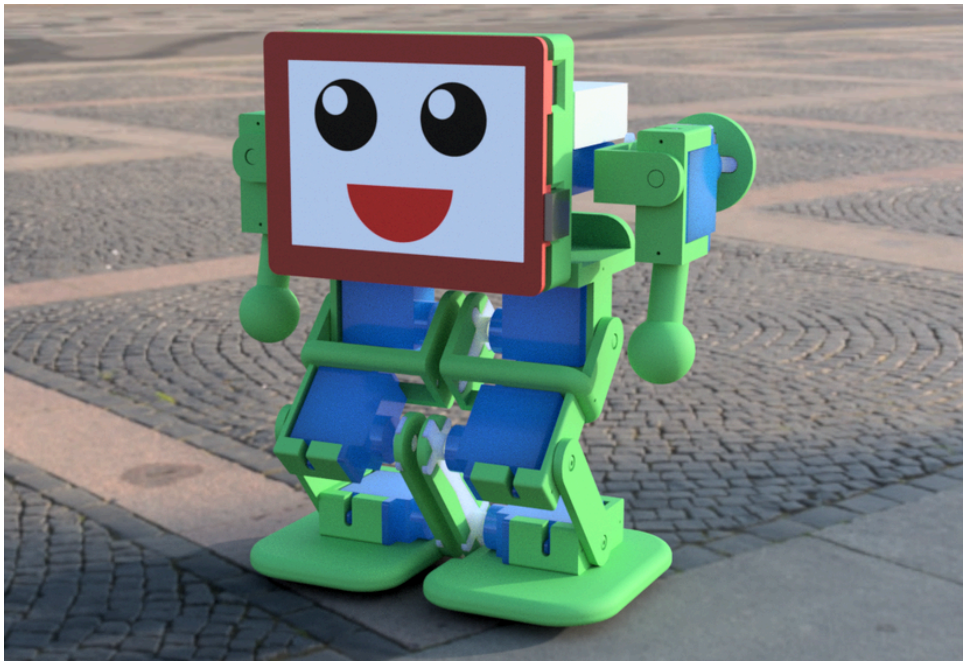
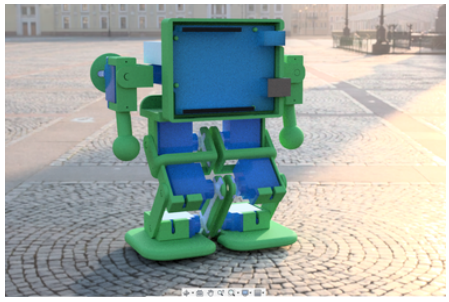
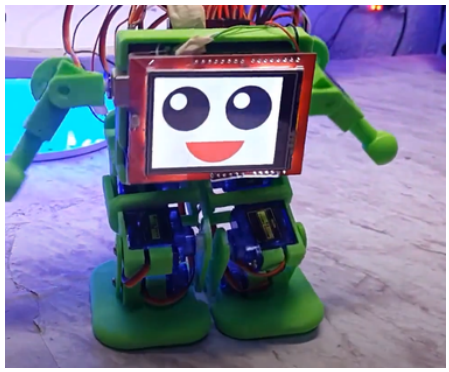
Ottis Robot, the Arduino Robot That Can Walk and Perform Visual and Audio Gestures

By EduardoH20 in CircuitsRobots

Introduction: Ottis Robot, the Arduino Robot That Can Walk and Perform Visual and Audio Gestures





