

AI for STEM Competition

Asia Pacific STEAM_AI Technology Innovation Challenge

03 Screen Display, Motors and Servos

CocoRobo





Part 1

Platform use



Part 2

Image drawing



Part 3

Camera screen
display



Part 4

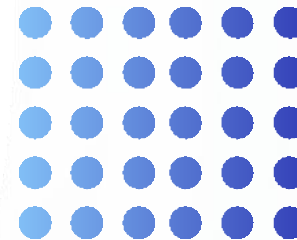
Motor and Servo

目 録

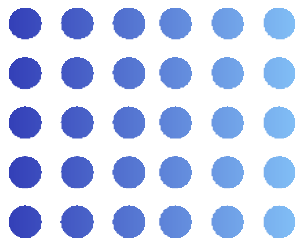
CONTENTS

ONE.

Platform Use



 <https://pi.cocorobo.hk/>



02

Platform Use

2 File Access Area

4 Auxiliary Area

CocoBlockly Pi

未命名 保存 < > 📷

樣例 實驗室 學習 存儲 語言 登入

邏輯
循環
數學運算
變量
字串
陣列
字典
元組
集合
函數
文件
時間
序列埠通訊
基礎硬件
媒體處理
人工智能
物聯網
擴展模組

3 Block Programming Area

1 Block Command Area

6 Code/ Interaction Area

7 Upload Area

Python 程式碼 終端交互窗 序列埠數據...

1
2

設備 有 無線 ①

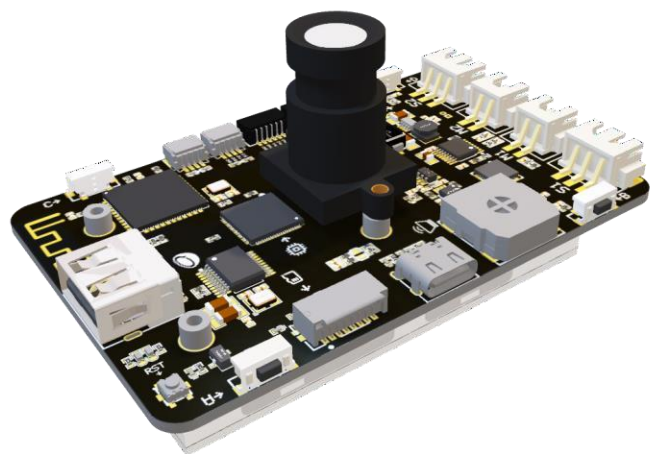
模組未連接，請連接。

連接設備 添加設備

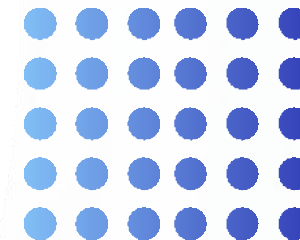
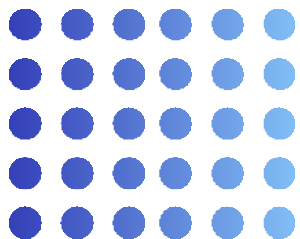
運行 上傳 停止 重啟 開機

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更新日誌 幫助 CocoBlockly Pi



Use a Type-C cable to connect the
Cocopi module to the computer



Platform Use

The screenshot shows the CocoBlockly Pi web interface. On the left is a sidebar with various programming blocks categorized under '基礎硬件' (Basic Hardware), '媒體處理' (Media Processing), '人工智能' (Artificial Intelligence), '物聯網' (IoT), and '擴展模組' (Expansion Modules). The main workspace is titled 'pi.cocorobo.hk 要求連線' (pi.cocorobo.hk requires connection). A modal window is open, showing a list of devices. The first device, '不明的 Google Inc. 裝置 - 已配對' (Unknown Google Inc. device - paired), is selected. The '連線' (Connect) button is highlighted. The bottom control bar contains buttons for '連接設備' (Connect device), '添加設備' (Add device), '運行' (Run), '上載' (Upload), '停止' (Stop), '重啟' (Restart), and '開機' (Power on). The '添加設備' button is highlighted.

