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The Robot Program Episode 021: Detect Face and Wave - Blockly

This lesson will demonstrate how to use Blockly 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 **Blockly**. Follow along with The Robot Program Episode 021: Detect Face and Wave - Blockly.

View the video episode here: <https://www.ez-robot.com/Tutorials/Lesson/95>

Last Updated: 6/12/2018

Professor E's Overview

This lesson demonstrated how to enable facial detection and how to trigger an action using a **Blockly** 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).

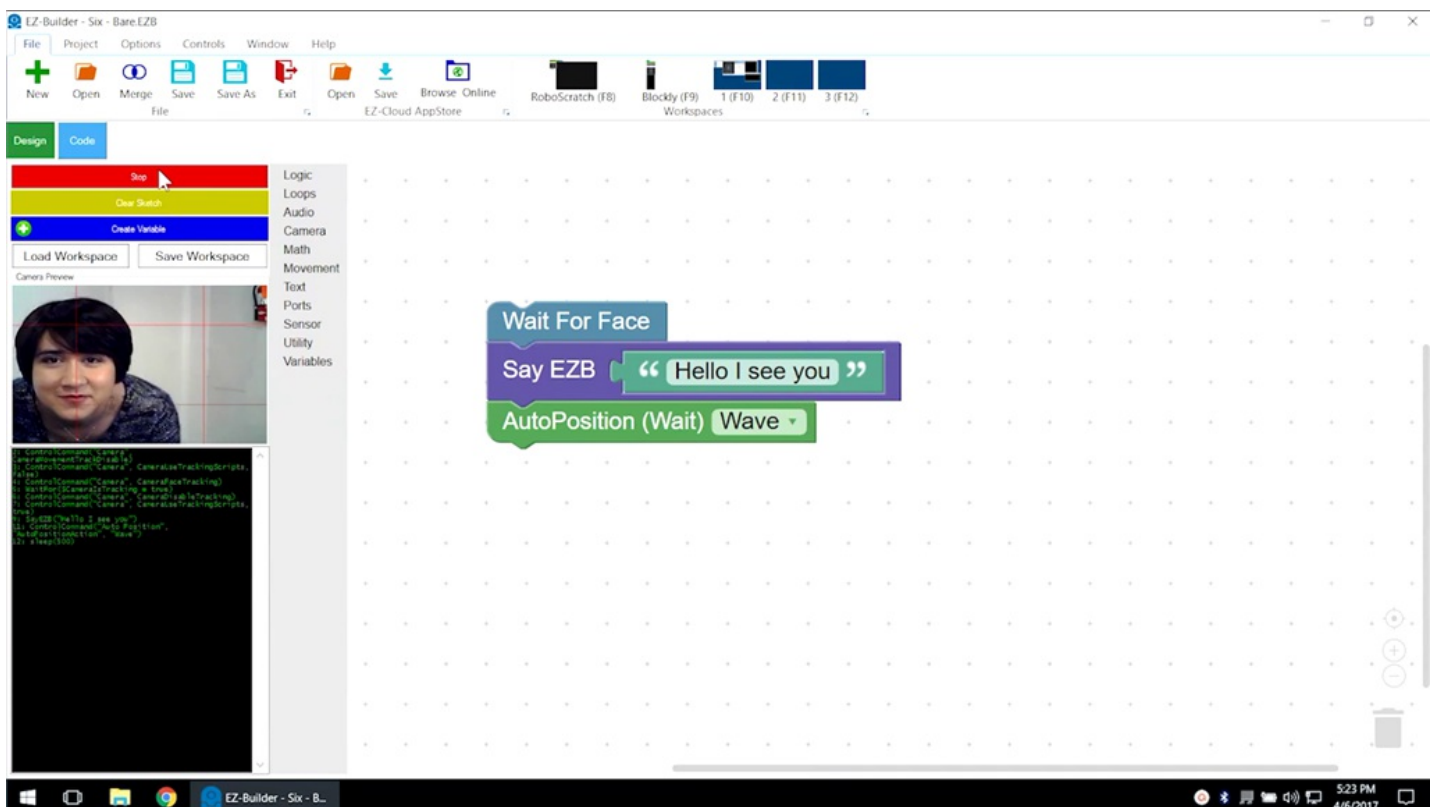
Open the **Blockly** workspace. Add the **Wait For Face** command. This command tells the robot to wait until it detects a face before moving on to the next line of code.

Add **Say EZB** and type in the desired speech. This command does not include a **Wait**, so it will execute and move immediately to the next command while the robot is still speaking. The audio will be output through the **EZ-B Robot Controller**.

Add **AutoPosition (Wait)** and choose an action, such as **Wave**. The use of **Wait** means that the action will be fully completed before moving on to the next line of code.

Click on **Start** to begin execution. Use the **Code** tab to view the **EZ-Script** code that was generated by the **Blockly** commands.

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



The screenshot displays the EZ-Builder software interface. The top menu bar includes File, Project, Options, Controls, Window, and Help. Below the menu is a toolbar with icons for New, Open, Merge, Save, Save As, Exit, Open, Save, Browse Online, and Workspaces. The main workspace is divided into Design and Code tabs. The Design tab is active, showing a camera preview window with a person's face and a red bounding box. The Blockly workspace contains a script with three blocks: 'Wait For Face', 'Say EZB' with the text 'Hello I see you', and 'AutoPosition (Wait)' with the action 'Wave'. The Code tab is also visible, showing the generated EZ-Script code.

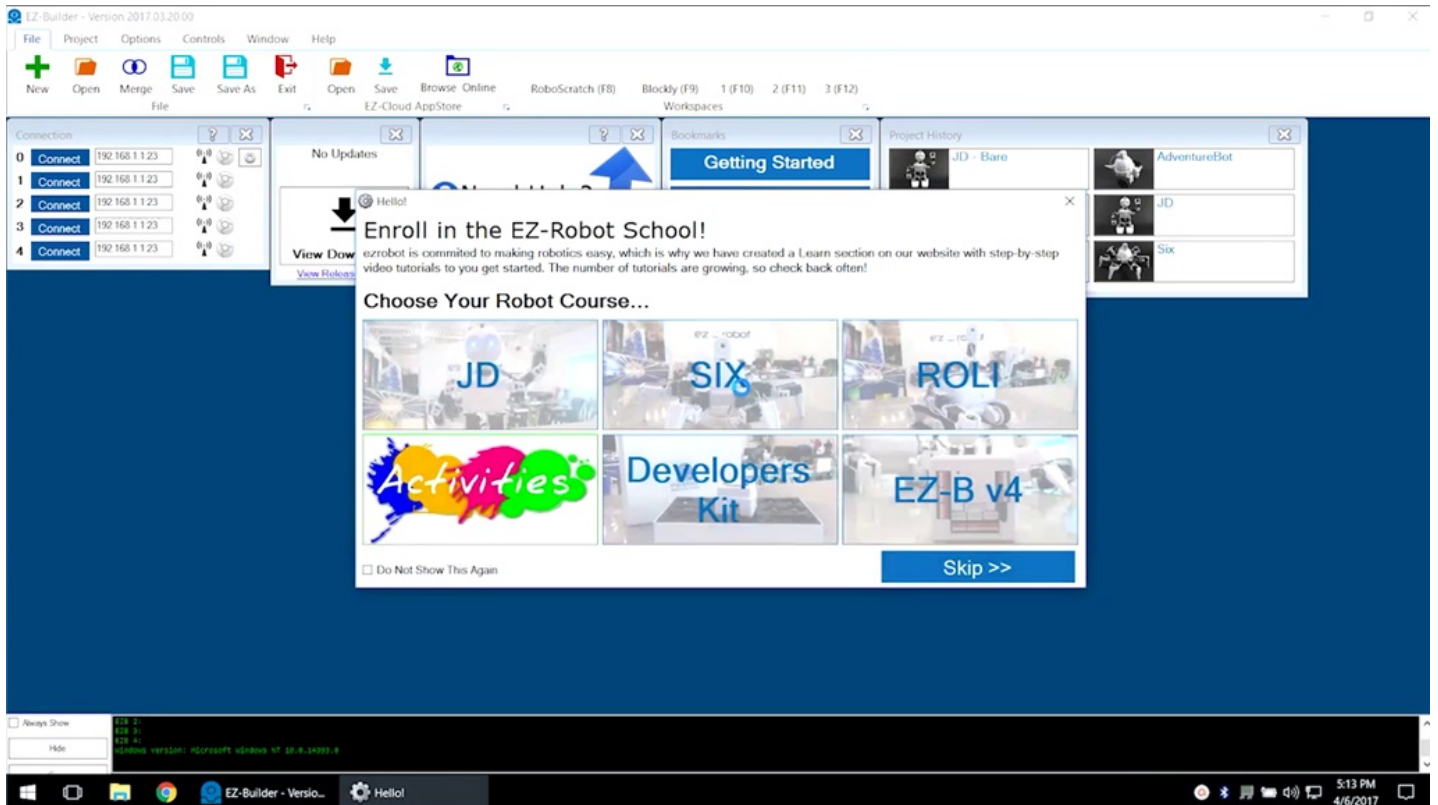
Step 1

Learn how to use **RoboScratch** to make the robot wave when it recognizes a face. Always begin with a fully charged robot. This example will use **Revolution JD**.