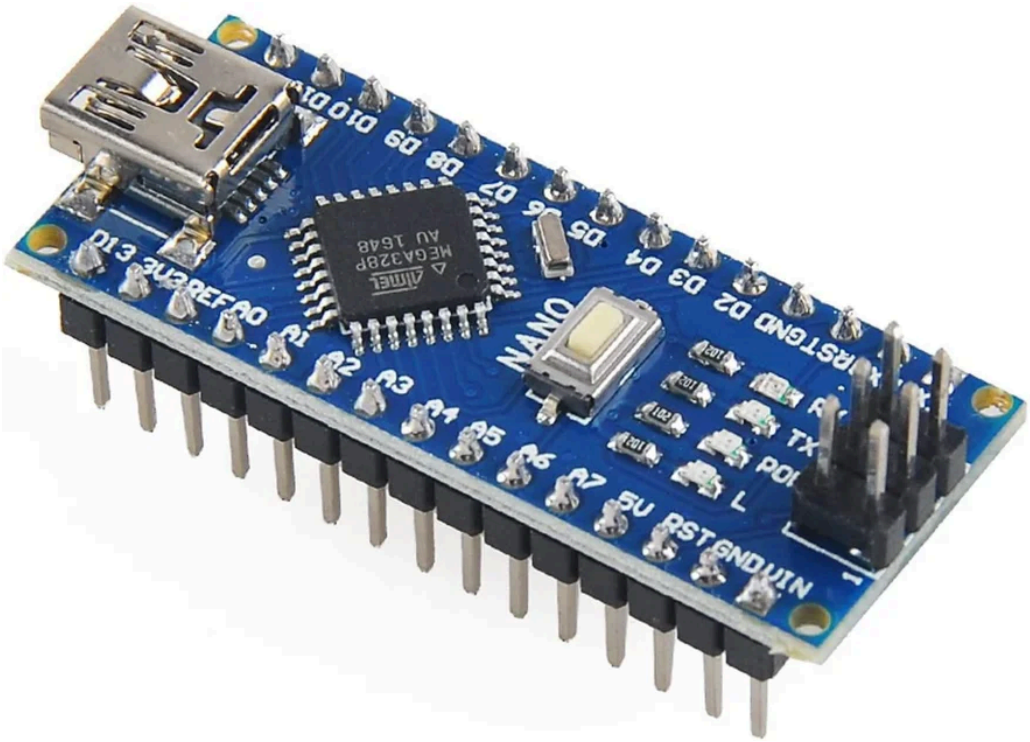


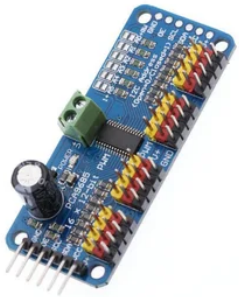
Fusion Projects »

Hello, good day! My name is Eduardo, since I was very young I have been interested in robots and all kinds of mechanical devices, I have studies in electronics and I am currently an engineering student, I love the arduino platform and I have done many electronic and robotics projects, you can see some of them on my facebook page Edu Electronics. I will also design in 3D with Fusion 360, which is a very versatile software for all kinds of mechanical projects, I made this robot based on the human form, I just wanted to make it a little more "human", adding visual gestures with a display TFT and sounds,

The creation of this robot requires materials that are easy to get, such as arduinos boards, cheap servos and the TFT display designed specifically for arduino uno, let's see what this robot can do

