EEZYbotARM MK2

DESCRIPTION

This is a 3D printed robotic Arm.
It follows the success of my previous smaller one EEZYbotARM so I simply called it MK2 (make 2)
It is a little bigger and stronger, just to obtain an acceptable payload.
It has been designed without a definite purpose, the aim is educational, providing a suitable hardware that allow to concentrate on exploring all its potential applications.
It shares the kinematick linkage of the ABB IRB460 scaled down with a ratio of 1:7
3D models in stl format can be downloaded for free from my account at Thinghiverse.
Printing and early tests YouTube.

ONSHAPE

CAD FILES :
I made available the source CAD files of the EEZYbotARM mk2 on my Onshape account : here
You can copy, modify and export files. (copied 483 times 20/02/18)

NOTES

HARDWARE :
I used metric hardware and all joints rotate on M4 screws. (in alternative of M4 an #8-32 can be used)
Holes of the joints are designed quite tight. This to allow a fine adjust of their diameter using an exact drill bit.
On screws are to be used selflocking nuts. They are to be tightened till the locking of the joint, then consequently you have to loose them until you obtain a smooth movement with a low clearance between components.
On the two axis of the main vertical.arm I used n.2 M4 threaded rods

SOFTWARE / FIRMWARE :
The purpose of the robot is to provide an educational tool wich allow making experiment with different control methods. I found very easy to use a Mini Maestro 12 Controller from Pololu, it is not very cheap but solve a lot of problems. You have to install drivers, a software and when connected to usb you're are immediately able to drive the servos choosing their speed and acceleration also. You can store the servo position to a sequence and when ready it can be played once or in a loop. Can also be stored in the internal script memory and it can be automatically played without computer connected.

MATERIALS

PRINTED PARTS BOM list :

EBAmk2_001_base.STL
EBAmk2_002_mainarm.STL
EBAmk2_003_varm.STL
EBAmk2_004_link135.STL
EBAmk2_005_link135angled.STL
EBAmk2_006_horarm__.STL
EBAmk2_006_horarm_plate.STL
EBAmk2_007_trialink.STL
EBAmk2_008_link147_new.STL

EBAmk2_009_trialinkfront.STL
EBAmk2_010_gearservo.STL
EBAmk2_010_gearservo_22DENTI.STL
EBAmk2_010_gearservo_25DENTI.STL
EBAmk2_011_gearmast.STL
EBAmk2_012_mainbase.STL
EBAmk2_013_lower base.STL
EBAmk2_014_claw base.STL
EBAmk2_015_claw finger dx.STL
EBAmk2_016_claw gear drive.STL
EBAmk2_017_claw finger sx.STL
EBAmk2_018_claw gear driven.STL
EBAmk2_019_drive cover.STL

NON PRINTED PARTS BOM list :
n.3 955 or 946 servo
n.1 SG90 SERVO
n.1 M6 selflocking nut
n.1 M6x25 screw
n.2 M3 selflocking nuts
n.2 M3 x 20 screws
n.1 M3 x 10 hex recessed head screw
n.9 M4 selflocking nuts
n.1 M4 x 40 screw
n.1 M4 x 30 screw
n.5 M4 x 20 screw
n.1 M4 x 60mm threated rod
n.1 M4 x 32mm threated rod
n.25 dia 6 mm ball spheres
n.1 606zz bearing
some M4 washers

STEP 1

Put in position a 946 servo with the driving shaft forward.

STEP 2

Fix the servo to the main base using the selftapping screws supplied with it.