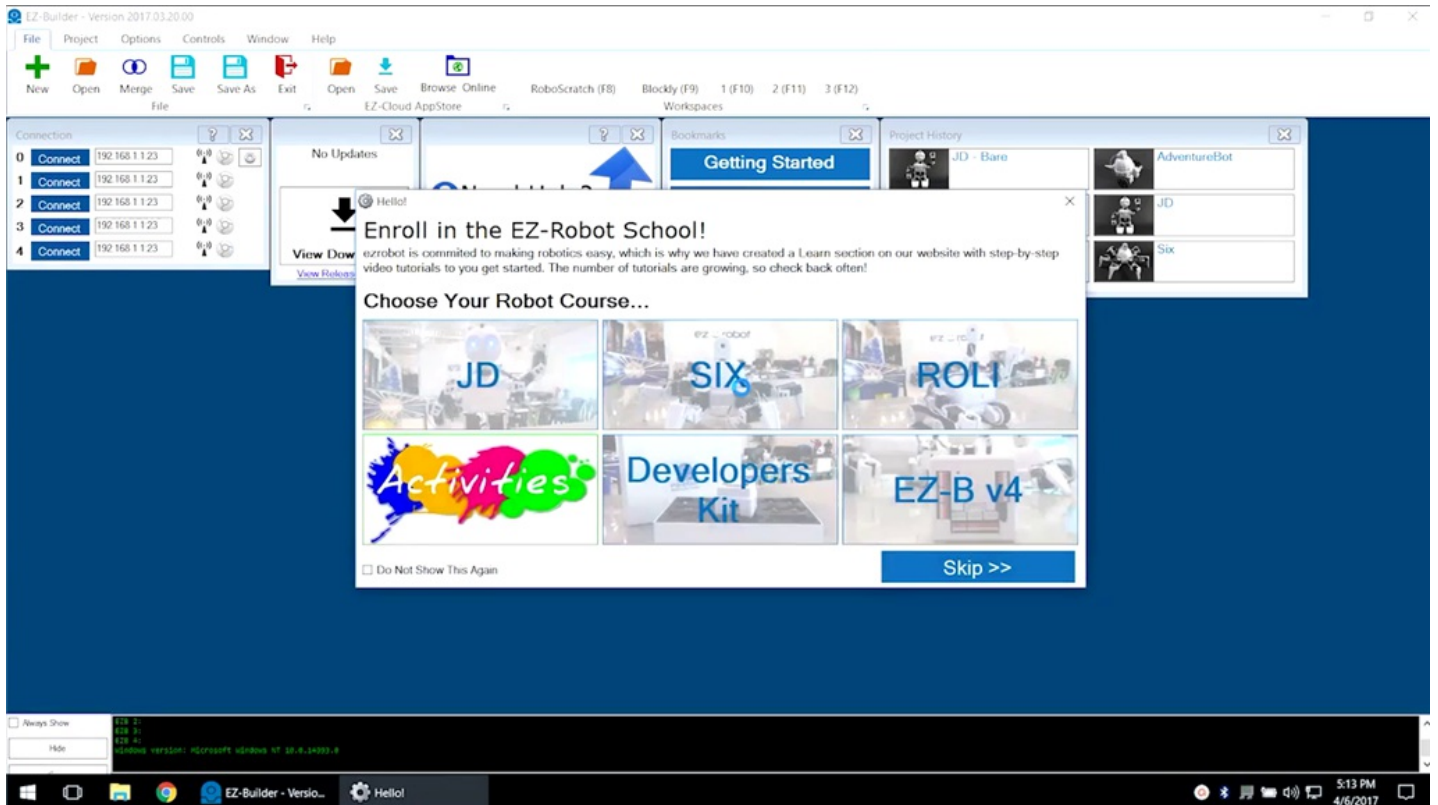
Step 2

Load the **EZ-Builder** software.