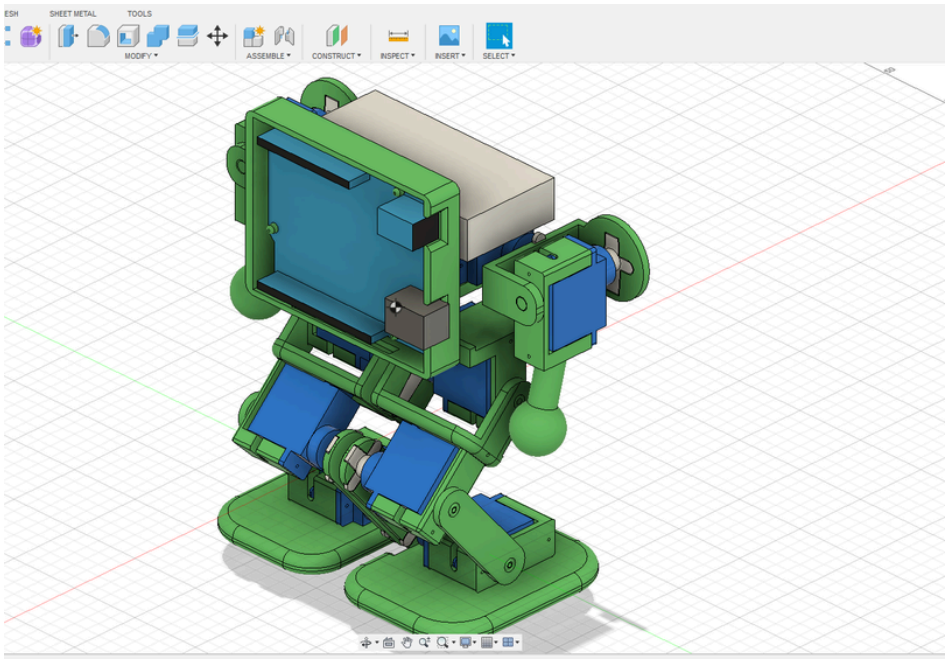
Supplies

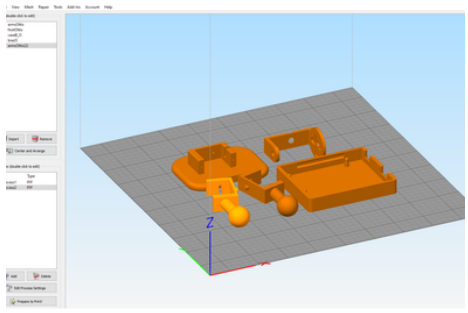


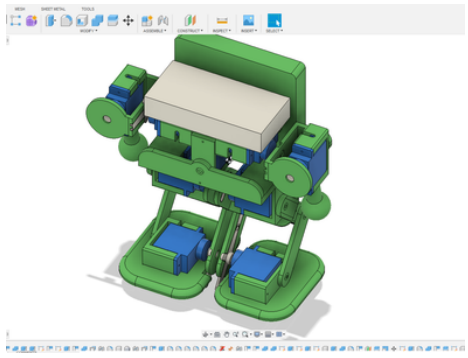


- Arduino UNO
- Arduino Nano
- Servo driver PCA9685
- 2 - batteries LI-Ion 1500mAh
- Step Up Module mt3608
- Hc-05 bluethooth module
- 11 - micro servos SG90
- 2.4" TFT LCD Display Shield Touch Panel ILI9341
- 3D print parts
- Soldering iron, wire, double side tape...

Step 1: Print the 3D Files







The first step is to download and print the parts that I have designed, I leave here all the necessary files in STL format, I will also gave you the editable file for Fusion 360, with this file you can customize your robot or improve it if you know how to use the fusion 360 software!