STEP 3

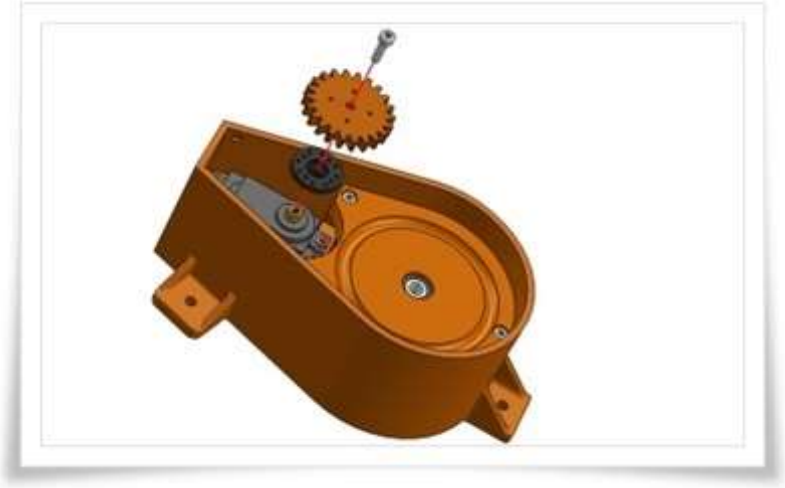
Insert 3 M3 nuts in the receptacles of the main base as swown.

STEP 4

Insert the 606 bearings in its housing and attach the plate to the main base using 3 M3 screws.

STEP 5

Verify the freedom of movement of the bearing.

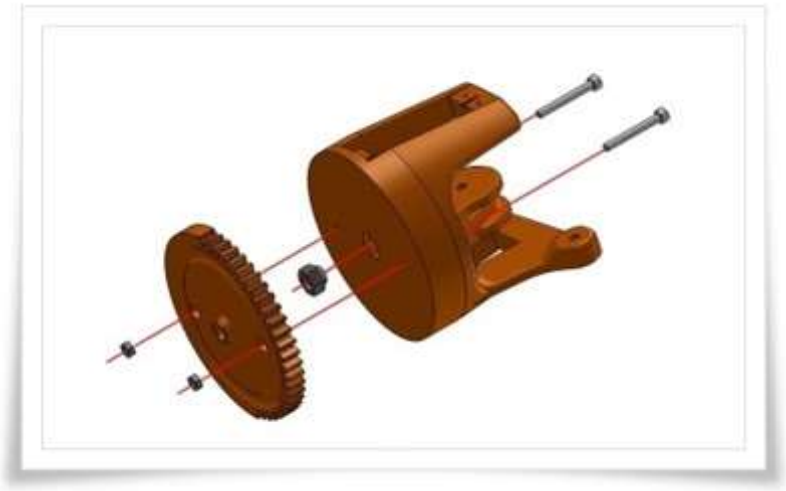


STEP 6

Position the drive plate on the splined shaft and upper the driving printed gear.
Add one or two small selftapping screw to connect plate and the gear

STEP 7

Thera are two driving gears available one has 22 theet and the other 25 I made two because during printing of the base I've got some deformation and the two axis distance became smaller

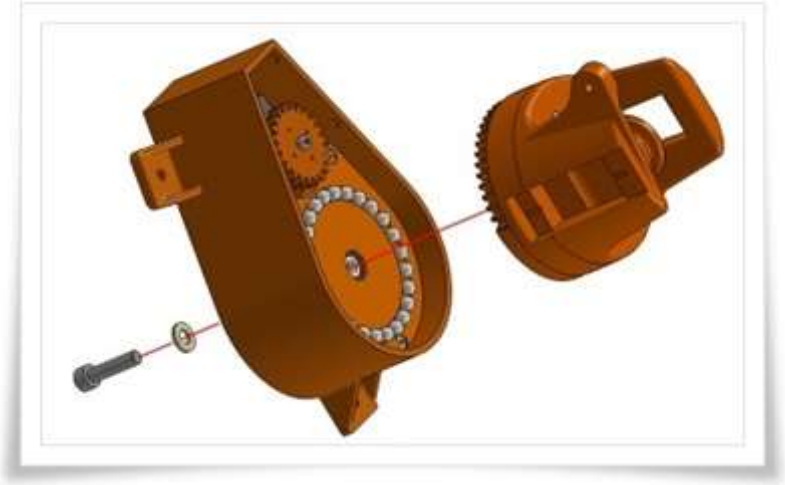


STEP 8

Insert an M6 self locking nut in the receptacle of the swivel base then place in position le geared base and fix it using a couple of M3 screws and nuts as shown.

