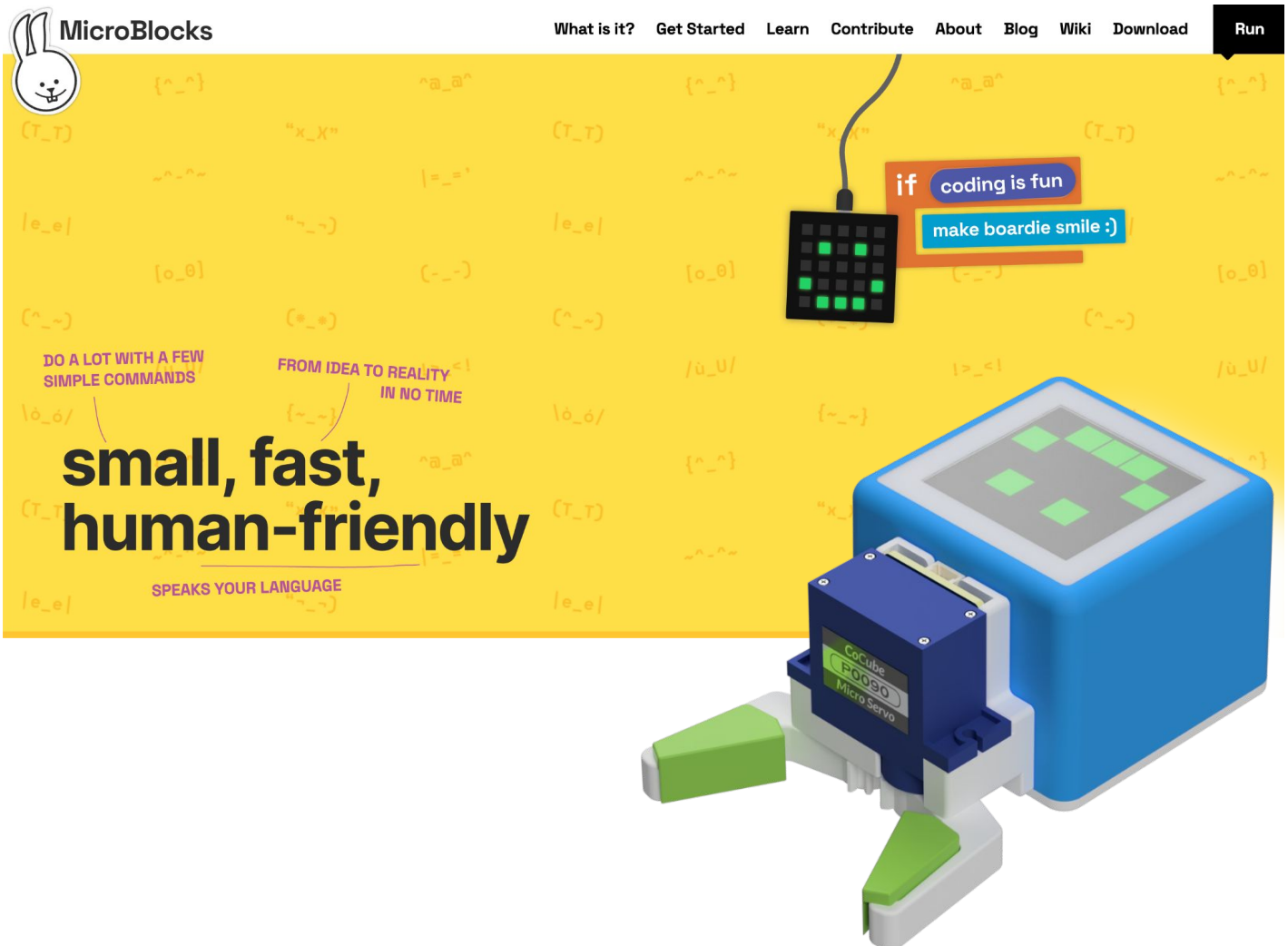




Learn to program tabletop football playing robots

In this introductory, hands-on workshop you will learn how to program **CoCube**, a tabletop modular robot using **MicroBlocks**, a blocks language similar to Scratch.