1 Click on the "Add" button

2 Select the corresponding device

3 Click the "Connect" button

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更新日誌 幫助 CocoBlockly Pi

The screenshot shows the CocoBlockly Pi web application interface. On the left is a vertical sidebar with various programming blocks categorized under '基礎硬件' (Basic Hardware), '媒體處理' (Media Processing), '人工智能' (Artificial Intelligence), '物聯網' (IoT), and '擴展模組' (Expansion Modules). The main workspace is currently empty. On the right, there is a panel for '設備' (Device) with a dropdown menu set to '有線上載' (Online Upload). Below this, a message states '模組未連接，請連接。' (Module not connected, please connect). A blue box highlights the '連接設備' (Connect Device) button. Other buttons in this panel include '添加設備' (Add Device), '運行' (Run), '上載' (Upload), '停止' (Stop), '重啟' (Restart), and '關機' (Shutdown). The top navigation bar includes options like '未命名' (Untitled), '保存' (Save), and '登入' (Login). The bottom footer contains copyright information 'CocoRobo LTD © 2023 版權所有' and links for '更新日誌' (Update Log), '幫助' (Help), and 'CocoBlockly Pi'.

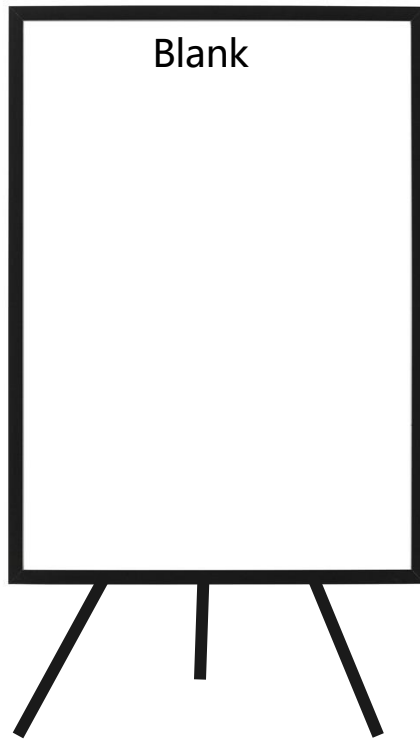
Click on the "Connect Device" button to get started

TWO.