STEP 9

Fill the path using about 25 spheres with a diameter of 6mm.

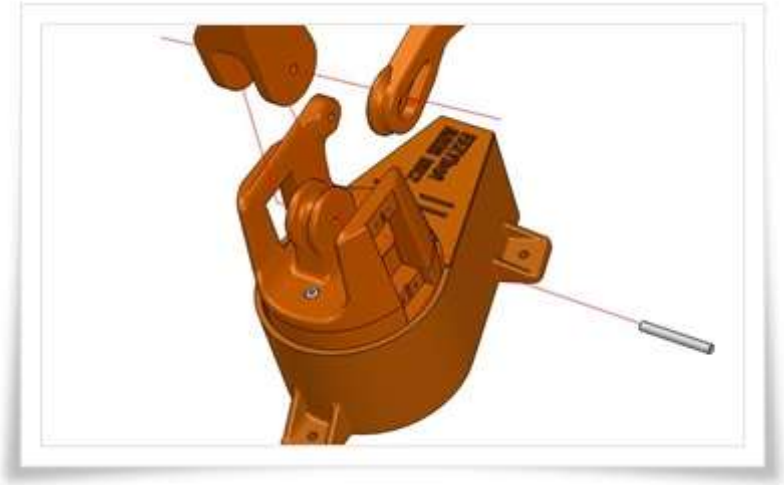


STEP 10

Keeping the main base flat and the swivel element in contact with it, connect the two elements using an M6 screw.

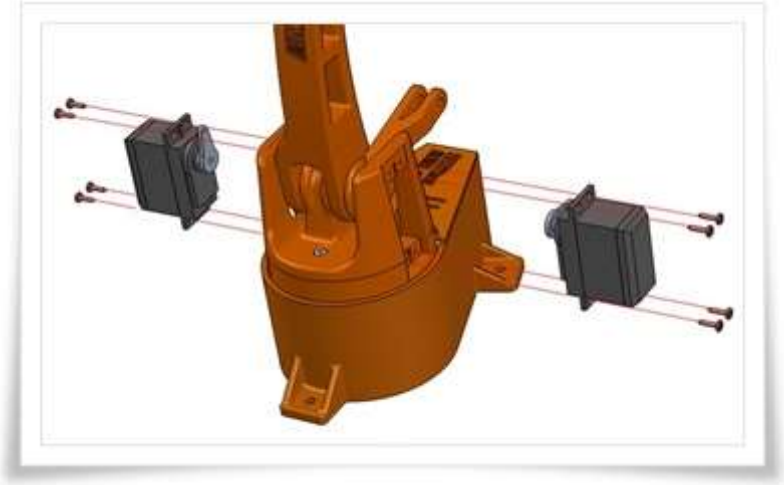
STEP 11

Now the main base is finished.



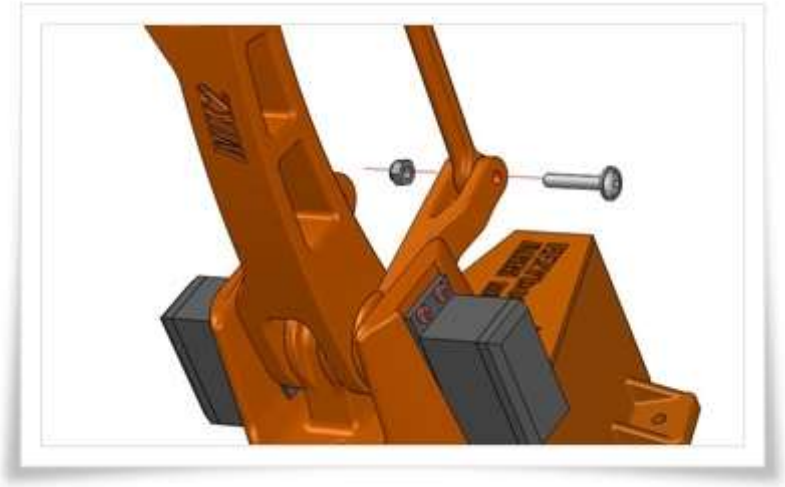
STEP 12

Put in position the main arm and the vertical drive lever, connect them with the main base horizontal axis using a 4mm dia rod 33 mm long.