You will learn how to retrieve the robot's position and orientation in real time using MicroBlocks, how to move the robot to a specified location, how to control the servo gripper to shoot the football, and ultimately complete the tabletop football robot task.

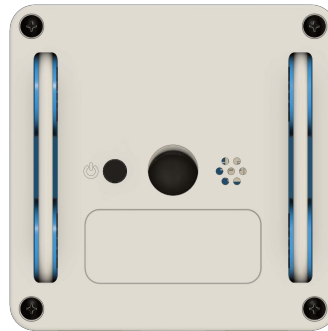
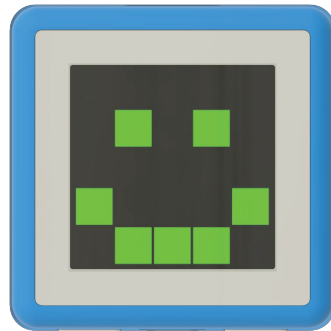




Step 1 | Meet CoCube

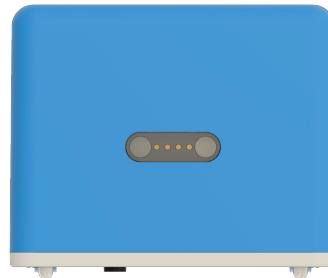
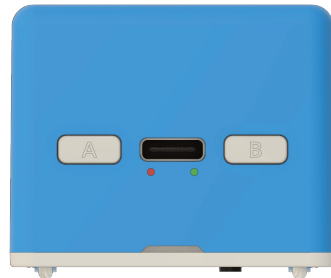
CoCube is a tabletop modular robot platform for education and research, featuring wireless communication, screen display, precise movement and accurate positioning!

TFT Screen
240 * 240

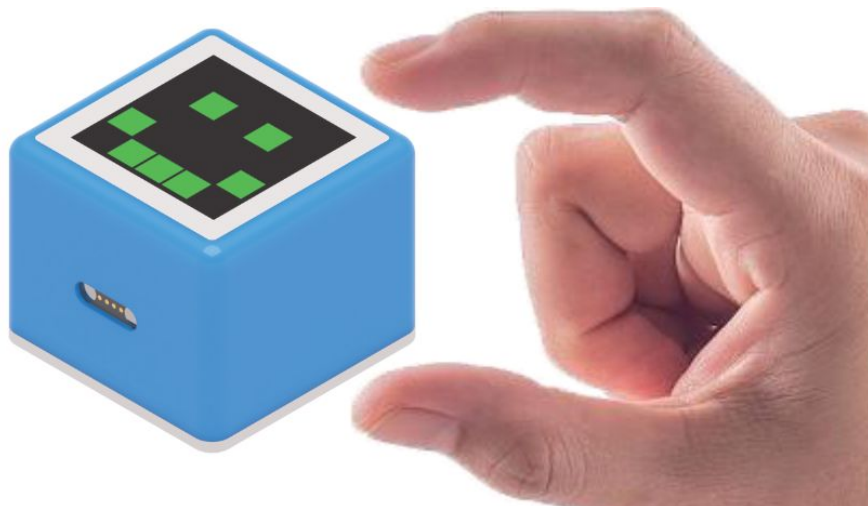


Track Wheels
Buzzer
Power Button – long press for 3s to turn on or off

Button A & B
Red LED – charging
Green LED – power on



Magnetic Connector
for expanding various CoModules



Power on the CoCube and have fun!