Image Drawing

● Image Drawing

Screen



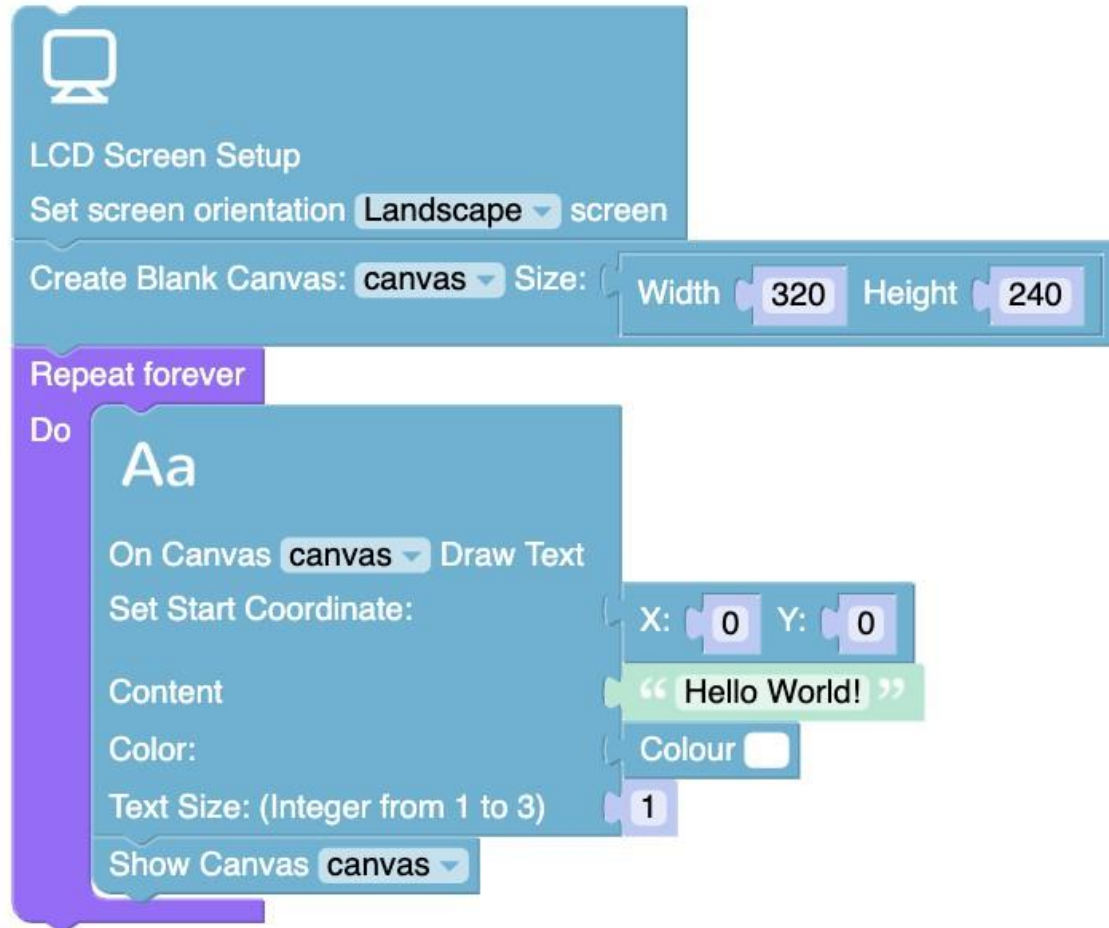
Create a
canvas



Draw and
display

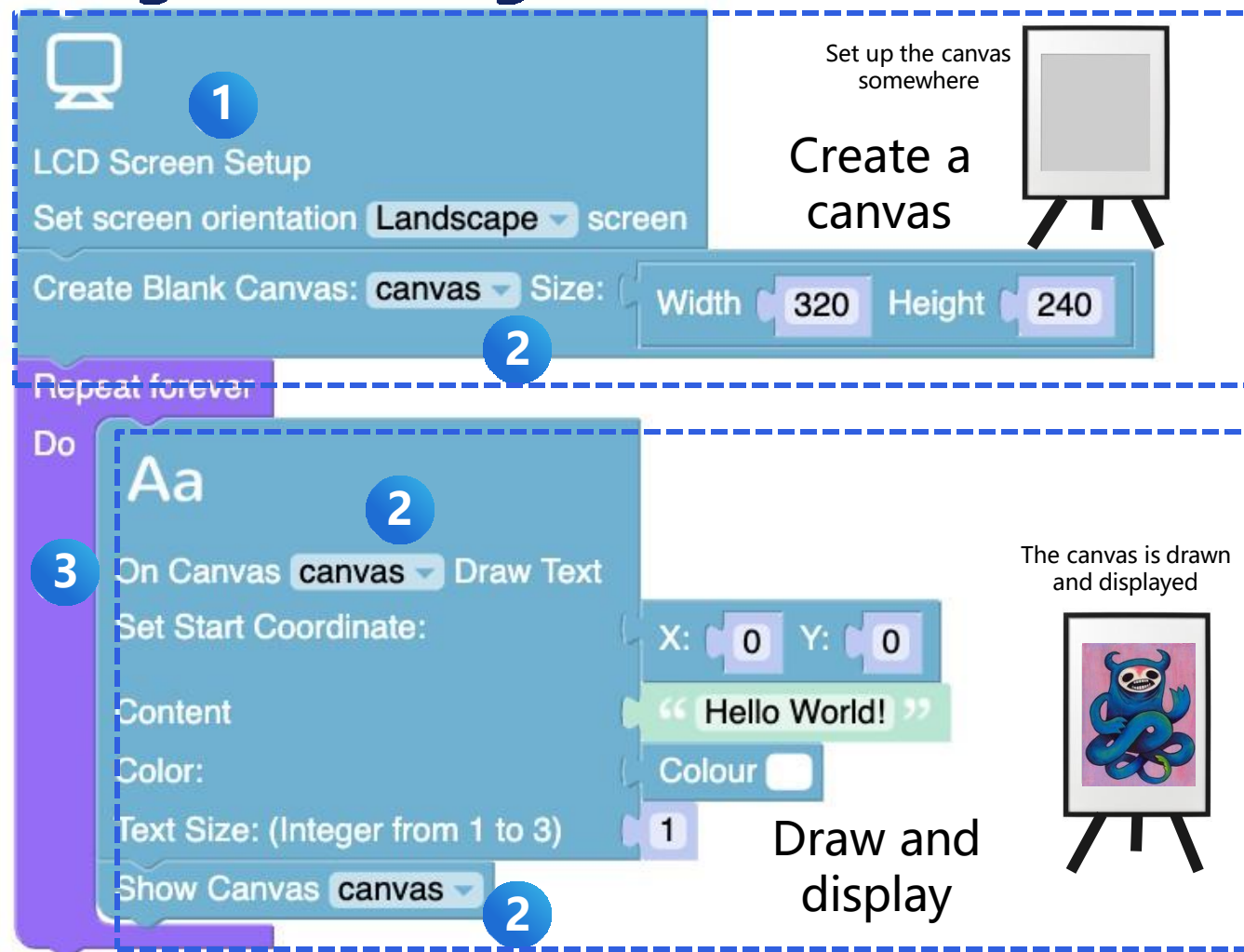


Image Drawing



Observe the program on the left and talk about what it consists of.

Image Drawing




- 1 Screen setup
- 2 Canvas
- 3 Repeat

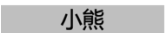
● Image Drawing

The role of the canvas



Original screen image

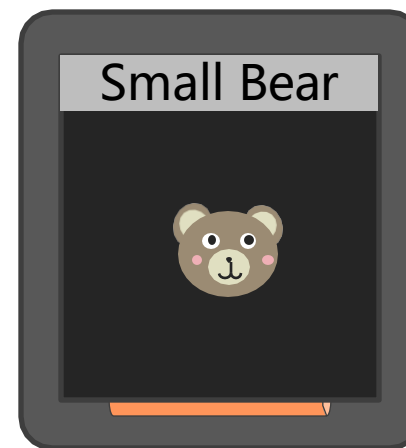
The figure drawn by canvas 1 is 

The figure drawn on canvas 2 is 



▲ Role 1

Move multiple
shapes on the
same canvas
together



▲ Role 2

Resize multiple
graphics on the
same canvas
together



▲ Role 3

Clear multiple
shapes on the
same canvas
together

Image Drawing



Activity 1:

Draw a solid square in the middle of the screen with a size of 50*50 pixels and make it green colour