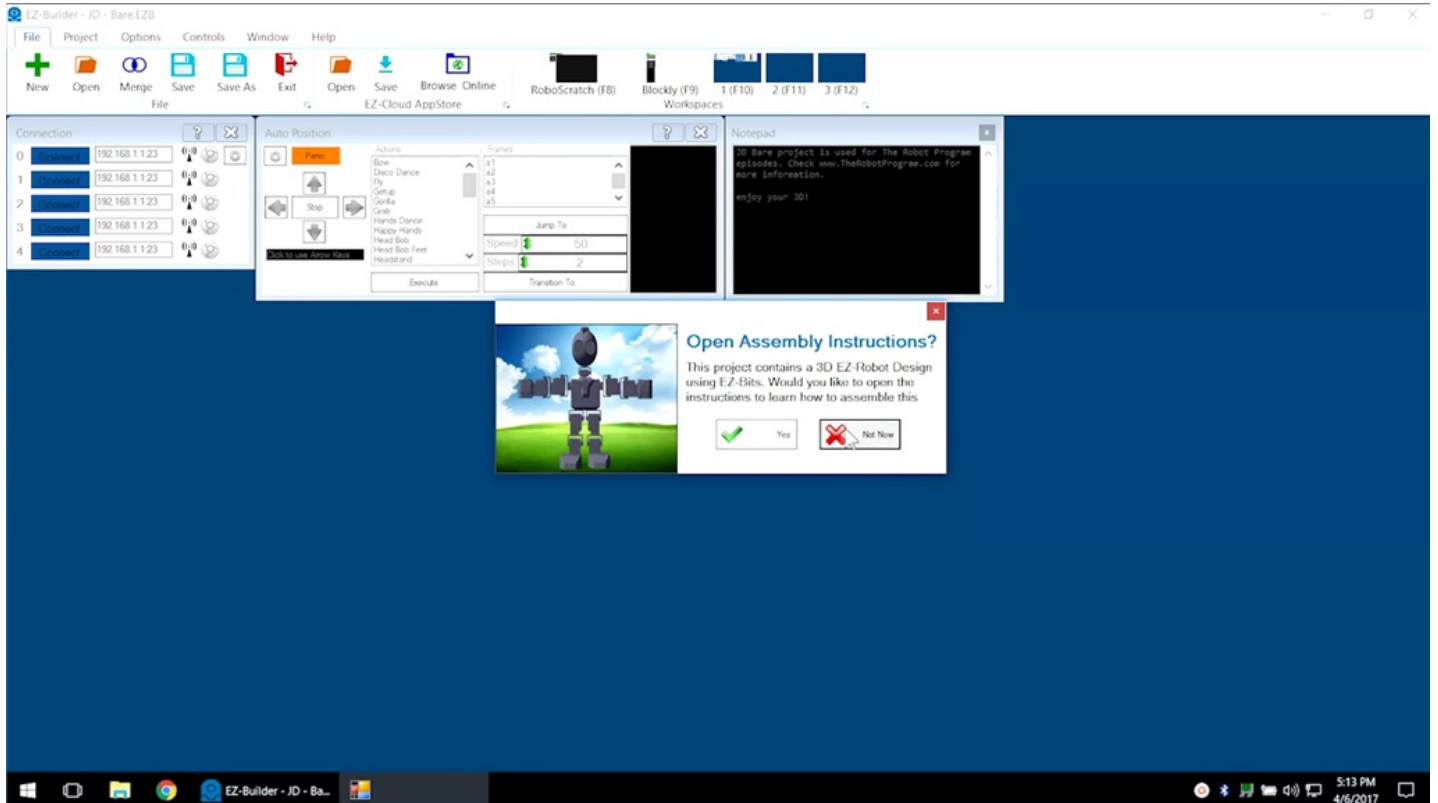
Step 3

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



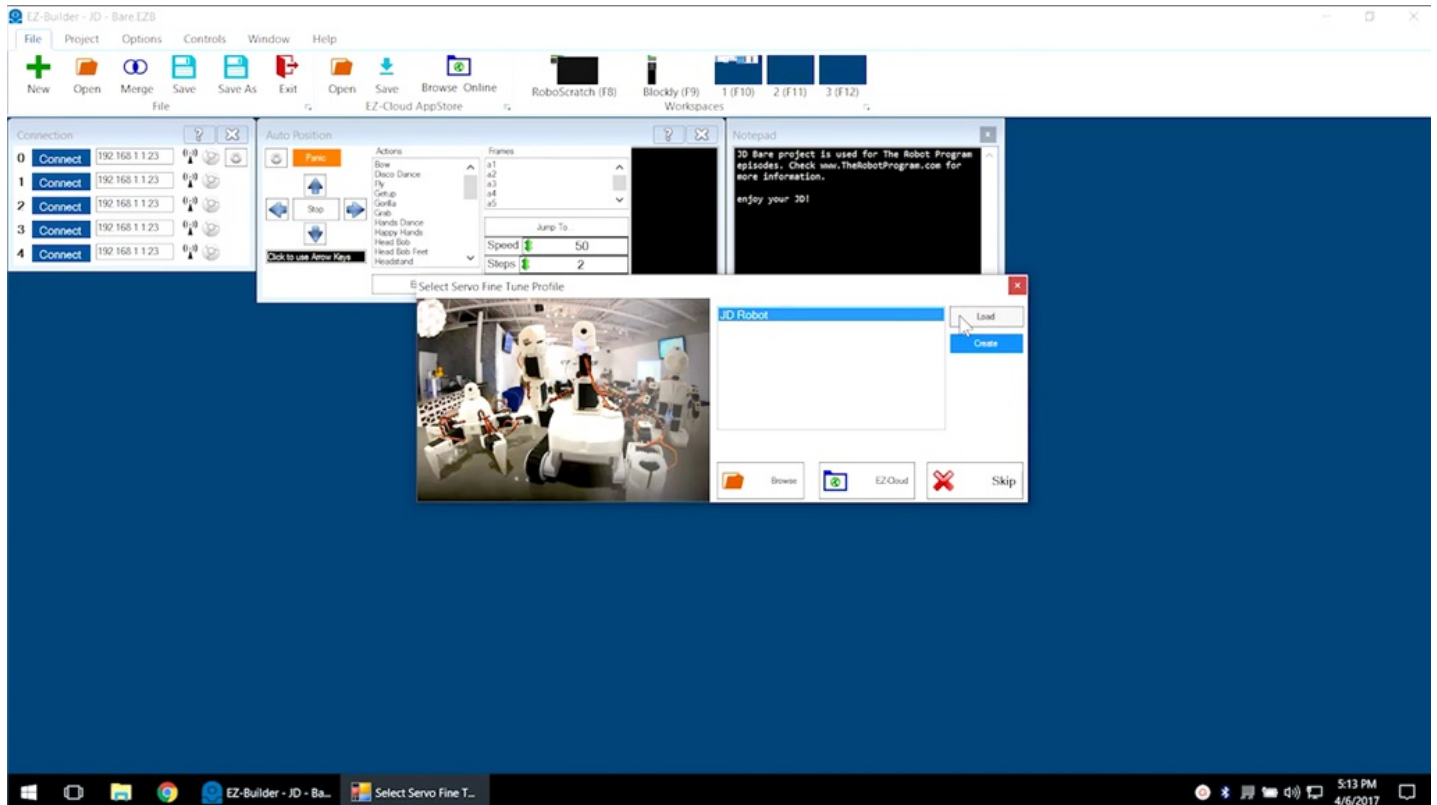
Step 4

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



Step 5

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



Step 6

Power on the fully charged robot. Use Wi-Fi to connect to the EZ-B and click on the blue **Connect** button.

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 New, Open, Merge, Save, Save As, Exit, Open, Save, Browse Online, and Workspaces. The interface is divided into several panels:

- Connection:** A table with 4 rows, each showing a "Connect" button and the IP address "192.168.1.123".
- Auto Position:** A panel with a "Pause" button, a "Stop" button, and a "Click to use Arrow Key" button. It also features a list of actions (Bow, Disco Dance, Fly, Getup, GoUp, Grab, Hands Dance, Happy Hands, Head Bob, Head Bob Feet, Headstand) and a "Frames" list (a1-a5). Below this are sliders for "Speed" (set to 50) and "Steps" (set to 2), and an "Execute" button.
- Notepad:** A text area containing the text: "JD Bare project is used for The Robot Program episodes. Check www.TheRobotProgram.com for more information. enjoy your JD!"

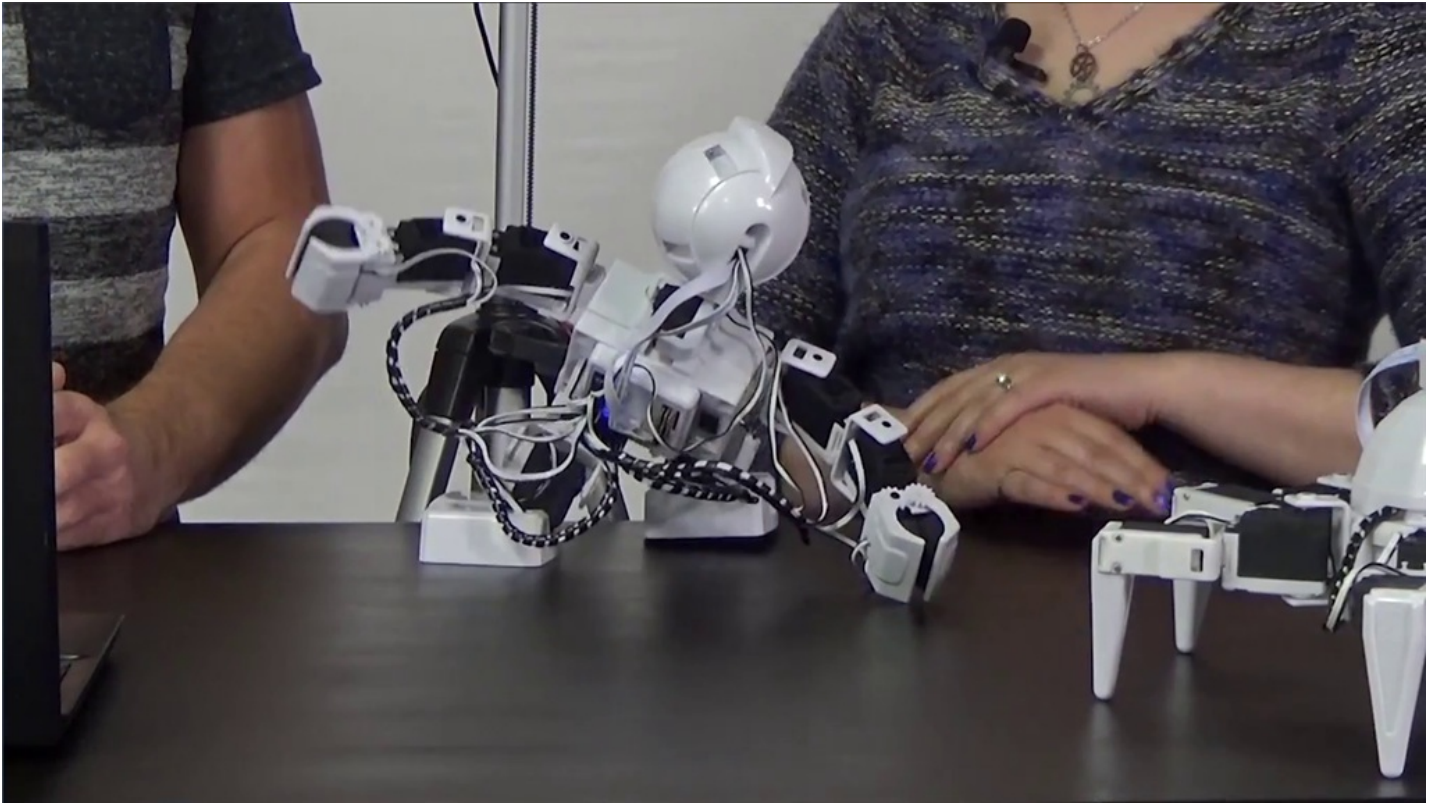
On the right side of the screen, a Windows network settings panel is open, showing the following options:

- Ethernet Connected
- EZ-B v4 JD1 Open (Connecting) with a "Cancel" button
- ez-education Secured
- EZ-Robot 3 Secured
- EZ-Robot Guest Secured
- EZ-Robot Operations

At the bottom of the network settings panel, there is a "Network settings" link and a "Wi-Fi" button (which is highlighted in blue) next to an "Airplane mode" button. The Windows taskbar at the bottom shows the time as 5:16 PM on 4/6/2017.