STEP 14

Fix in position the two servo and hold in place using eight selftapping screws. To drive the arms use the sigle horns supplied with the servos.
Make sure that the mid position of the servos are aligned with the housing of the arms

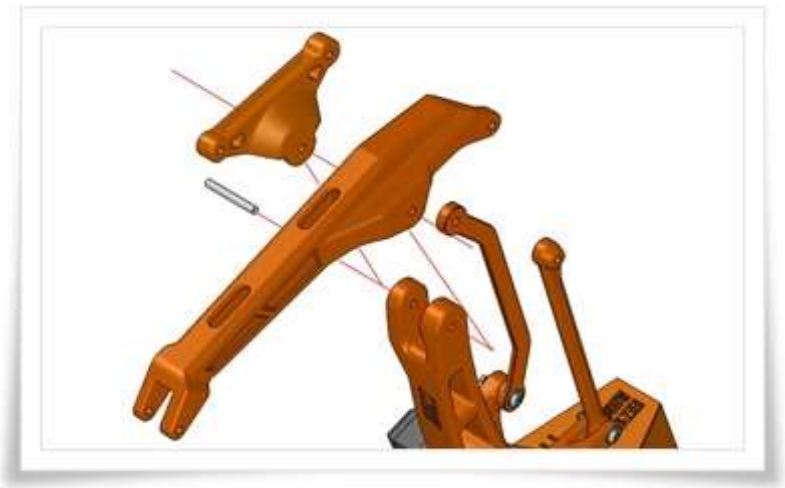


STEP 15

Connect the lower end of straight lever to the driving arm.

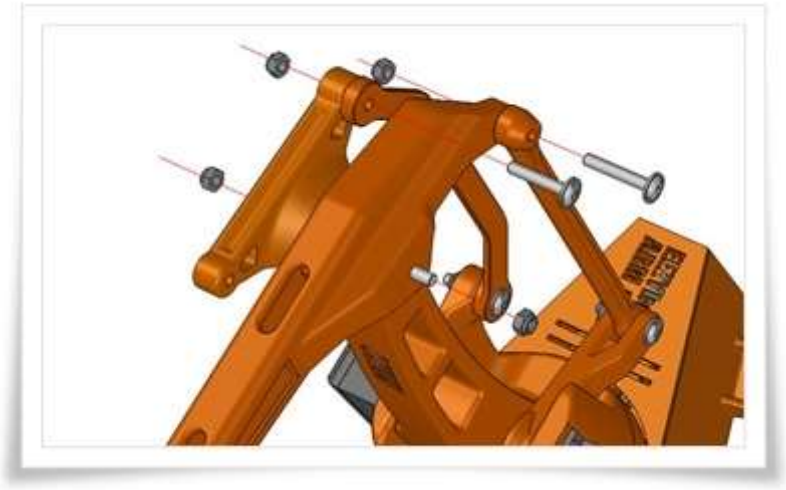
STEP 16

Connect the lower end of angled lever to the fixed end on the base.



