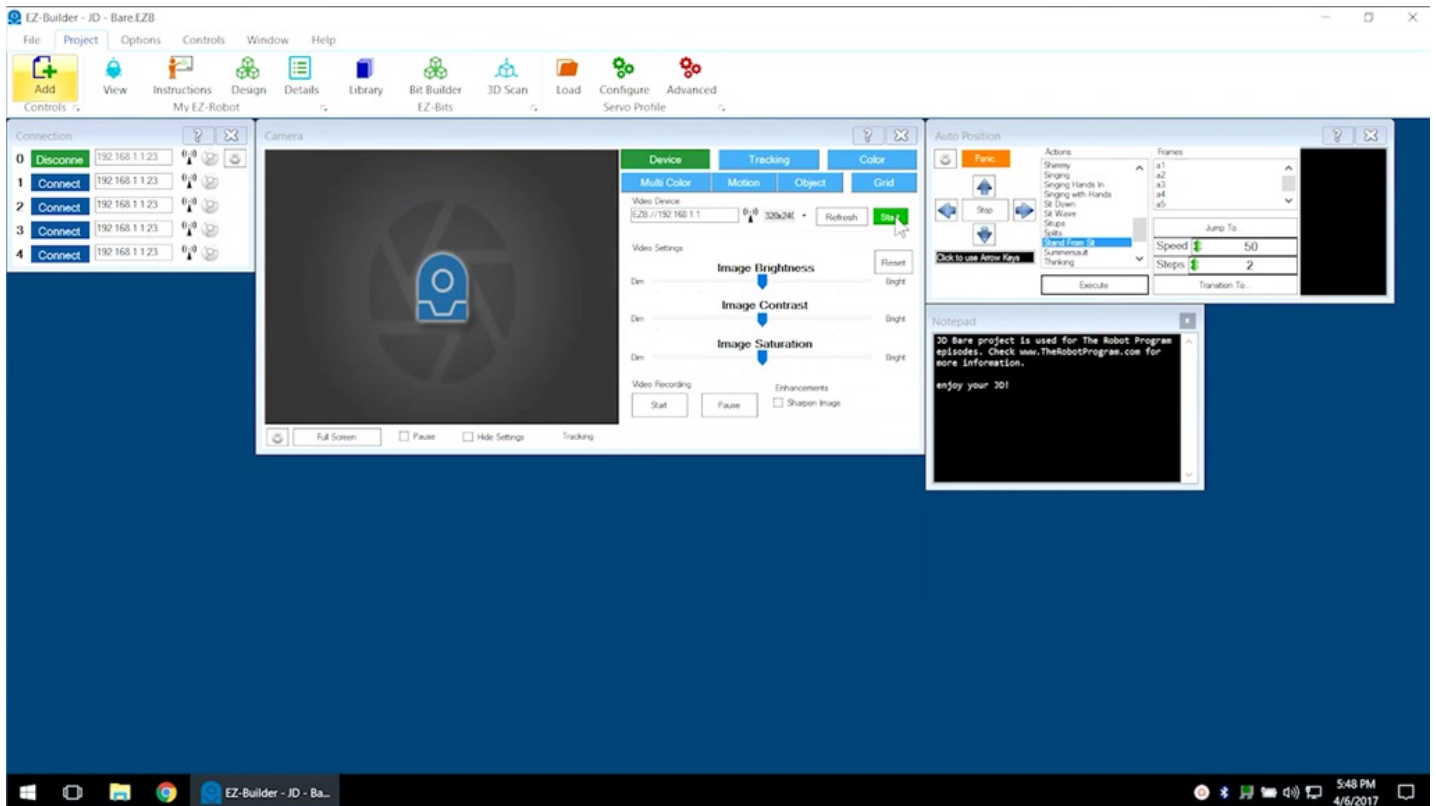
## Step 9

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



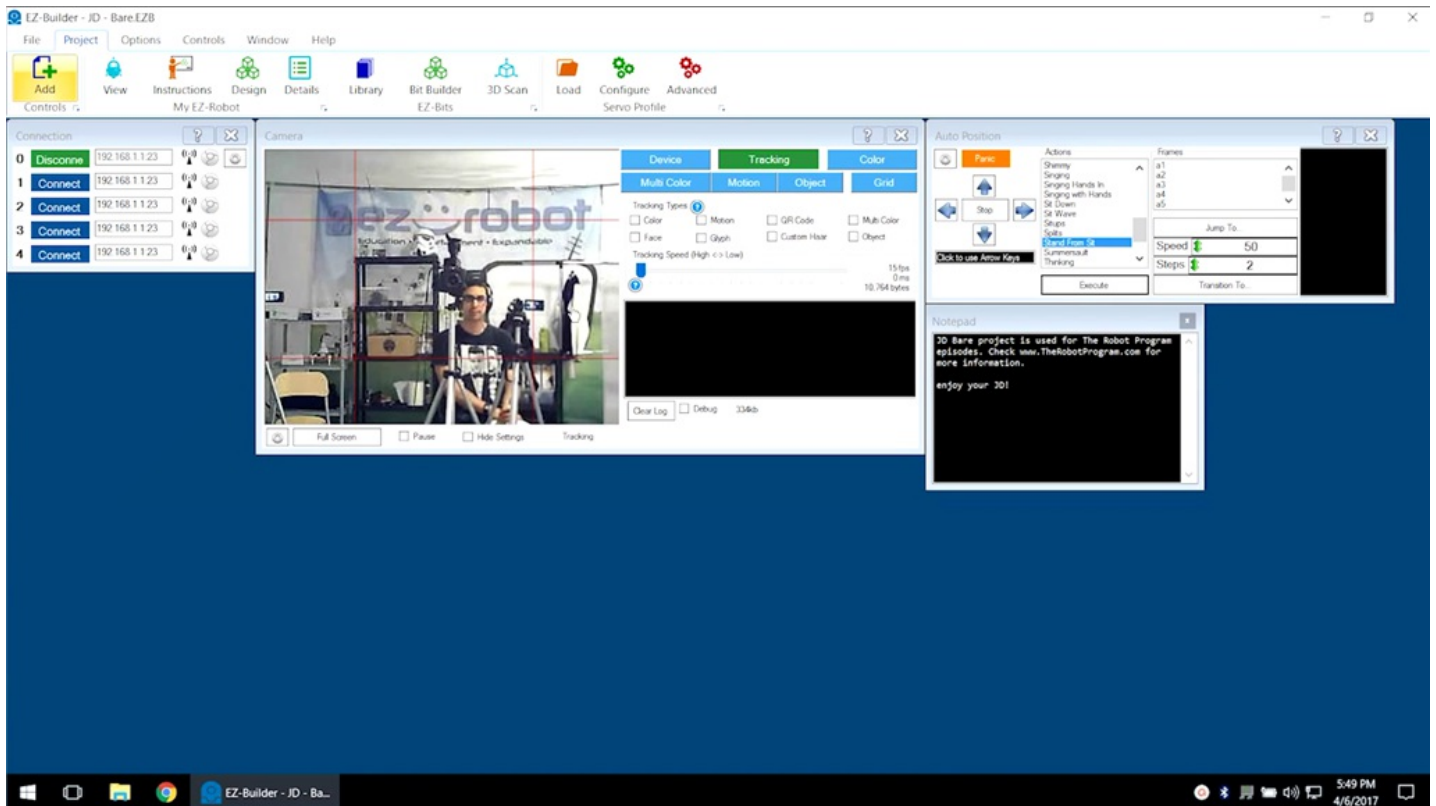
## Step 10

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.