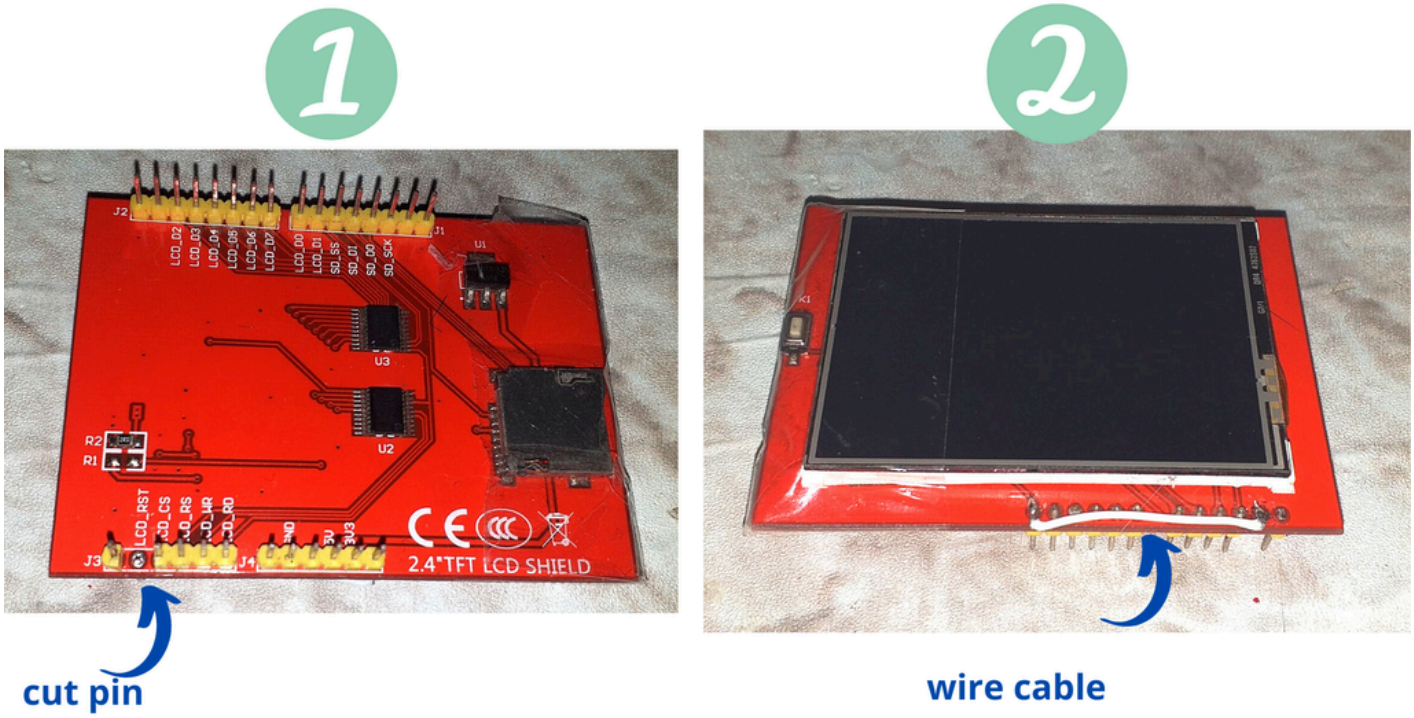
STL´s

https://drive.google.com/file/d/1-sLCTwfKZNly46tAgkTpEZaJGwMDmr0t/view?usp=sharing

Fusion file:

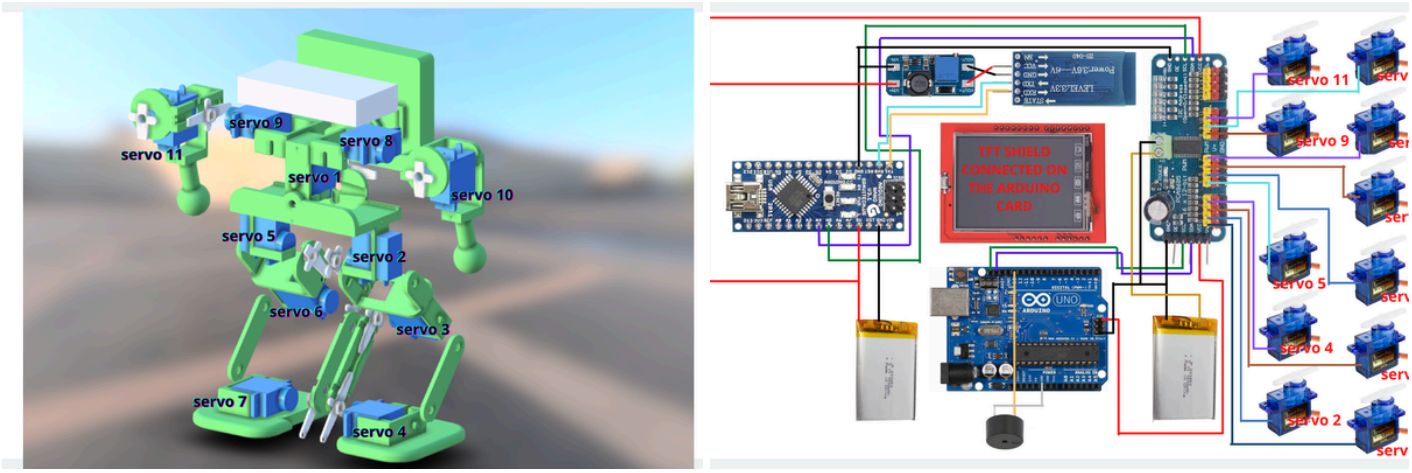
https://drive.google.com/file/d/1WEbP7r_DAYPbivqsT8Qq1ESWr7_RfWHe/view?usp=sharing