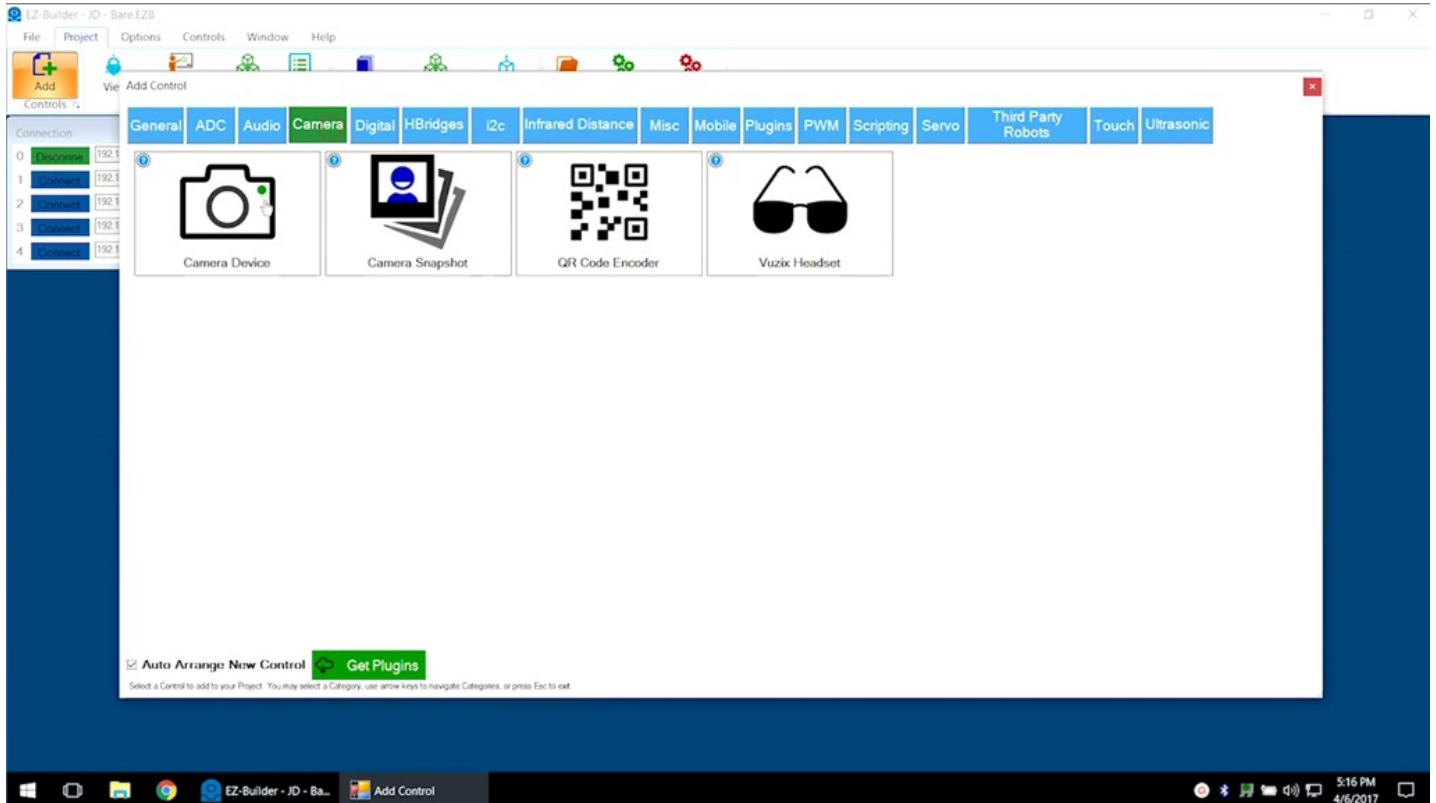
Step 7

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



Step 8

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



Step 9

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

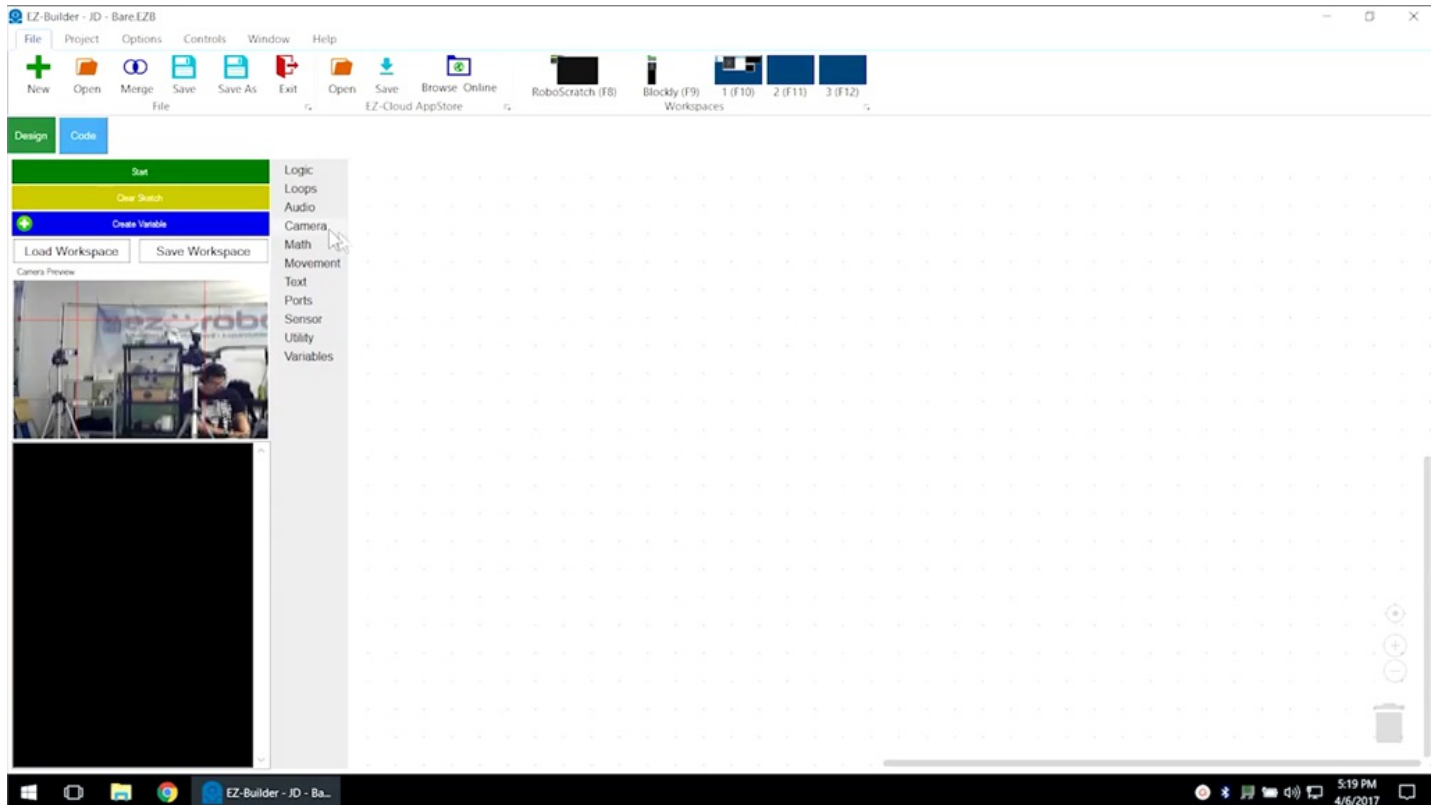
The screenshot displays the EZ-Builder software interface. The main window is titled "EZ-Builder - JD - Bare.EZB". The interface is divided into several panels:

- Connection Panel:** Shows a list of connection attempts. The first attempt is "Disconnect" at 192.168.1.123. The subsequent four attempts are "Connect" at the same IP address, all showing a signal strength of 0 dBm.
- Camera Panel:** Contains a video feed area (currently showing a blue robot head icon) and a settings panel. The settings panel includes tabs for "Device", "Tracking", and "Color". Under "Device", the "Video Device" is set to "EZB://192.168.1.1" with a resolution of "320x240". A green "Start" button is visible. Below this are sliders for "Image Brightness", "Image Contrast", and "Image Saturation", each with a "Reset" button. There are also "Start" and "Pause" buttons for "Video Recording" and an "Enhancements" section with a "Sharpen Image" checkbox.
- Auto Position Panel:** Features a "Turn" button, a list of actions (Bow, Disco Dance, Fly, Getup, Goofa, Grab, Hands Dance, Happy Hands, Head Bob, Head Bob Feet, Headstand), and a "Frames" list (a1-a5). It also includes "Speed" (set to 50) and "Steps" (set to 2) controls, along with "Execute" and "Transition To" buttons.
- Notepad Panel:** 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 5:17 PM on 4/5/2017.

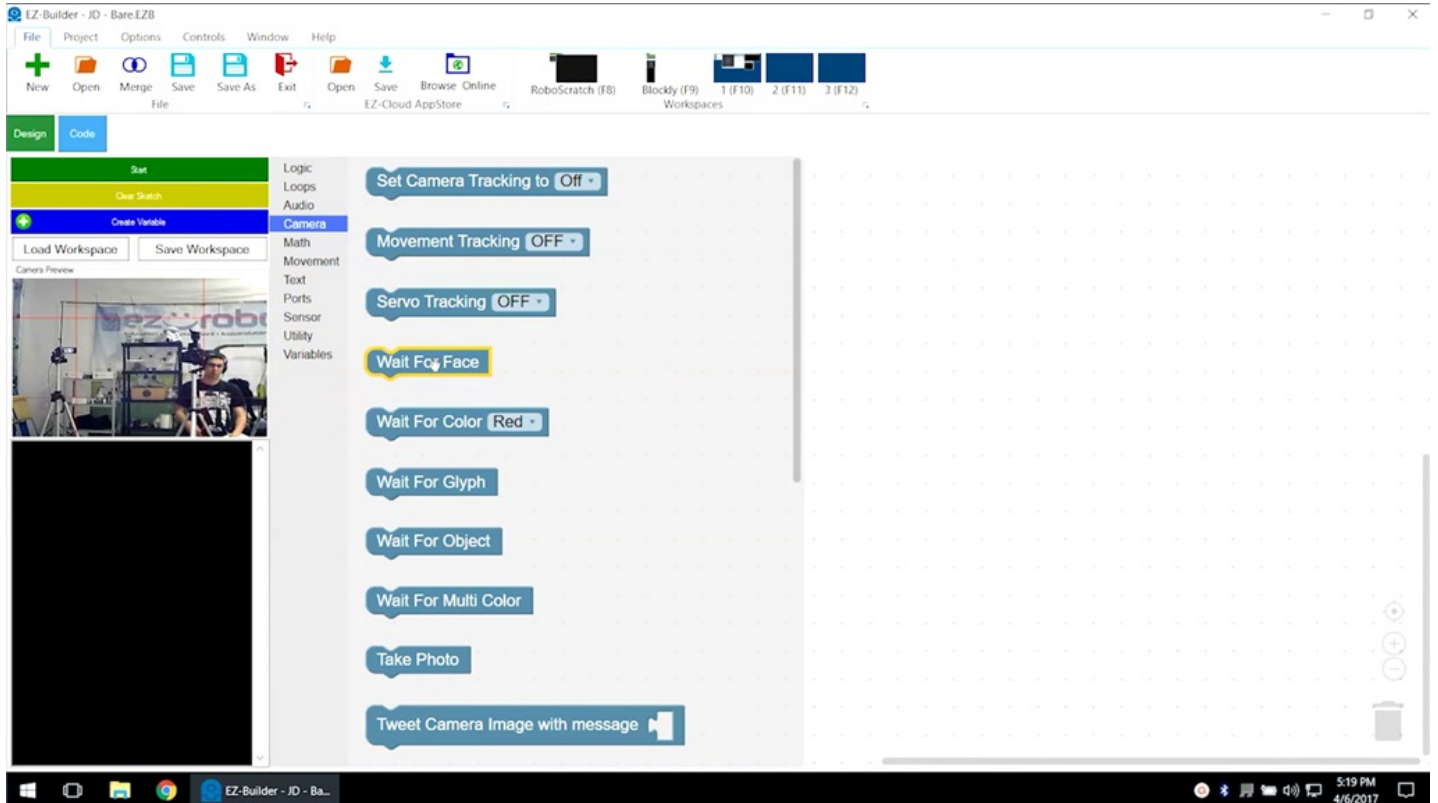
Step 10

Select **File** -> **Blockly** to enter the **Blockly** workspace for graphical programming.