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

- Connection:** A list of four connections, all with the IP address 192.168.1.123 and a status of "Connect".
- Camera:** The central panel showing a live video feed of a person in a robot. The "Tracking" tab is selected, with sub-tabs for Multi Color, Motion, Object, and Grid. Tracking types include Color, Face, Motion, QR Code, Multi-Color, and Object. Tracking speed is set to "High (> Low)".
- Auto Position:** A panel with a "Turn" button and a list of actions: Shanny, Singing, Singing Hands In, Singing with Hands, St. Owen, St. Wave, Sign, and Walk. It also has a "Click to use Arrow Keys" button and an "Execute" button.
- Notepad:** A small window containing 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 12

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

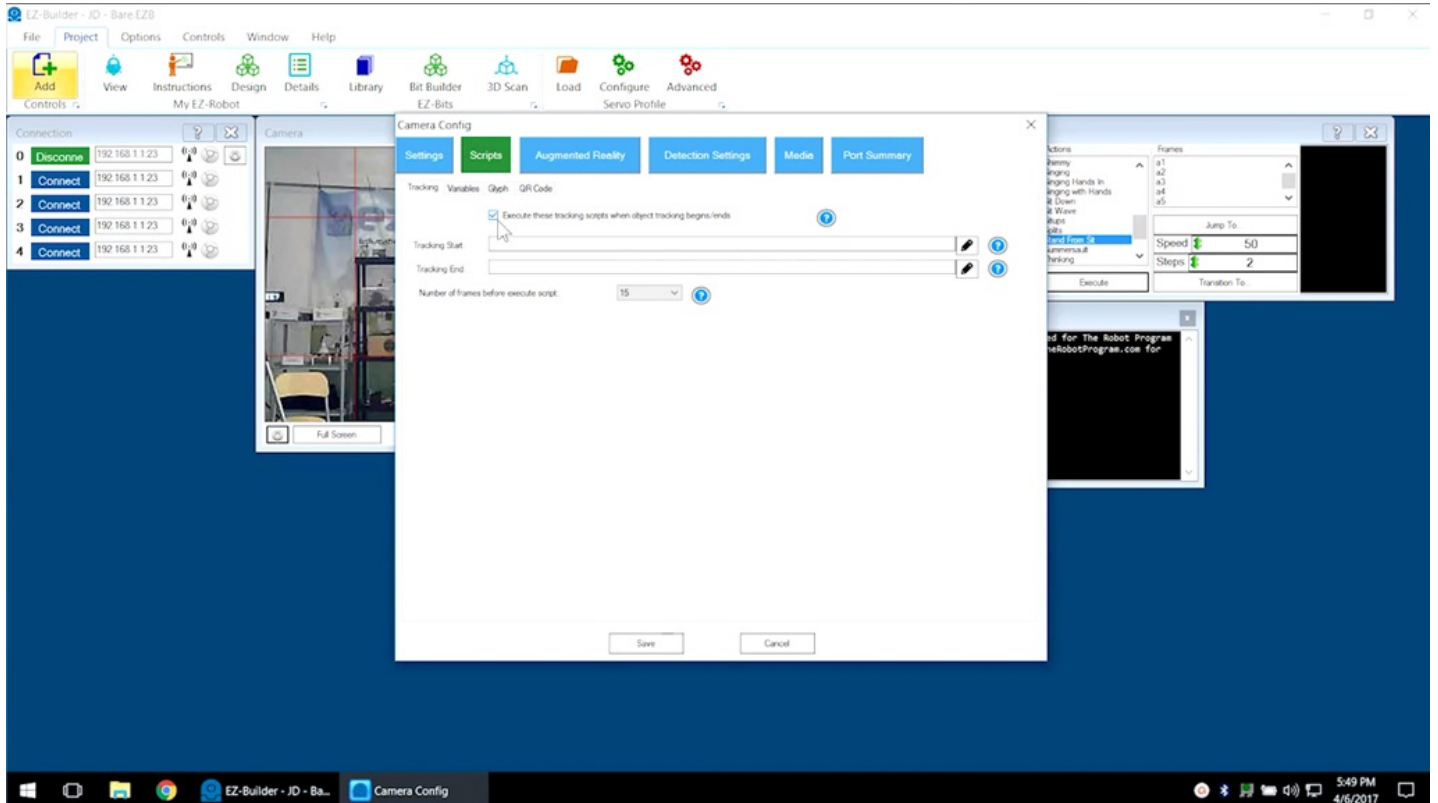
The screenshot displays the EZ-Builder software interface for a robot project. The main window is titled "EZ-Builder - JD - Bare.EZB". The interface includes a menu bar (File, Project, Options, Controls, Window, Help) and a toolbar with various icons. The central area is divided into several panels:

- Connection:** A list of four connection points, all showing "Connect" status and the IP address "192.168.1.123".
- Camera:** A live video feed of a robot in a workshop. Overlaid on the video are tracking settings for "Multi Color" (checked), "Motion" (checked), "Object" (checked), and "Grid" (checked). The "Tracking Speed (High < > Low)" is set to "14fps". Below the video is a "Clear Log" button and a "Debug" checkbox.
- Auto Position:** A panel with "Actions" (Shimmy, Singing, Singing with Hands, St. Wave, Slurp) and "Frames" (a1, a2, a3, a4, a5). It includes a "Jump To" field, "Speed" (50), and "Steps" (2) settings.
- Notepad:** A small window containing the text: "3D Bare project is used for The Robot Program episodes. Check [www.TheRobotProgram.com](http://www.TheRobotProgram.com) for more information. enjoy your 3D!"

The Windows taskbar at the bottom shows the system tray with the time "5:49 PM" and date "4/6/2017".