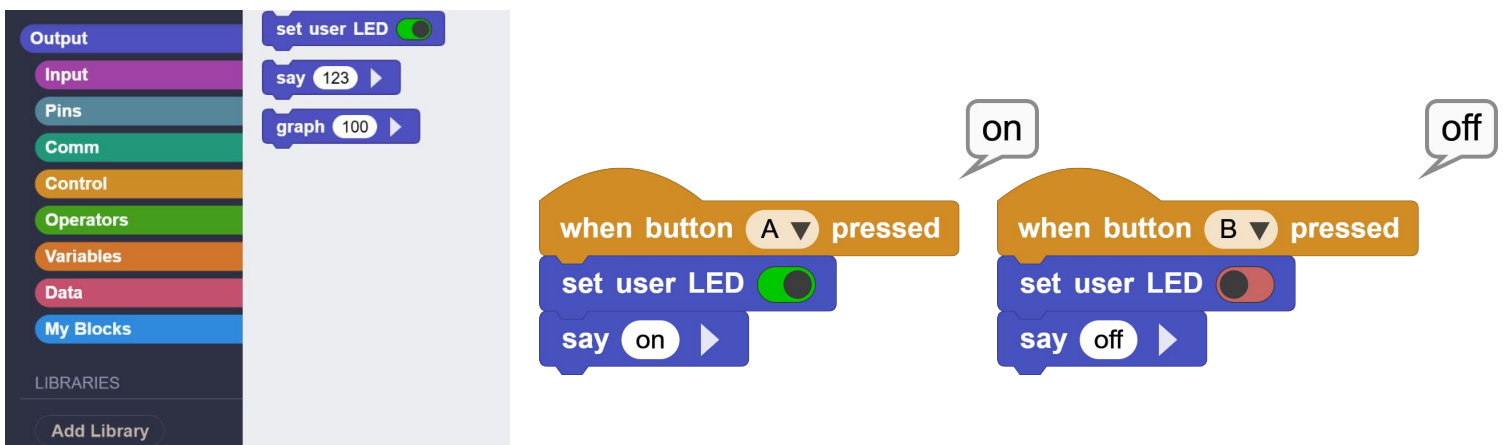


Step 2 | Meet MicroBlocks

MicroBlocks is a blocks programming language for physical computing inspired by Scratch.

Open the MicroBlocks website and connect CoCube via USB or BLE.

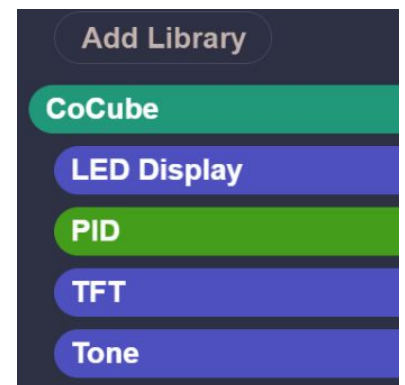
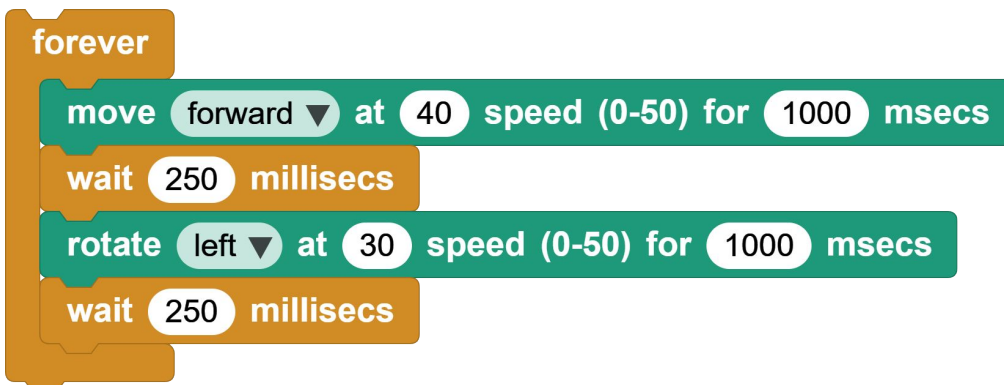
<https://microblocks.fun/>



Add the library of CoCube.