Step 2: Modify the TFT Shield



You have to modify the connection of a pin in the TFT module, it is necessary to disconnect the lcd_reset pin from the shield and make a bridge with a cable to the reset pin of the arduino, otherwise the screen will not be able to reset and the information will not be updated in LCD

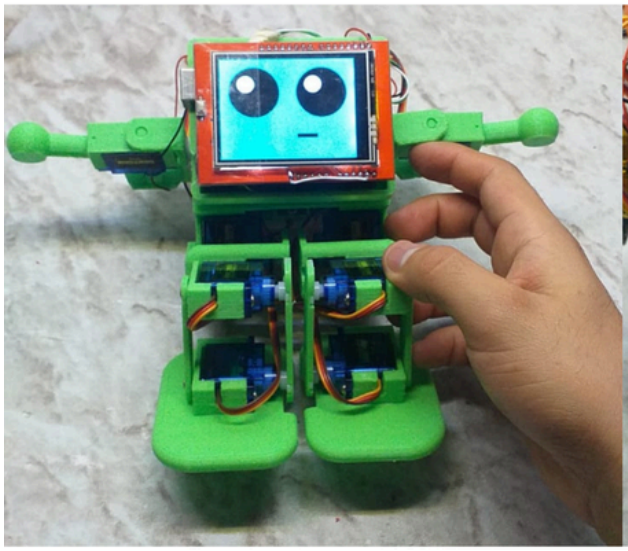
Step 3: Conect Everything!

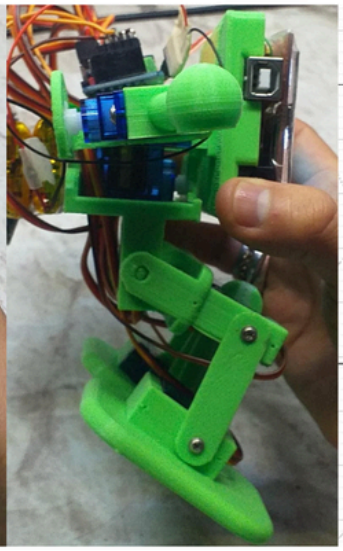


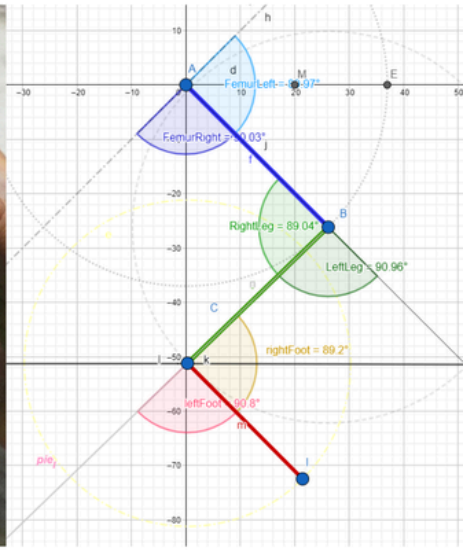
You have to conect everything, but do not assemble the joints with the shafts of the servomotors , conect all modules and Arduino like the Schematics, you can see the 3d model to download it or use the explosion animation to see it in detail!

https://a360.co/3bTHBQW

Step 4: Upload the Home Calibration Code







Now you could upload the arduino code to both cards, but before uploading the final codes you must upload the test code to the arduino nano, be careful, you must upload the arduino nano code with the bluethoot module disconnected, otherwise an error will appear, after uploading the test code you have to assemble the shaft of the servos, the robot must be in this position with the code test, that is to calibrate the positions of the servos, the test code has the position "home" for the robot.