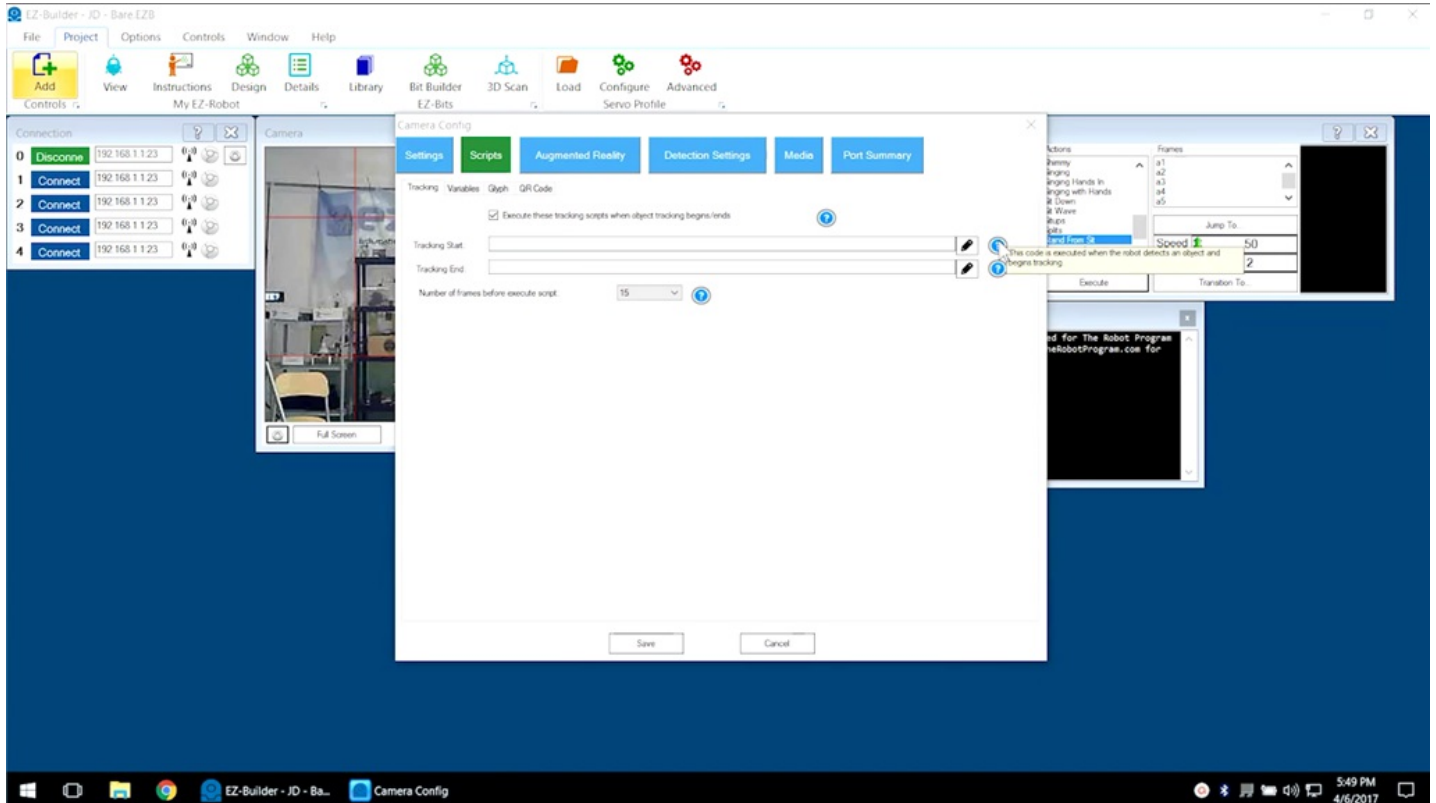
## Step 13

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



# Step 14

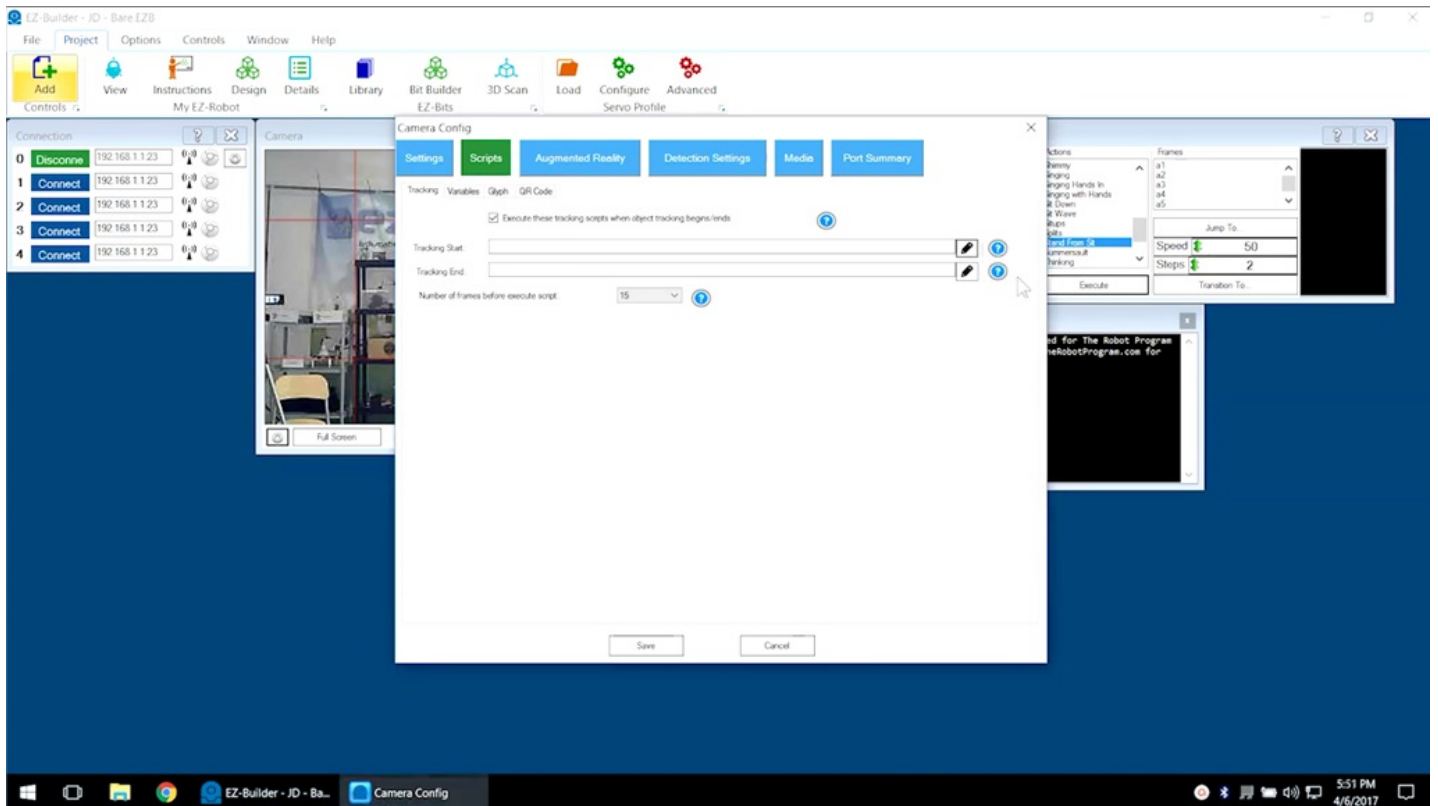
Hovering over any blue question mark will provide more information about an **EZ-Builder** feature.