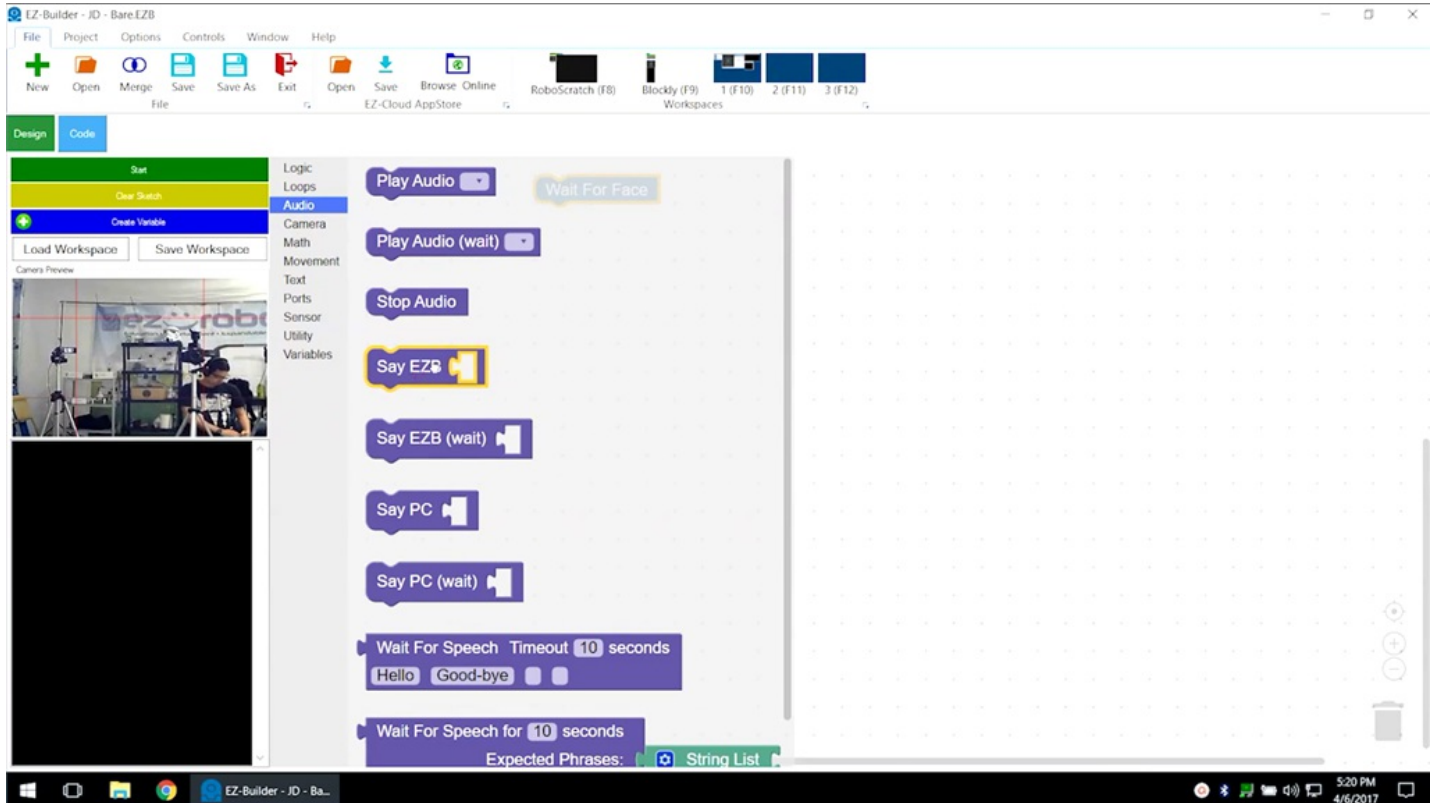
Step 11

Select **Camera** from the menu, then click and drag **WaitForFace** into the editing space.



Step 12

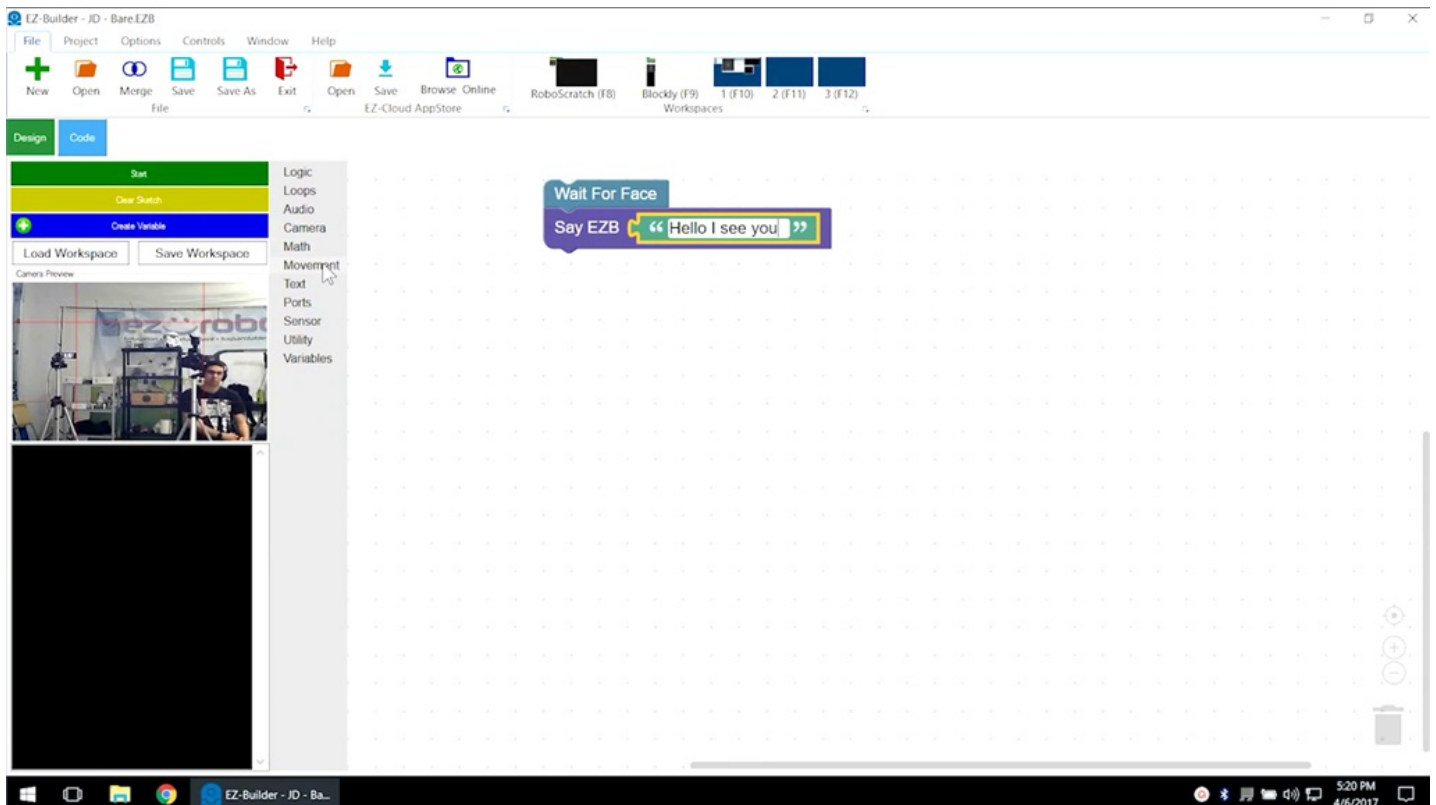
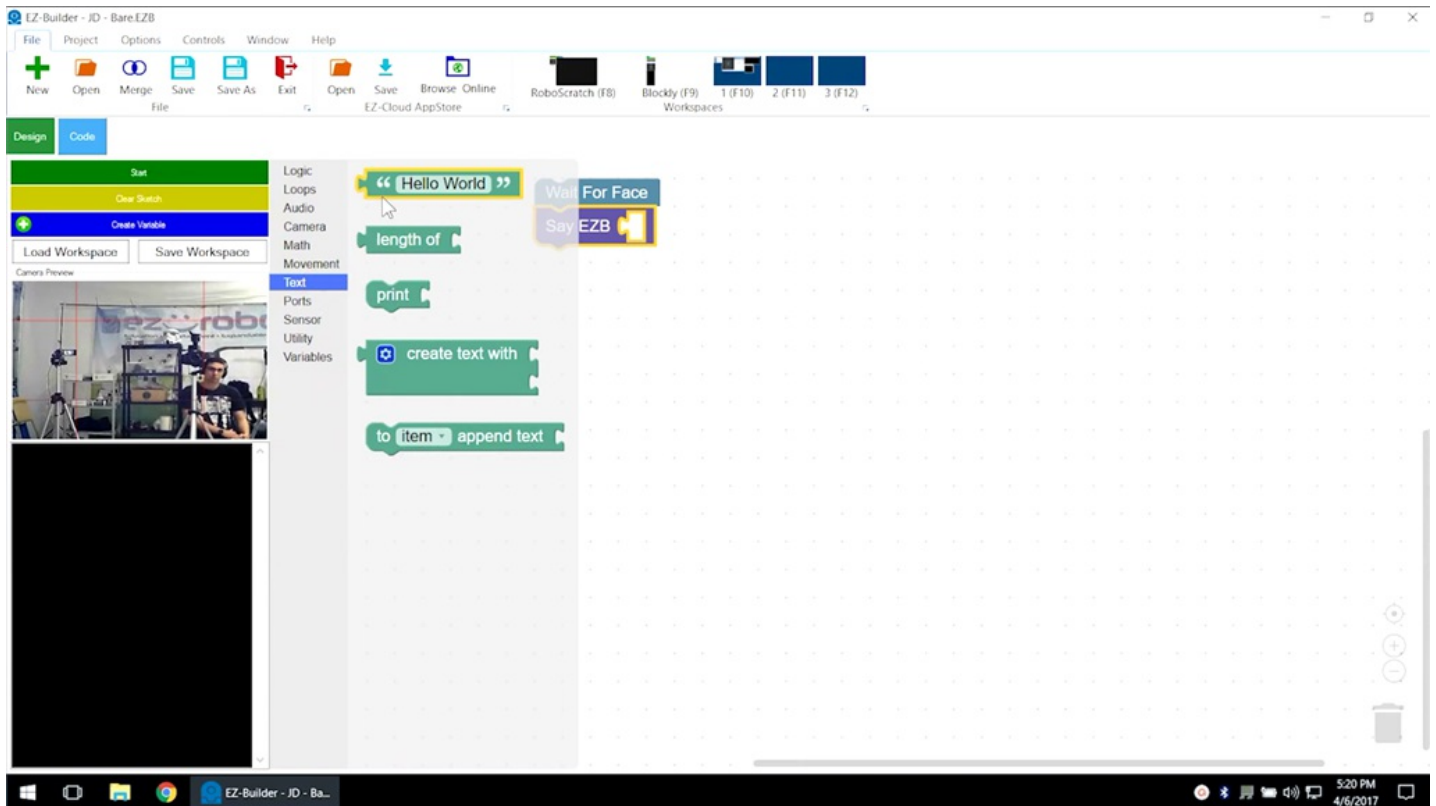
From the **Audio** tab, click and drag **Say EZB** underneath the previous command.