Process analysis

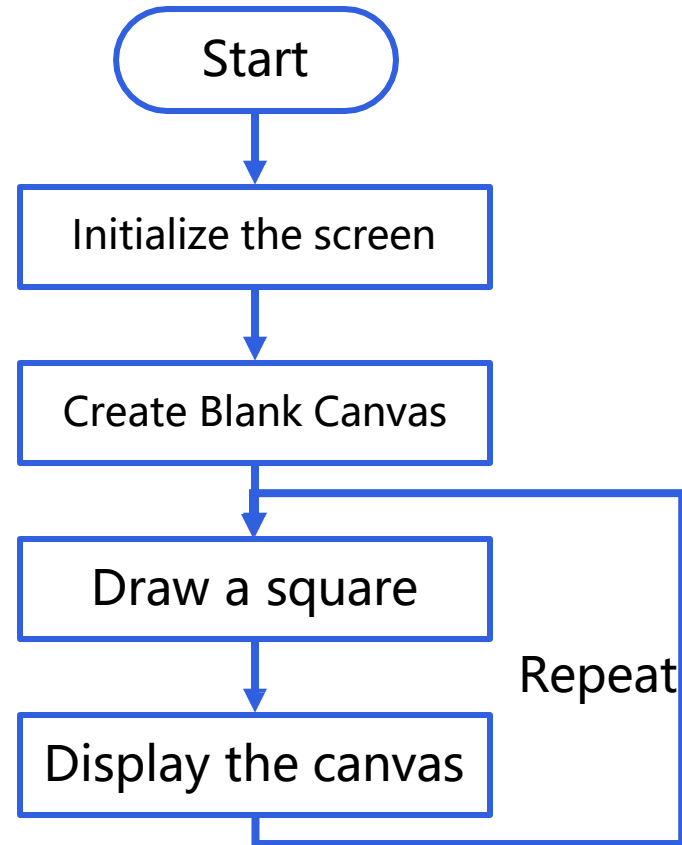


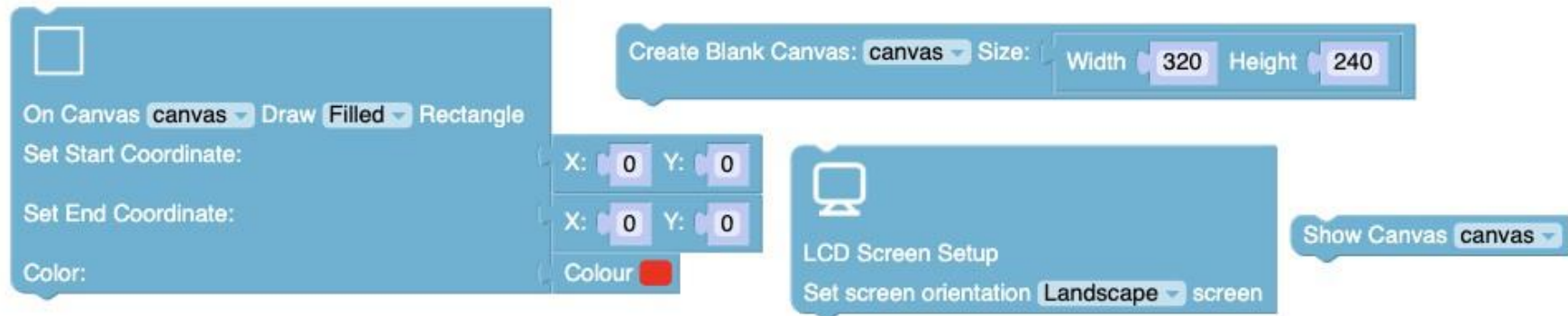
Image Drawing



Activity 1: Draw a solid square in the middle of the screen with a size of 50*50 pixels and make it green colour

Usage of Block Codes

Screen



Loops

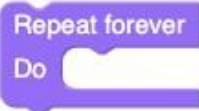


Image Drawing



Activity 1: Draw a solid square in the middle of the screen with a size of 50*50 pixels and make it green colour

Block
Explanation

The image shows a Scratch 'Draw Filled Rectangle' block with several annotations:

- Square Settings:** Points to the 'Draw' dropdown menu, which is set to 'Filled'.
- Start Coordinates:** Points to the 'Set Start Coordinate' field, which is set to X: 0 Y: 0.
- End Coordinates:** Points to the 'Set End Coordinate' field, which is set to X: 0 Y: 0.
- Colour settings:** Points to the 'Colour' dropdown menu, which is set to a green color.

The block also includes a 'Color' field and a color palette.