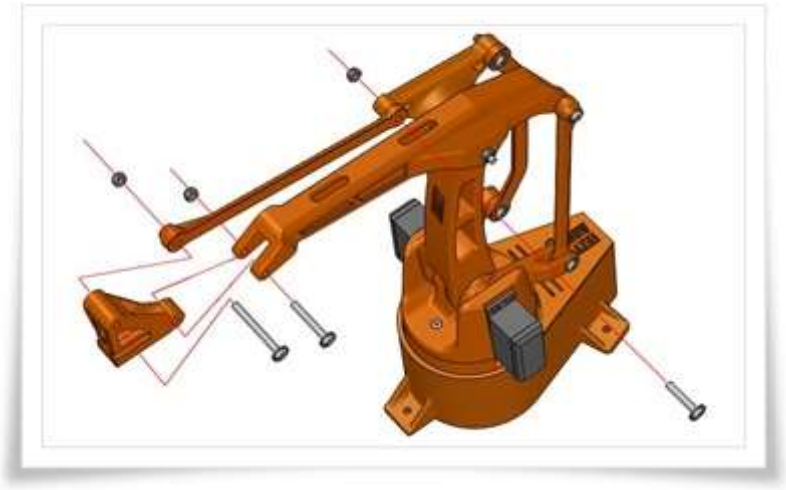
STEP 17

Use a threated M4 rod to connect the horizontal arm and the triangle to the upper part of the main arm.



STEP 18

Connect the straight rod to the main arm and angled to the triangle.

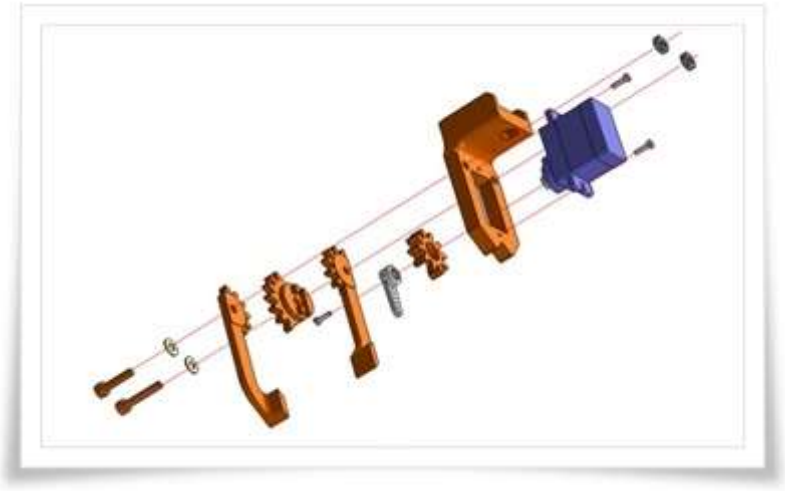


STEP 19

Attach the rod and the claw fast release to the front part of the horizontal arm.

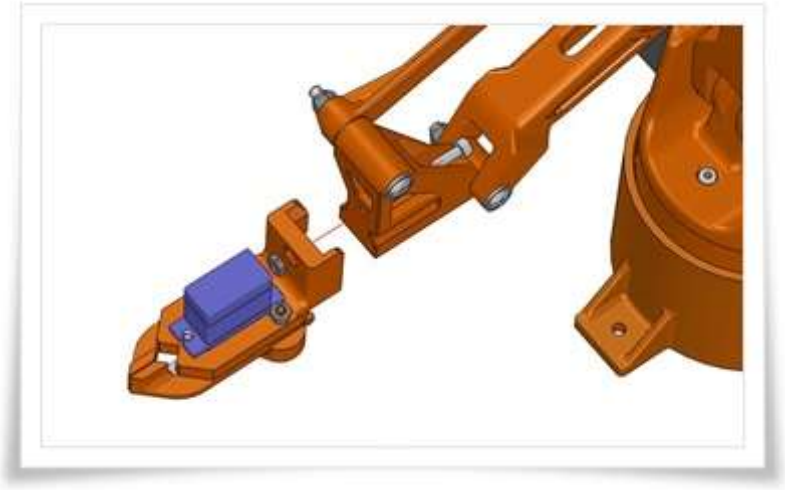
STEP 20

The robot arm is now assembled.
You can now proceed with the claw assembly or you can use your own claw design



STEP 21

Assembly the claw as shown on the image.



STEP 20

Attach the claw to the fast release end of the arm.

STEP 23

The eezybotarm mk2 is now mechanically assembled, ready to be driven by the electronics.

EEZYbotARM mk2 numbers

last update 20/02/18