The screenshot displays the EZ-Builder software interface. The top menu bar includes File, Project, Options, Controls, Window, and Help. Below the menu is a toolbar with icons for New, Open, Merge, Save, Save As, Exit, Open, Save, Browse Online, and EZ-Cloud AppStore. The main workspace is divided into two tabs: Design and Code. The Code tab is active, showing a sequence of commands in a workspace. The commands are: Play Audio, Wait For Face, Play Audio (wait), Stop Audio, Say EZB, Say EZB (wait), Say PC, Say PC (wait), Wait For Speech Timeout 10 seconds (with Hello and Good-bye options), and Wait For Speech for 10 seconds (with Expected Phrases: String List). The Audio tab is selected in the left sidebar, and the Say EZB command is highlighted in yellow. The bottom status bar shows the Windows taskbar with the EZ-Builder - JD - Ba... window, the system tray, and the date and time: 5:20 PM 4/6/2017.

Step 13

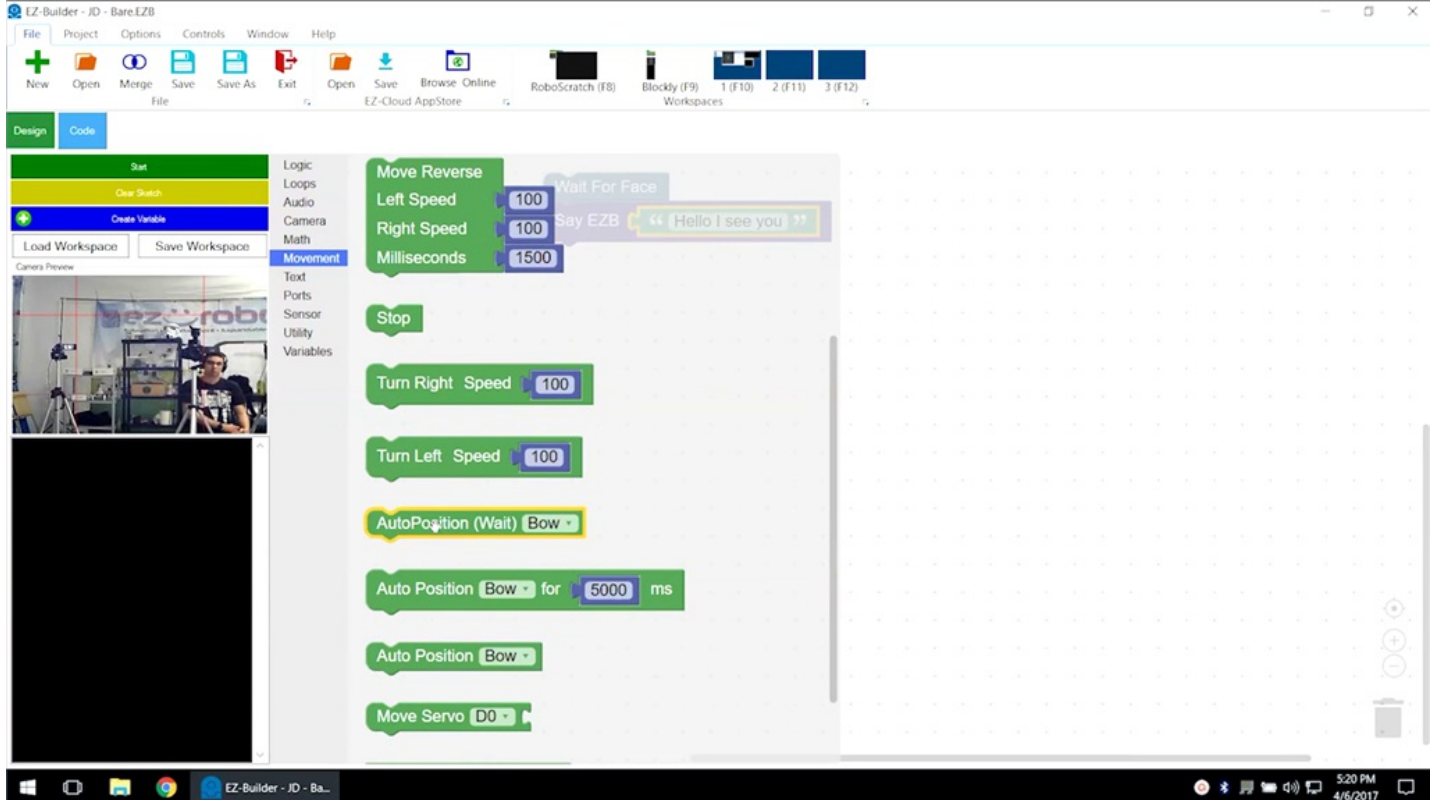
From the **Text** tab, add blank text to the audio command. Type **Hello I see you** between the quotation marks.



Step 14

Select **Movement** from the menu, then click and drag **AutoPosition (Wait)** underneath the previous command.

Functions that have **b[/b]** in their name will run completely before moving on to the next command.