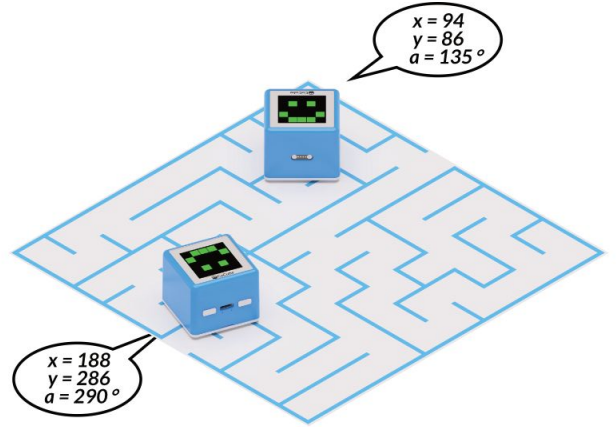
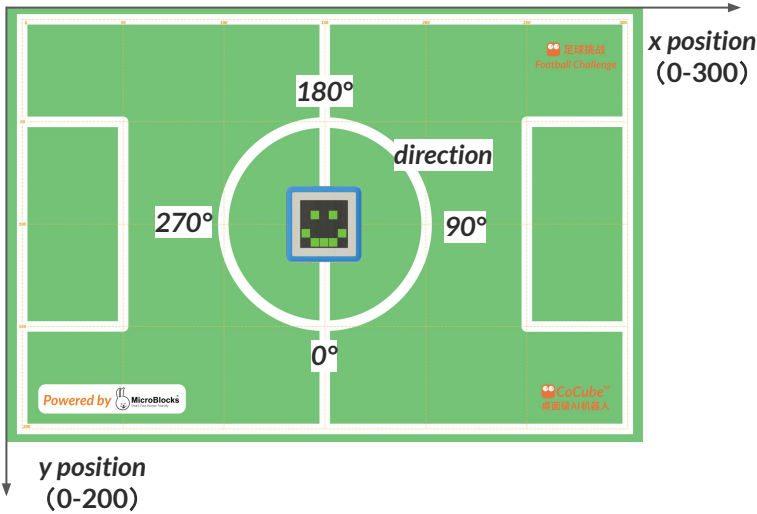
Creative time: let CoCube draw a square and a circle, and explore the functions of LED Display, TFT and Tone!





Step 3 | Meet CoMaps

CoMaps uses optical identification technology to print coded microdots on regular paper, providing high-precision, easy-to-deploy positioning capabilities for CoCube robots.



Have a test!

```

forever
  graph X position Y position direction
forever
  say 166 91 181 X position Y position direction
  
```

Creative time: try these 5 blocks, let CoCube robot complete more precise movements.

```

move forward at 40 speed (0-50) by 50 steps
rotate to angle 0 at 30 speed (0-50)
rotate left at 30 speed (0-50) by 90 degrees
point towards X 0 Y 0 at 30 speed (0-50)
move to X 0 Y 0 at 40 speed (0-50)
  
```

Tips

If you are programming with a cable, you can place the blocks under the hat block and unplug the cable before running.

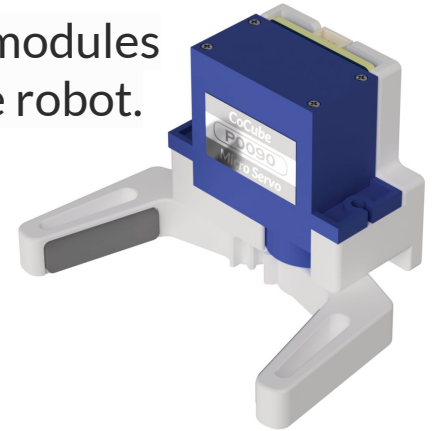
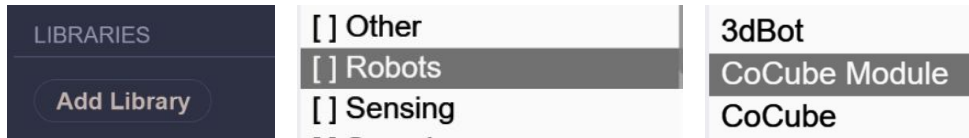
```
when button A pressed
```



Step 4 | Meet CoModules

CoModules are a series of magnetic attachment modules designed to expand the functionality of the CoCube robot.

Add the library of CoCube Module.