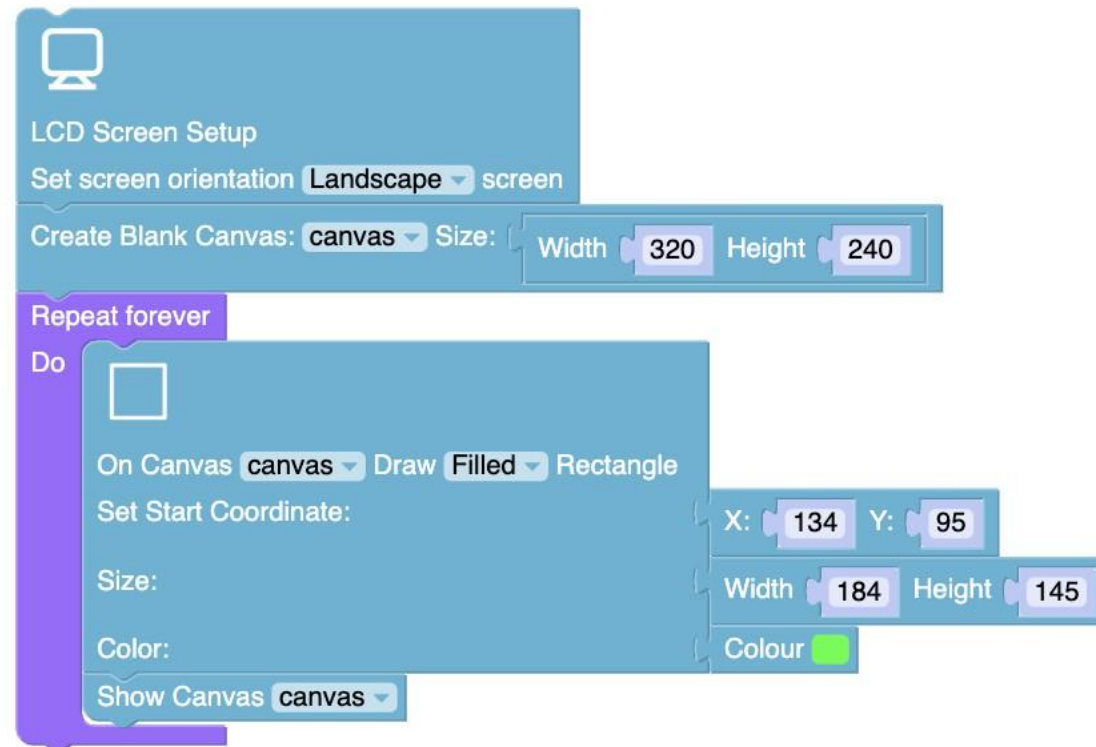
Image Drawing



Activity 1:

Draw a solid square in the middle of the screen with a size of 50*50 pixels and make it green colour

System Reference



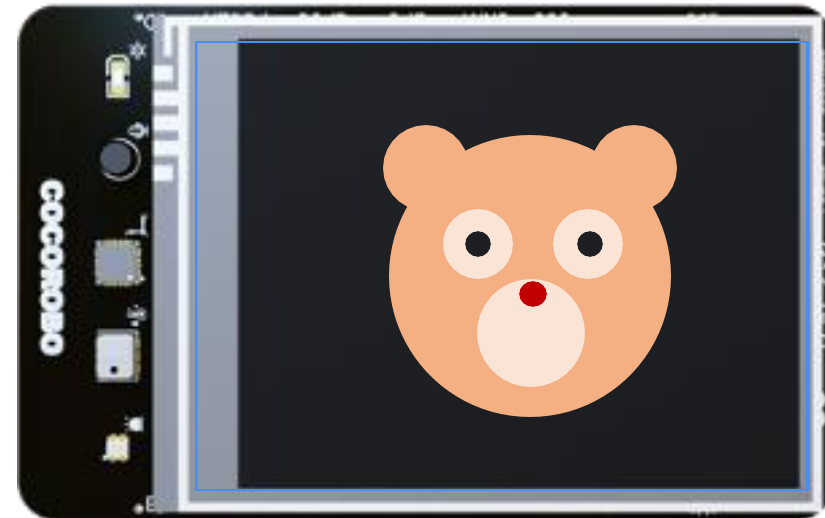
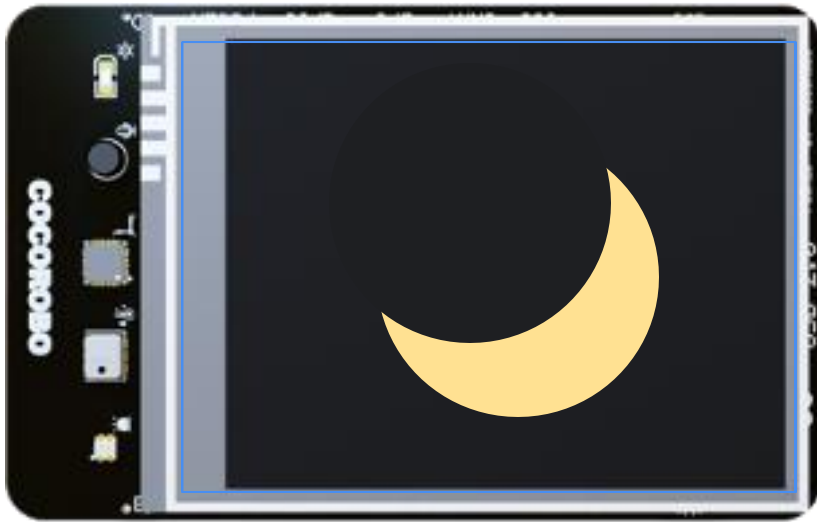
● Image Drawing



Activity 1 (Bonus)

Try to finish drawing the following graphic on the screen:

You can also
get creative!