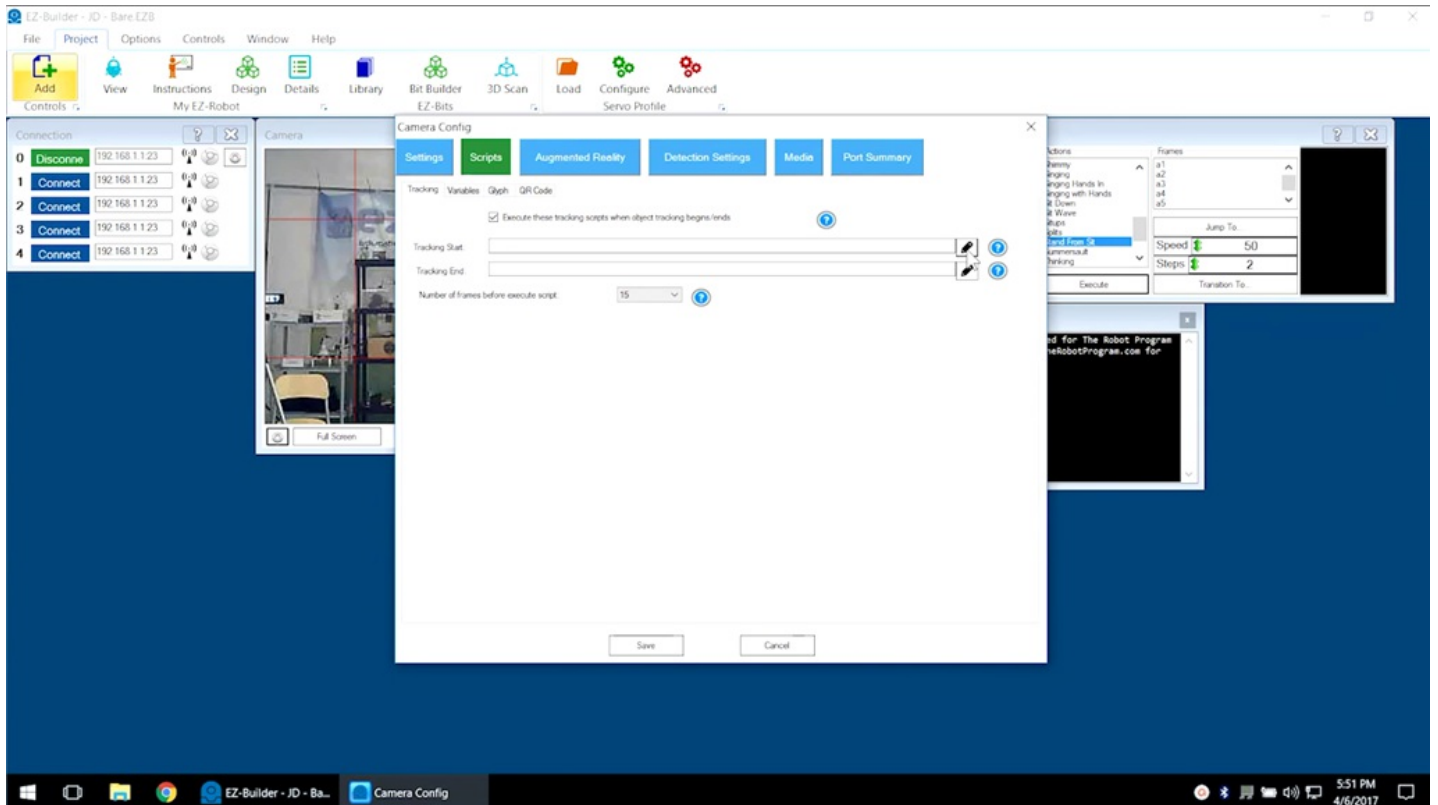
## Step 15

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



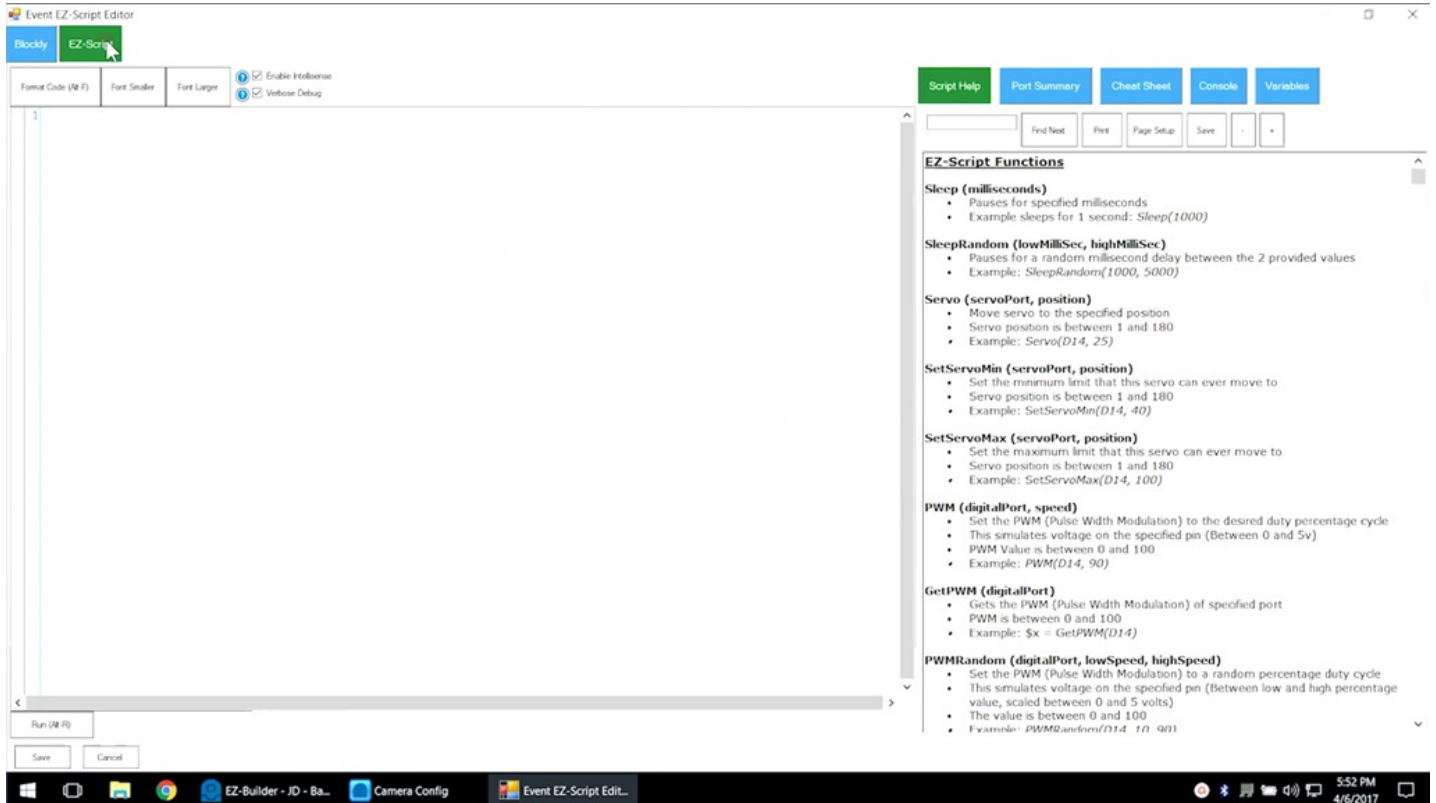
## Step 16

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.



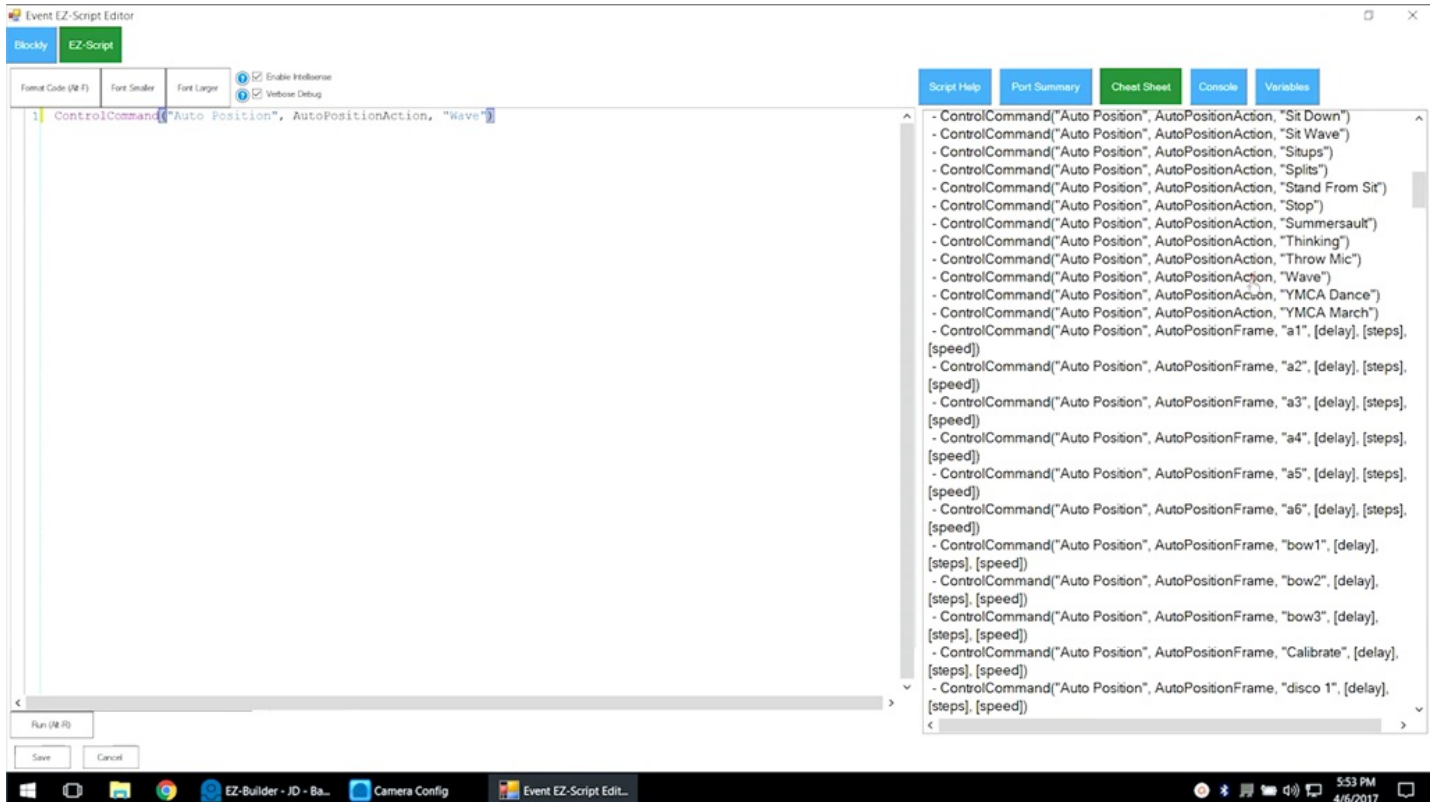
# Step 18

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 in the format `ControlCommand("Auto Position", AutoPositionAction, "ActionName")`. The controls include: Grab, Hands Dance, Happy Hands, Head Bob, Head Bob Feet, Kick, Left, Lunge Singing, Pass the Mic, Point, Predance, Pushups, Reverse, Right, Roll Hands, Shimmy, Singing, Singing Hands In, Singing with Hands, Sit Down, Sit Wave, Situps, Splits, Stand From Sit, Stop, Summersault, Thinking, Throw Mic, Wave (highlighted), YMCA Dance, and YMCA March. On the right, a panel titled "EZ-Script Functions" is visible, listing various functions like Sleep, SleepRandom, Servo, SetServoMin, SetServoMax, PWM, GetPWM, and PWMRandom with their respective descriptions and examples. 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 tray on the right shows the time as 5:33 PM on 4/6/2017.

## Step 20

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

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

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

An Intellisense dropdown menu is visible below the `say` command, listing the following options:

- say("Text to speak")
- sayEZB("Text to speak")
- sayEZBWait("Text to speak")
- sayWait("Text to speak")

On the right side of the editor, there is a panel titled "EZ-Script Functions" which lists various functions with their descriptions and examples:

- 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. Other open applications include EZ-Builder - JD - Ba... and Camera Config.