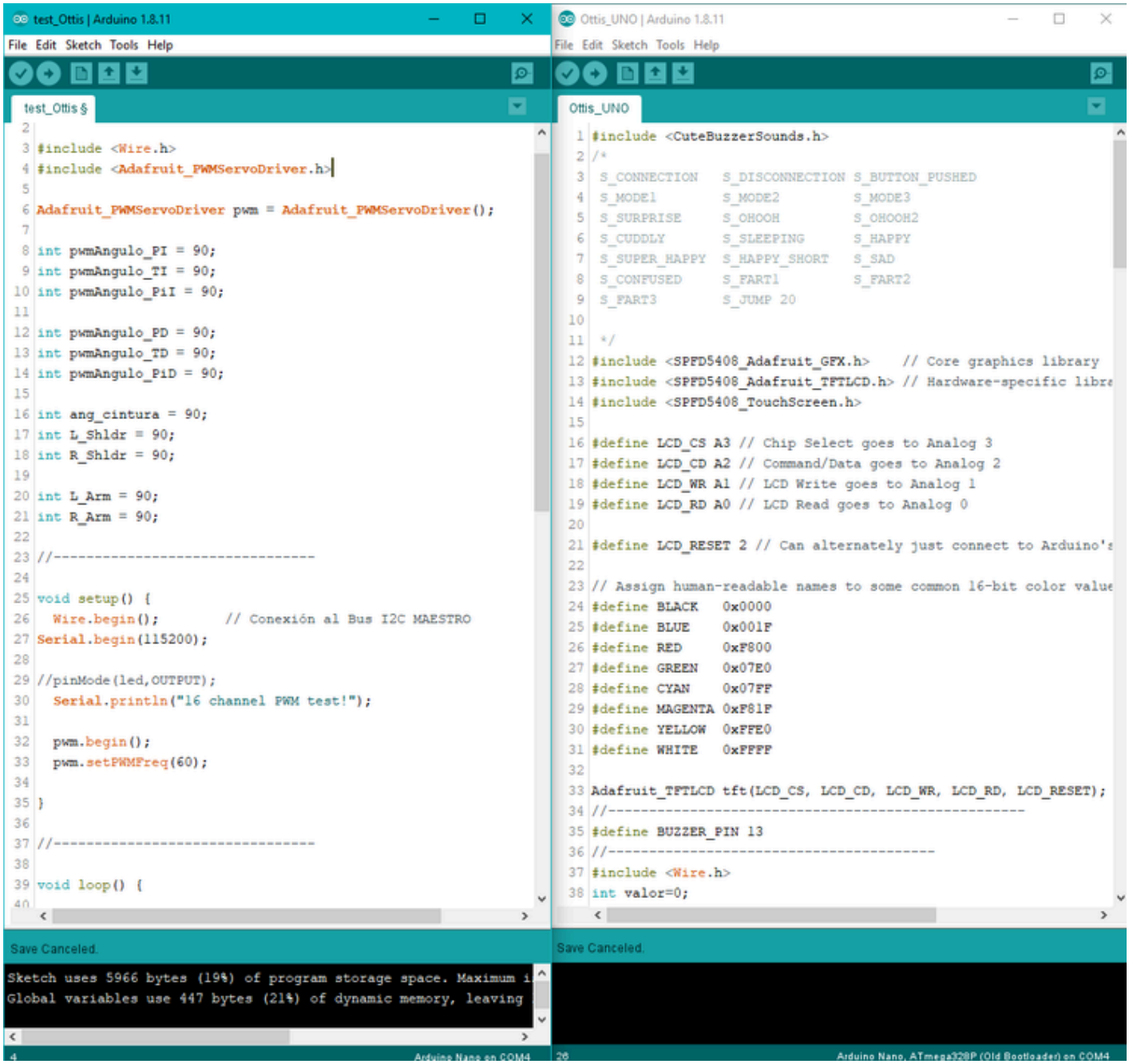
You need this library for the servo driver

https://github.com/adafruit/Adafruit-PWM-Servo-Driver-Library/blob/master/examples/pwmtest/pwmtest.ino

Test code:

https://drive.google.com/file/d/13bqThnsl_gnkbV_8nVJOvAqs7p3Nr94A/view?usp=sharing

Step 5: Upload the Code



If the robot is already in the "home" position with the test code, then you can upload the final codes, the code for the Arduino Nano controls the servo motors with the help of the library for the PCA9685 driver, the Arduino UNO code controls the gestures performed with the display and the buzzer, the arduinos communicate via i2c protocol, the Nano receives the commands from an android application via bluethoot and sends data to the UNO to perform the corresponding gestures

libraries (Arduino UNO):