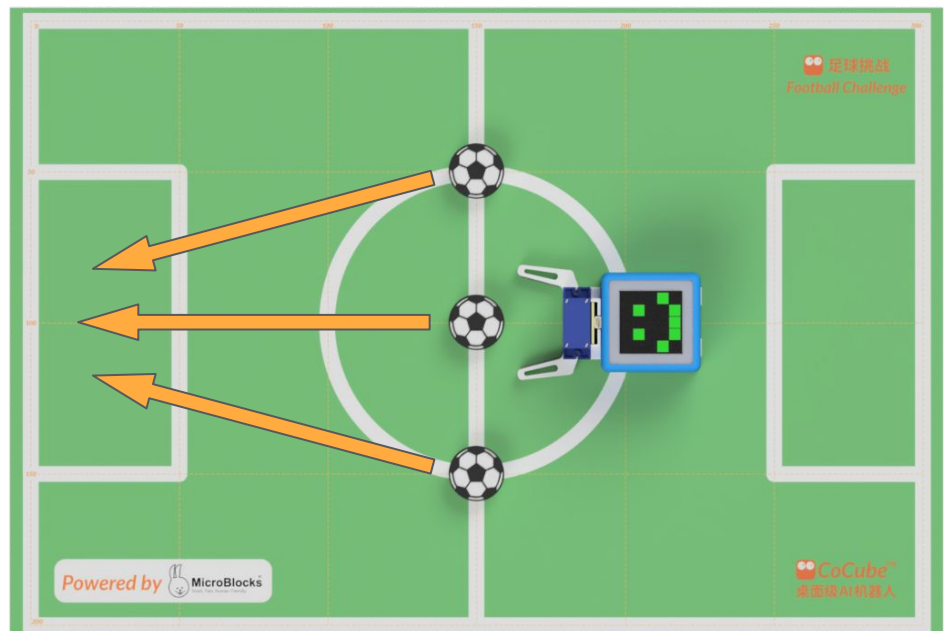
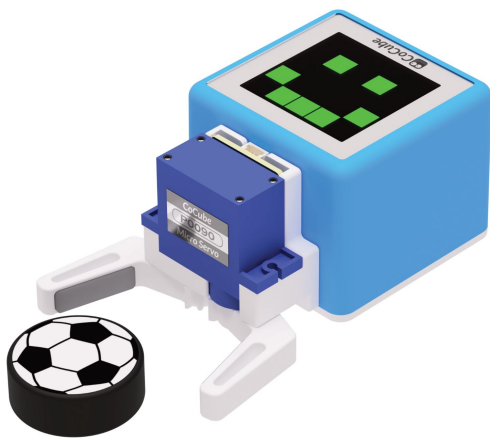
Have a test!

gripper open

gripper close

gripper degrees 0 (0 to 70)

Challenge time: start programming and control the CoCube robot to automatically deliver three footballs into the goal as soon as possible.



Tips: if the gripper wants to clamp the ball, it is appropriate to set the angle to about 10 degrees.



Step 5 | Advanced Challenge

Remote Control

If your computer has BLE and you want to remotely control the CoCube like a racing car, you can open this website.

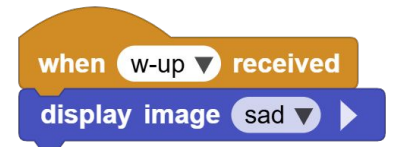
<https://keyboard.cocube.fun/>



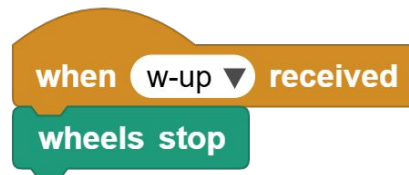
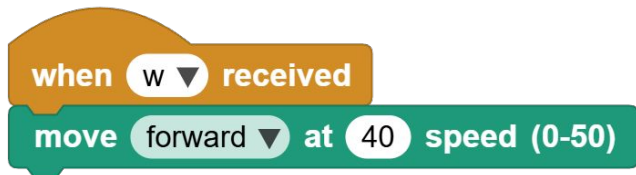
press key "w"
to send "w"



release key "w"
to send "w-up"



You can define how to control the CoCube movement and gripper functions with the keyboard.



Football Shot

You can add the small parts to the Gripper so that it can **actually** shoot. Please complete the football challenge again!