# Step 21

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

The screenshot displays 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 interface includes a menu bar with options like "Format Code (Alt F)", "Font Smaller", "Font Larger", "Enable IntelliSense", and "Verbose Debug". A toolbar at the top right contains "Script Help", "Port Summary", "Cheat Sheet", "Console", and "Variables". Below the toolbar is a search bar with "Find Next", "Prev", "Page Setup", "Save", and a dropdown menu.

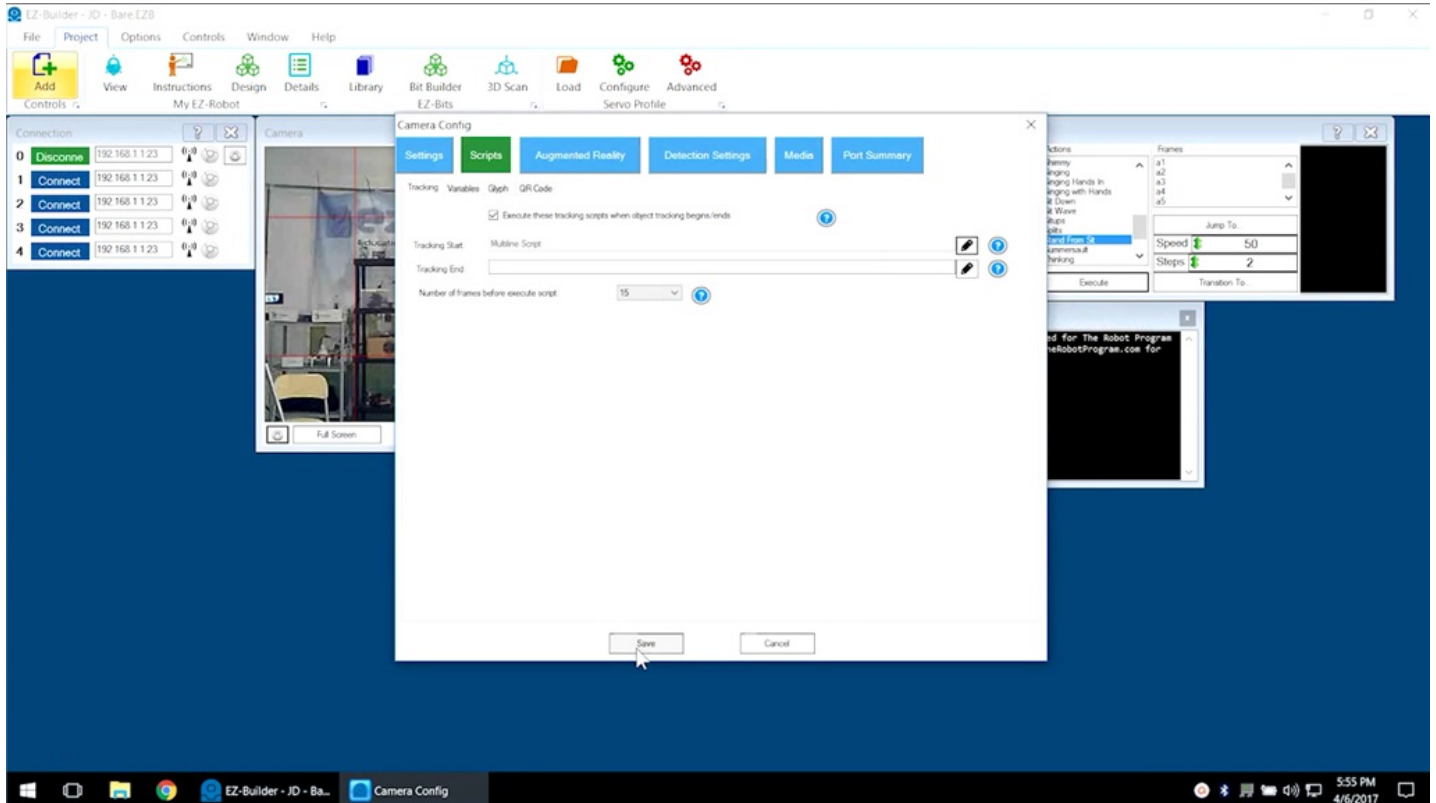
The right-hand pane is titled "EZ-Script Functions" and lists several functions with their descriptions and examples:

- 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)`
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  - Gets the PWM (Pulse Width Modulation) of specified port
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  - Example: `$x = GetPWM(D14)`
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  - 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 bottom of the window shows a taskbar with open applications: "EZ-Builder - JD - Ba...", "Camera Config", and "Event EZ-Script Edit...". The system tray on the right indicates the time is 5:54 PM on 4/6/2017.