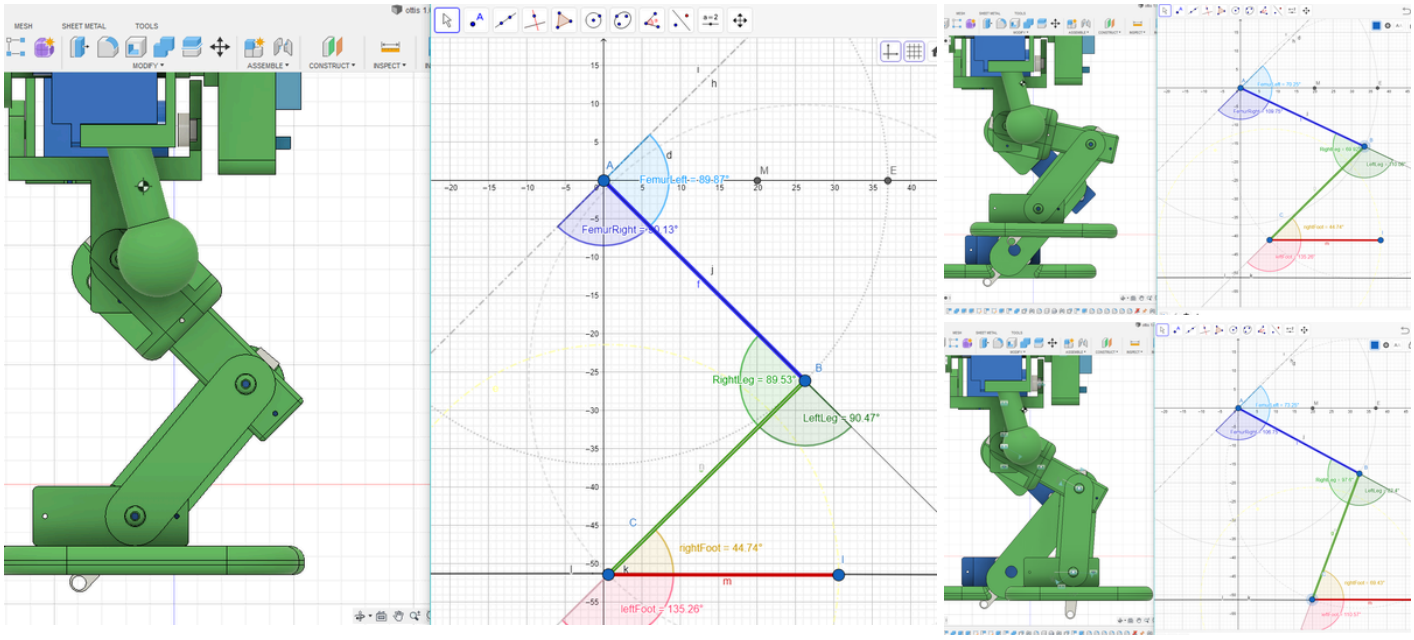
Cute buzzer sounds:https://drive.google.com/file/d/1hGTMd_5iqw0oo43KZcO1XjjoreXarMkw/view?usp=sharing

TFT display: https://github.com/JoaoLopesF/SPFD5408

Arduino Nano code:https://drive.google.com/file/d/1wFzN4lqWscweqg6aMt2G9hzuLylDkZWx/view?usp=sharing

Arduino UNO code:https://drive.google.com/file/d/1xcpe3QGNugKbf9jeuONmJVWDFSzwoTBT/view?usp=sharing