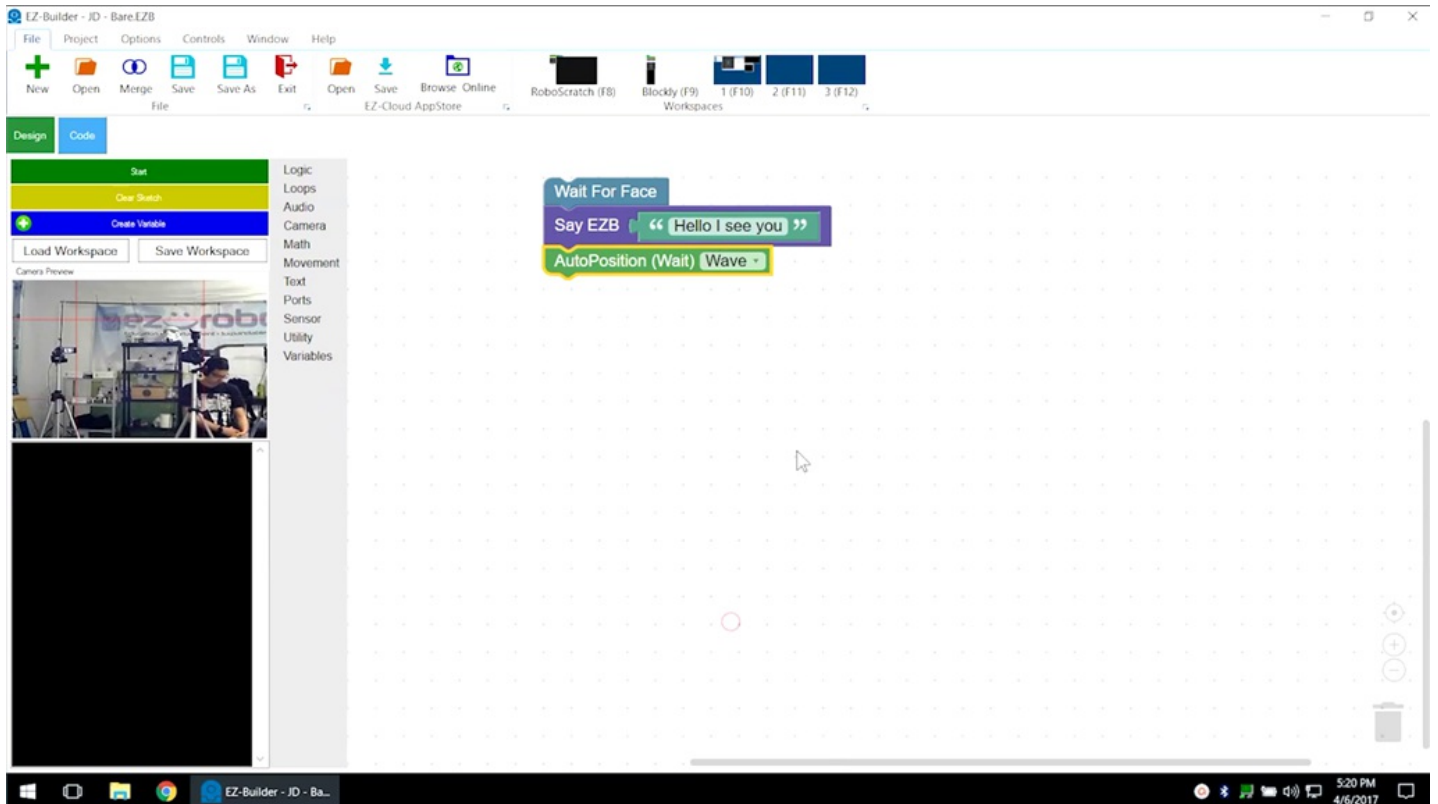


The screenshot displays the EZ-Builder software interface. The top menu bar includes File, Project, Options, Controls, Window, and Help. Below the menu is a toolbar with icons for New, Open, Merge, Save, Save As, Exit, Open, Save, Browse Online, EZ-Cloud AppStore, RoboScratch (F8), Blockly (F9), and Workspaces (1 (F10), 2 (F11), 3 (F12)). The main workspace is divided into a Design view on the left and a Code view on the right. The Design view shows a camera preview of a robot. The Code view shows a sequence of commands: Start, Clear Switch, Create Variable, Load Workspace, Save Workspace, Camera Preview, Logic, Loops, Audio, Camera, Math, Movement, Text, Ports, Sensor, Utility, and Variables. The Movement menu is expanded, showing a list of commands: Move Reverse, Left Speed (100), Right Speed (100), Milliseconds (1500), Stop, Turn Right Speed (100), Turn Left Speed (100), AutoPosition (Wait) Bow, Auto Position Bow for 5000 ms, Auto Position Bow, and Move Servo D0. The AutoPosition (Wait) Bow command is highlighted in yellow. The code block in the Design view shows a sequence of commands: Wait For Face, Say EZB (Hello I see you), AutoPosition (Wait) Bow, Auto Position Bow for 5000 ms, Auto Position Bow, and Move Servo D0.

Step 15

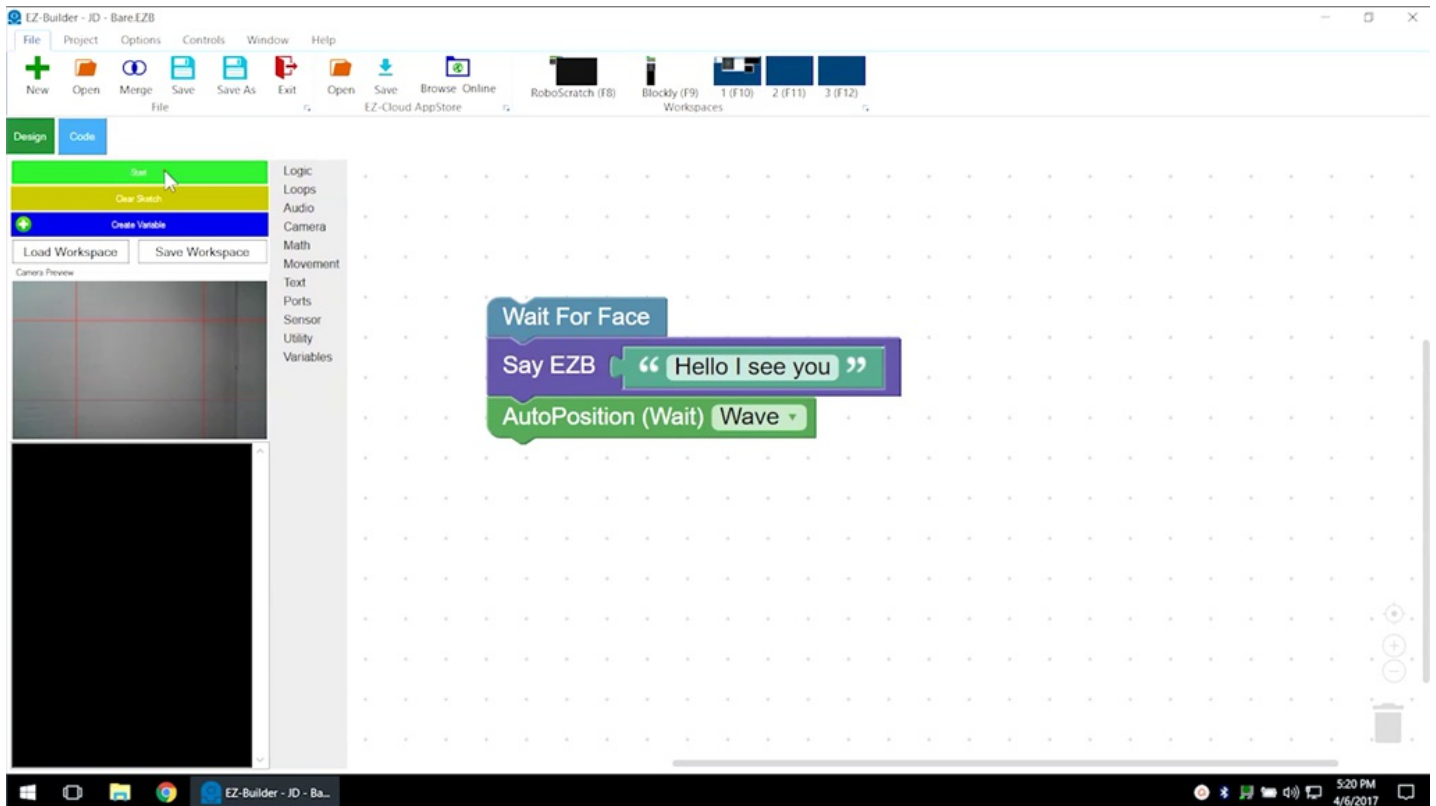
Choose **Wave** from the list of action options.

These three components will cause the robot to speak and wave once a face is detected.



Step 16

Execute the program using the green **Start** button. Follow the green line and highlighting as the program runs.