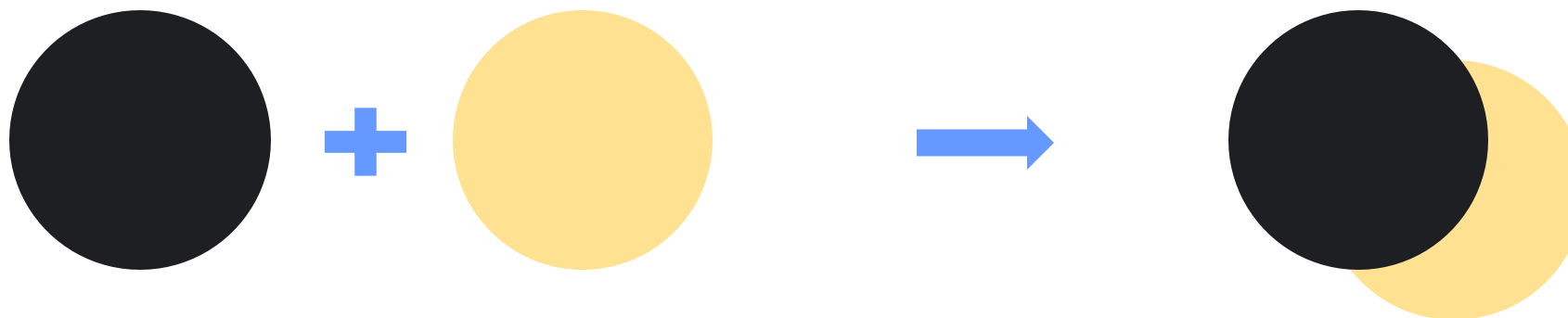


● Image Drawing

Activity 1 (Bonus)

Try to finish drawing the following graphic on the screen:

Reference
Ideas



THREE.