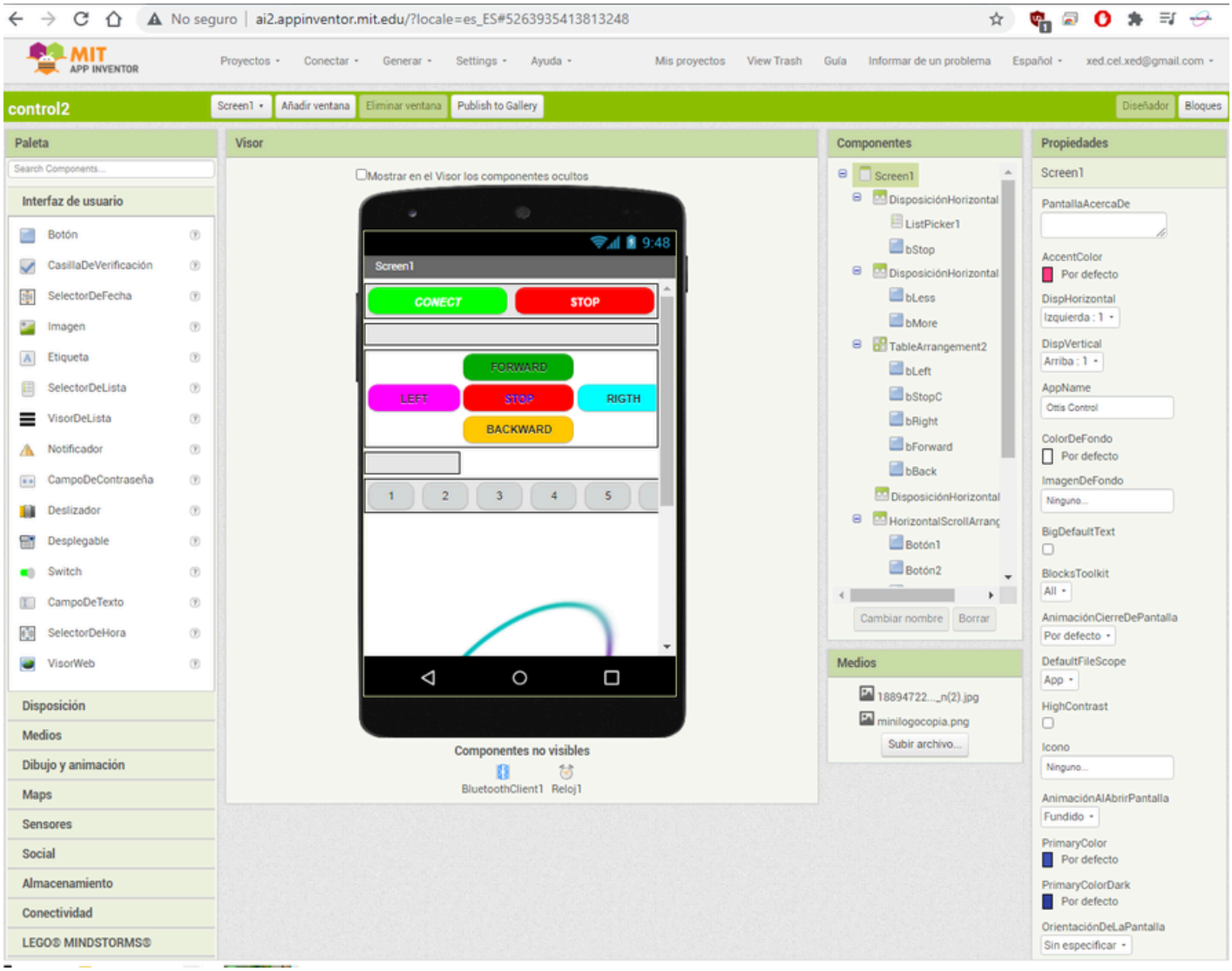
Step 6: See How I Program the Cinematics



You can use this program called Geogebra, which is free, to simulate the angles, create movements and with these angles you could create new sequences of movements by writing them in arduino with some appropriate programming structure

https://www.geogebra.org/suite/v4mc3xay

Step 7: Android App



I program an android application with the famous MIT APP INVENTOR platform, you can download the project and edit it (.aia file) or download and install the apk file to your cell phone to use the application

.aia file: https://drive.google.com/file/d/1jCSM6QCcCwRWdgh8FqEp1j8IOUoKr_BV/view?usp=sharing

apk file: https://drive.google.com/file/d/1jCSM6QCcCwRWdgh8FqEp1j8IOUoKr_BV/view?usp=sharing

Step 8: Enjoy!

Now you have everything you need to build your Ottis robot, feel free to improve or customize it with the Fusion 360 Software, in the near future I plan to add more gestures, because there are still many sounds that I do not use and it is possible to draw a large number of figures on the TFT display