## Step 22

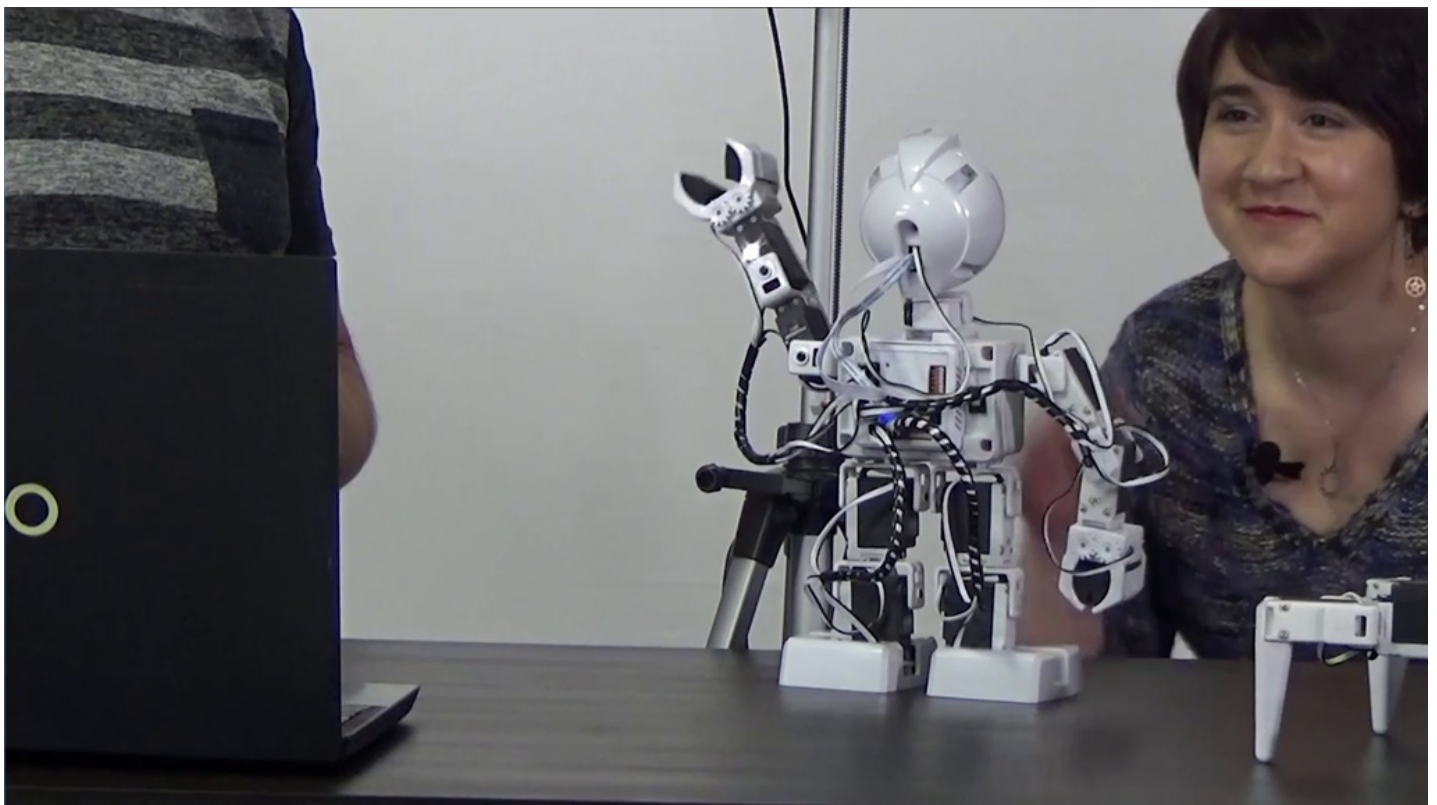
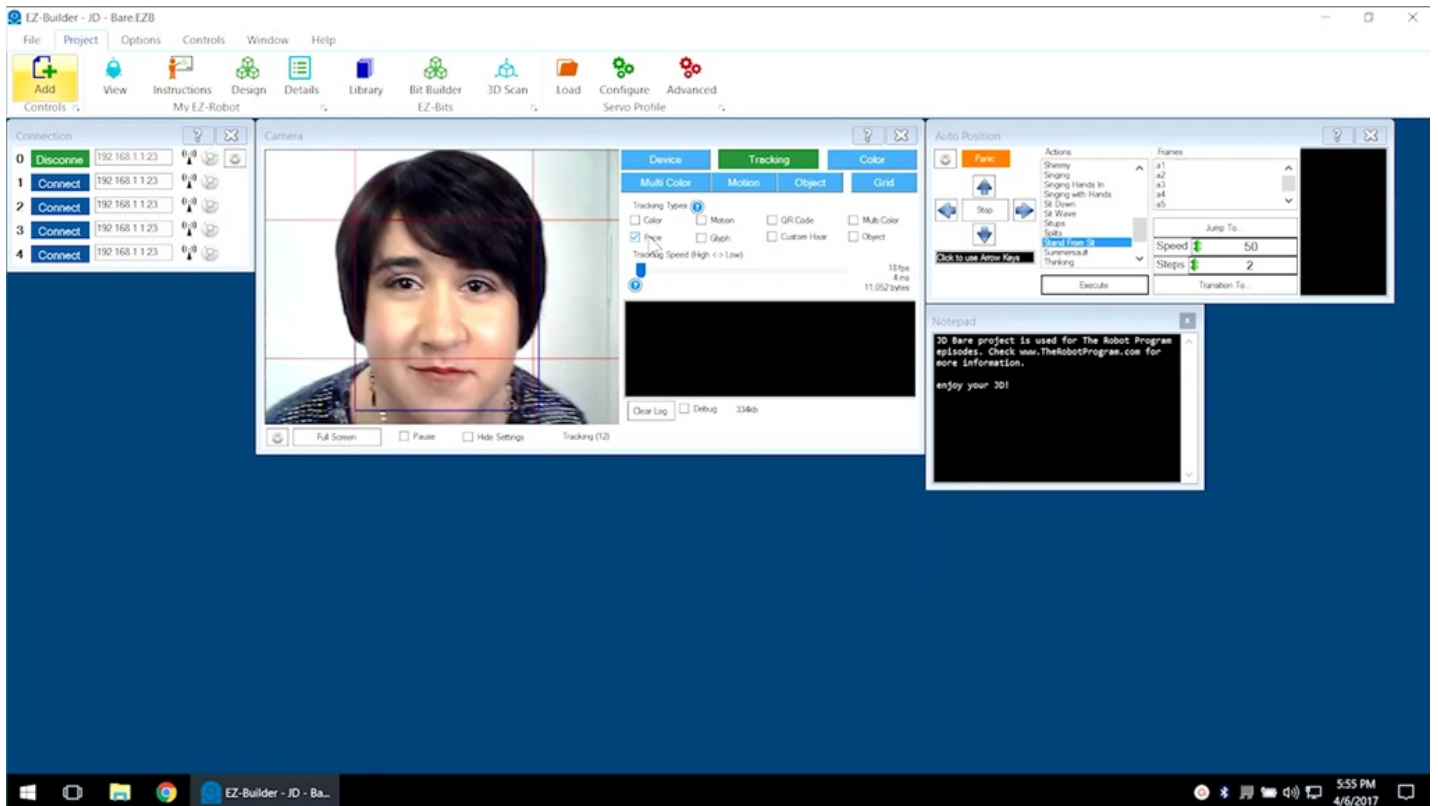
Save the code and return. The script will execute for any selected tracking type.