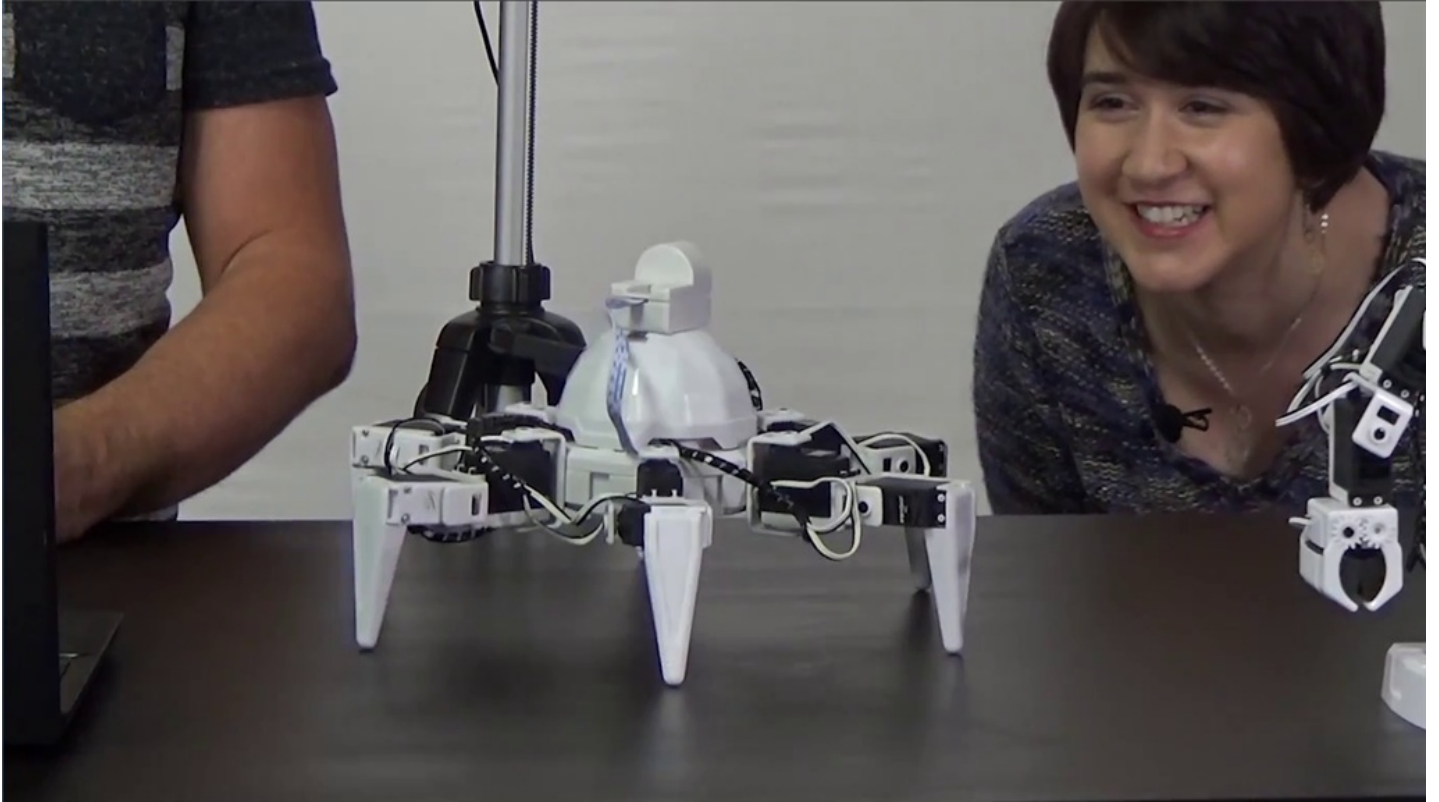
Step 17

Once the robot detects a face, it will speak and complete the wave action.



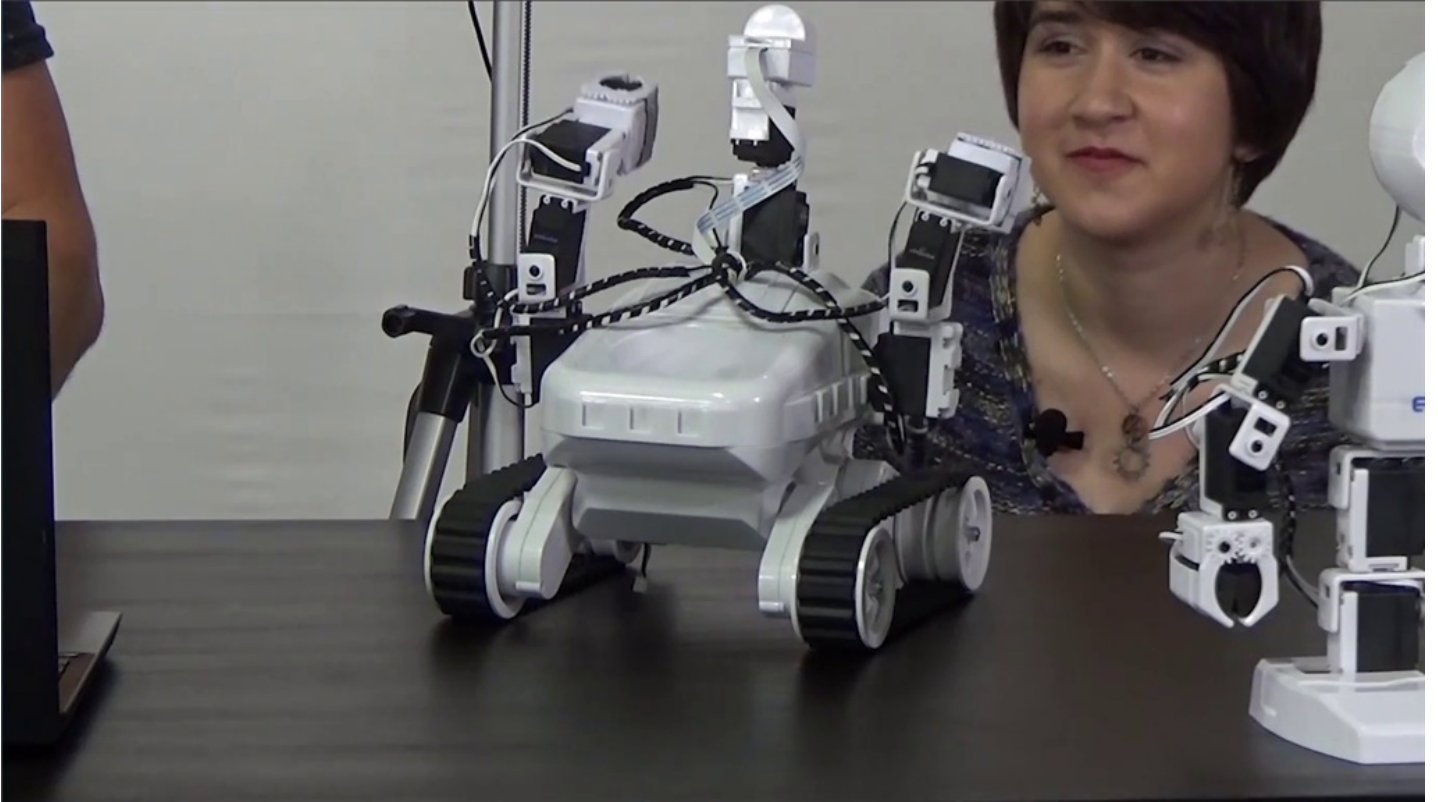
Step 18

Revolution Six will execute the same steps.



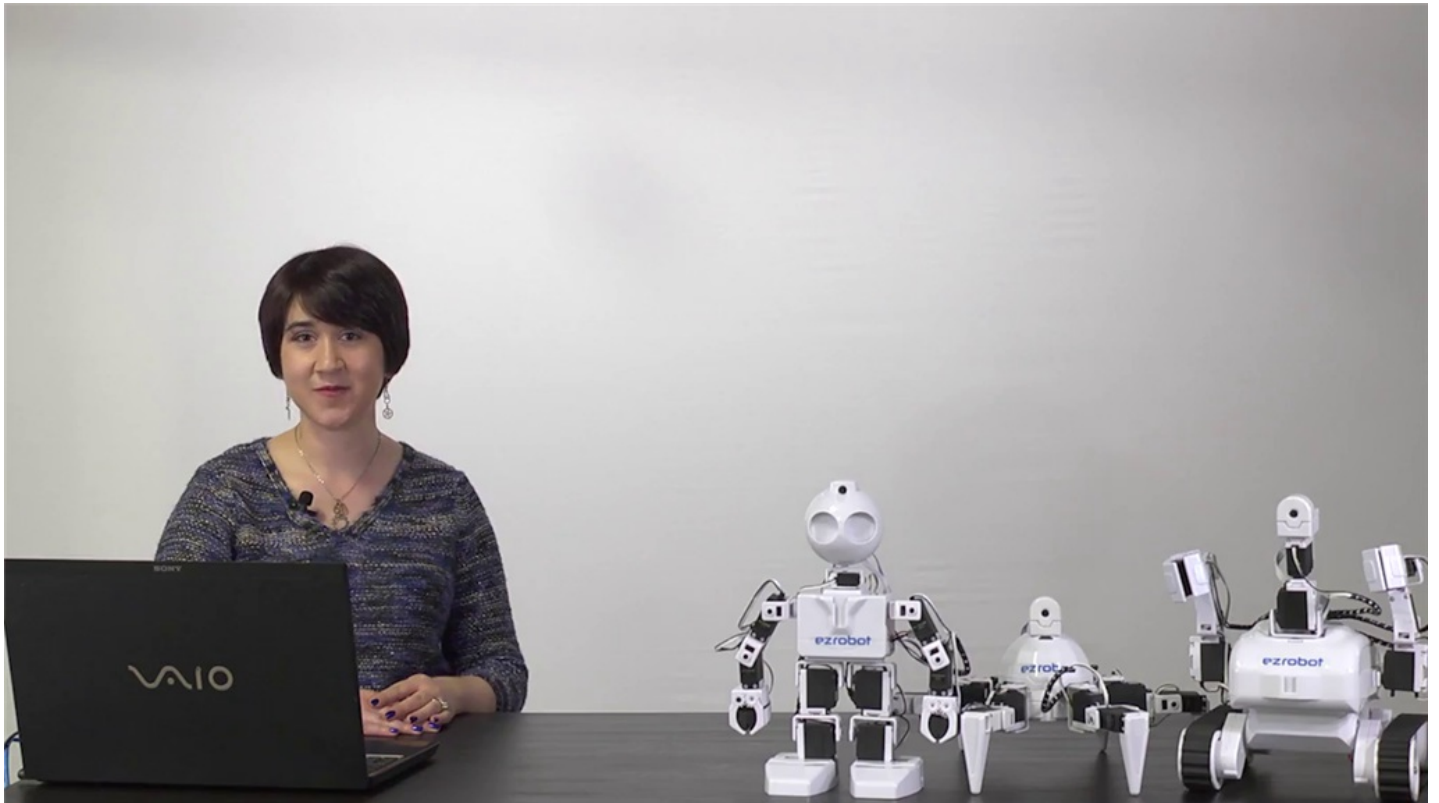
Step 19

Revolution Roli will execute the same steps.



Step 20

Save the project for future use.



Quiz

Question #1 Why is a camera a peripheral device?

Question #2 Which command was used to convert text to robot audio output?

Question #3 What does AutoPosition (Wait) mean?

View the answers to this quiz at www.ez-robot.com/Tutorials/Lesson/95.

Visit www.TheRobotProgram.com for more episodes.