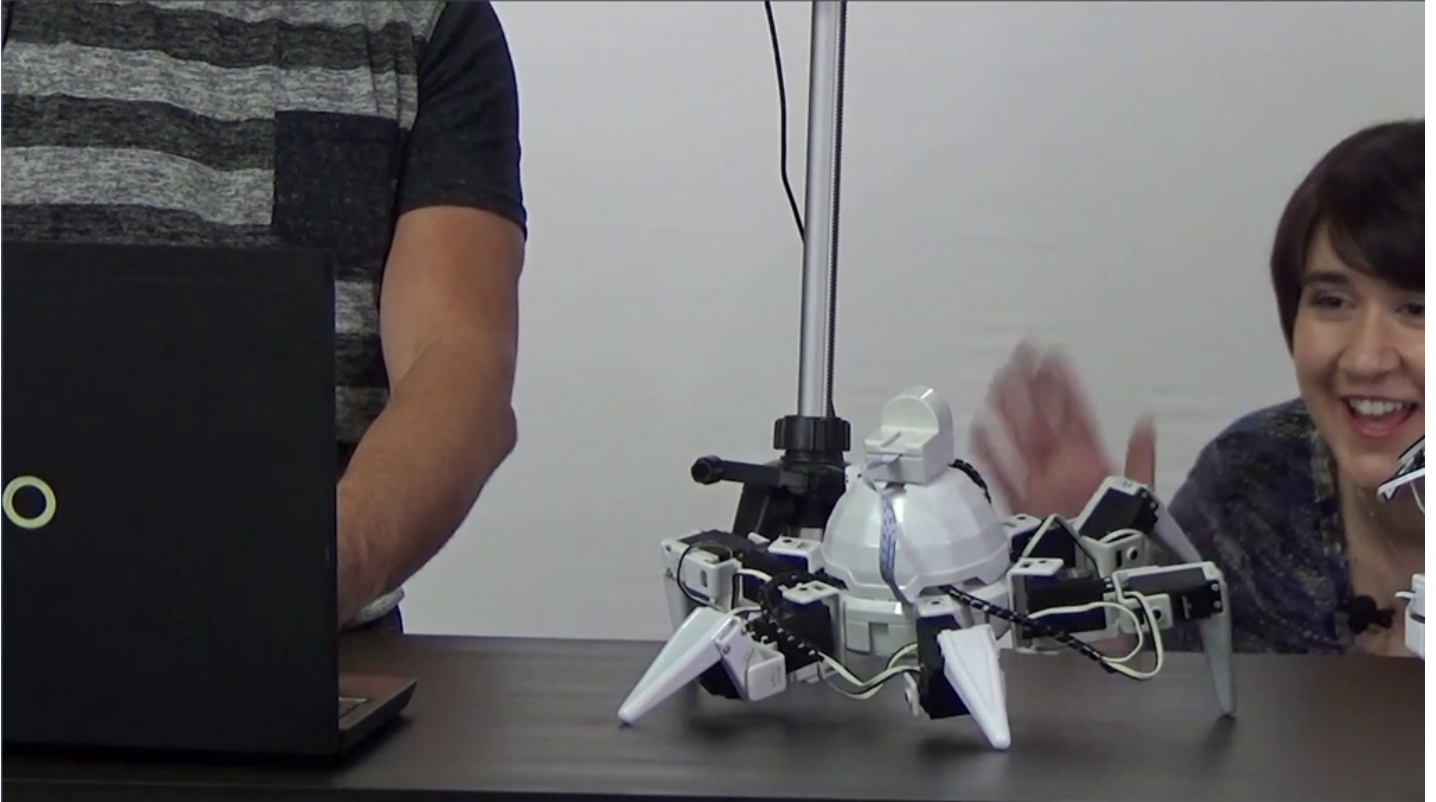
## Step 23

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.



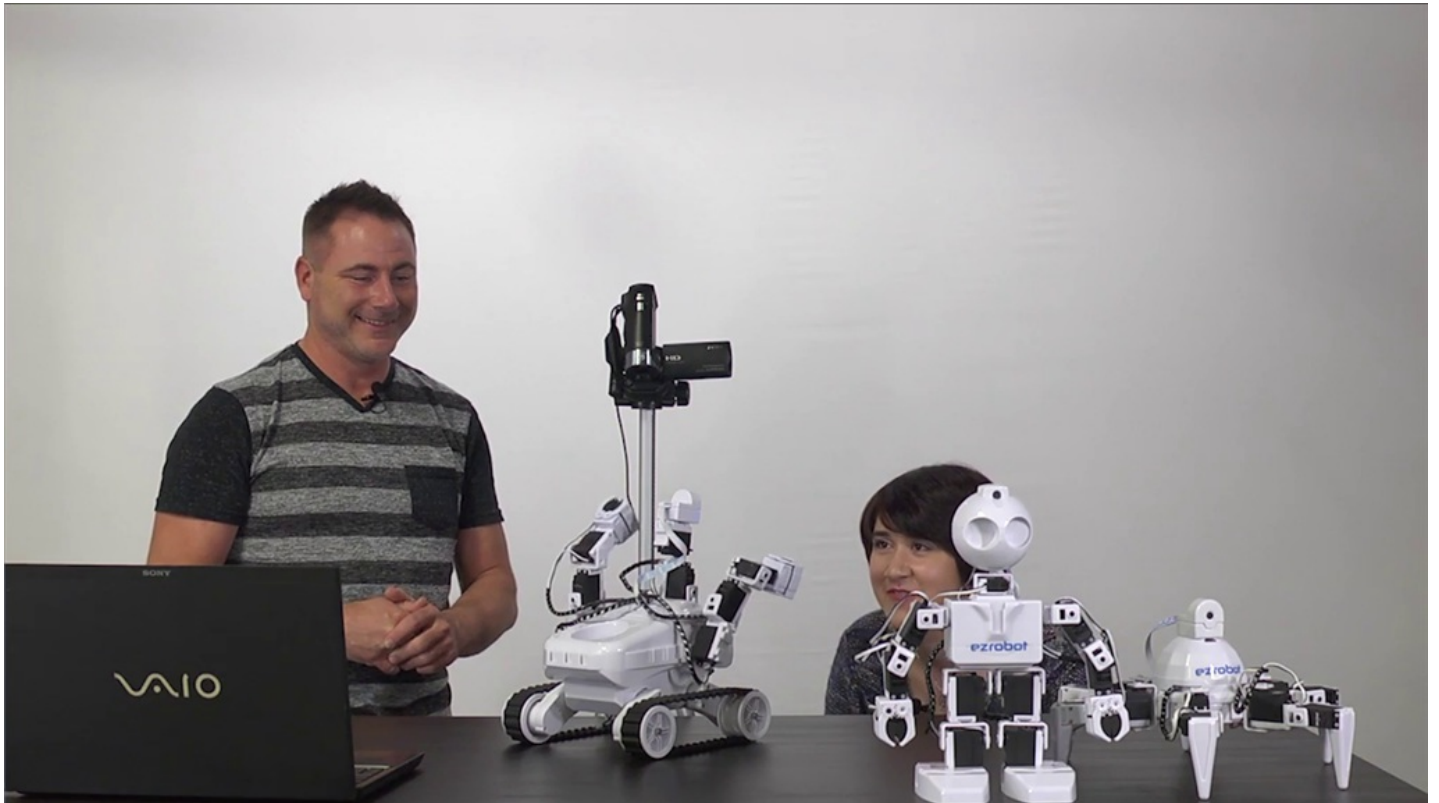
## Step 24

**Revolution Six** will execute the same steps.



## Step 25

**Revolution Roli** will execute the same steps.



## Quiz

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**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.