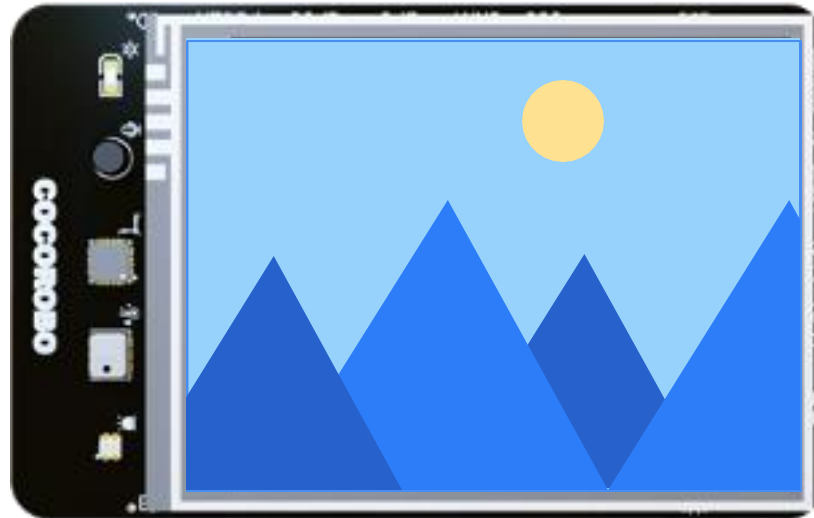
Camera Screen Display

● Camera Screen Display



Activity 2: Take a picture and keep it on the screen

Effect

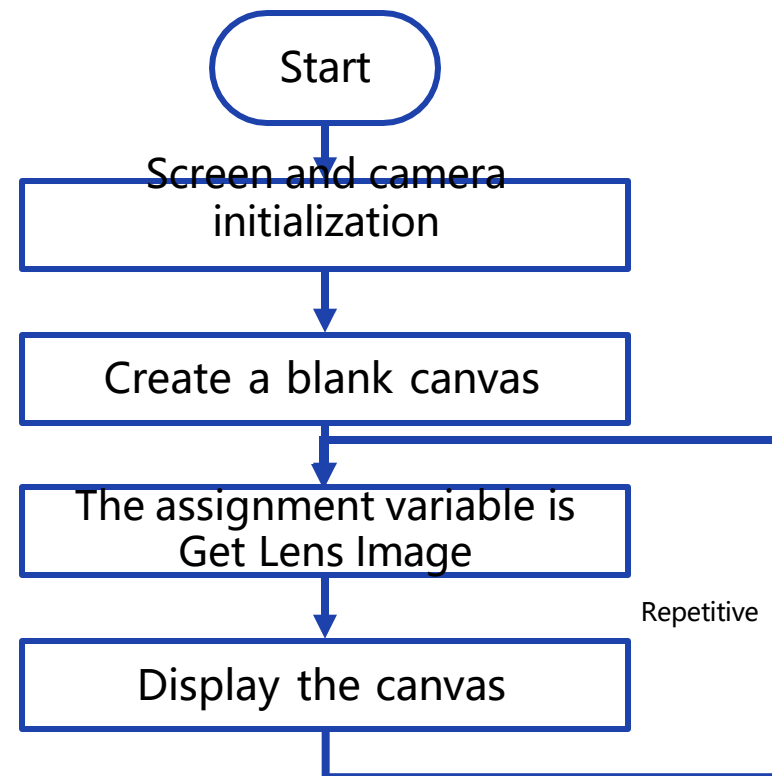


● Camera Screen Display



Activity 2: Take a picture and keep it on the screen

**Process
analysis**



● Camera Screen Display



Activity 2: Take a picture and keep it on the screen

Blocks Used

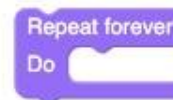
Screen



Camera



Loops



Variables

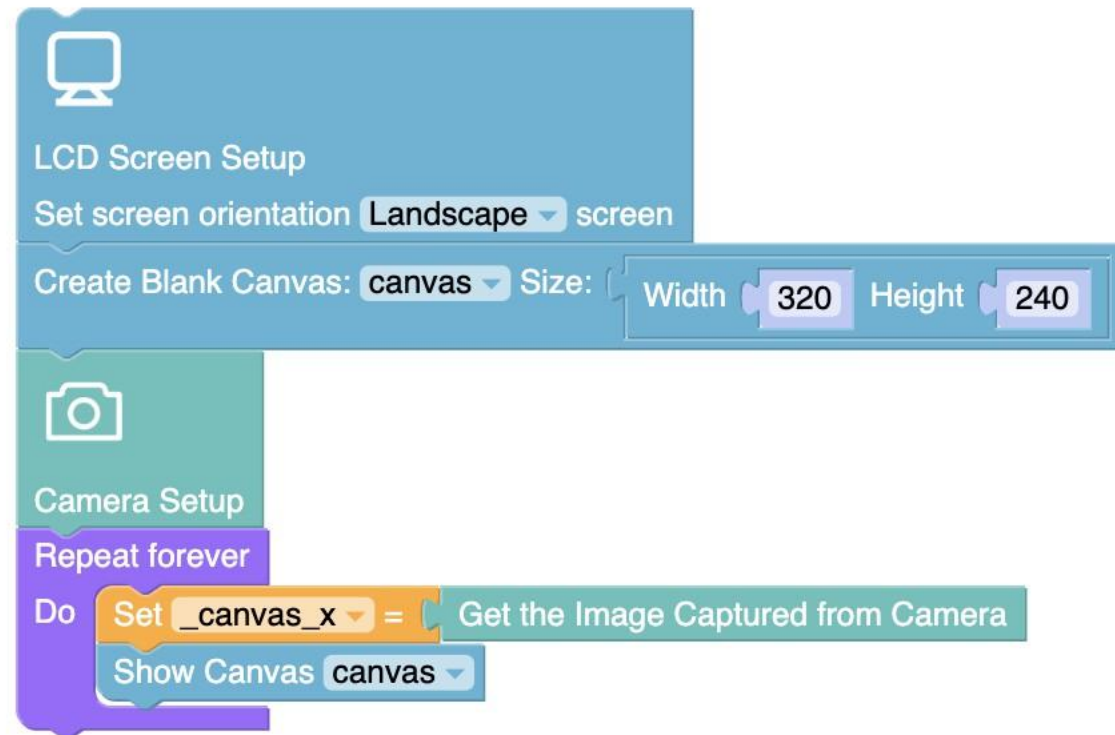


● Camera Screen Display



Activity 2: Take a picture and keep it on the screen

Block
Assembly



● Camera Screen Display



Activity 3: Continuing from Activity 2, press the C button to complete the photo storage function



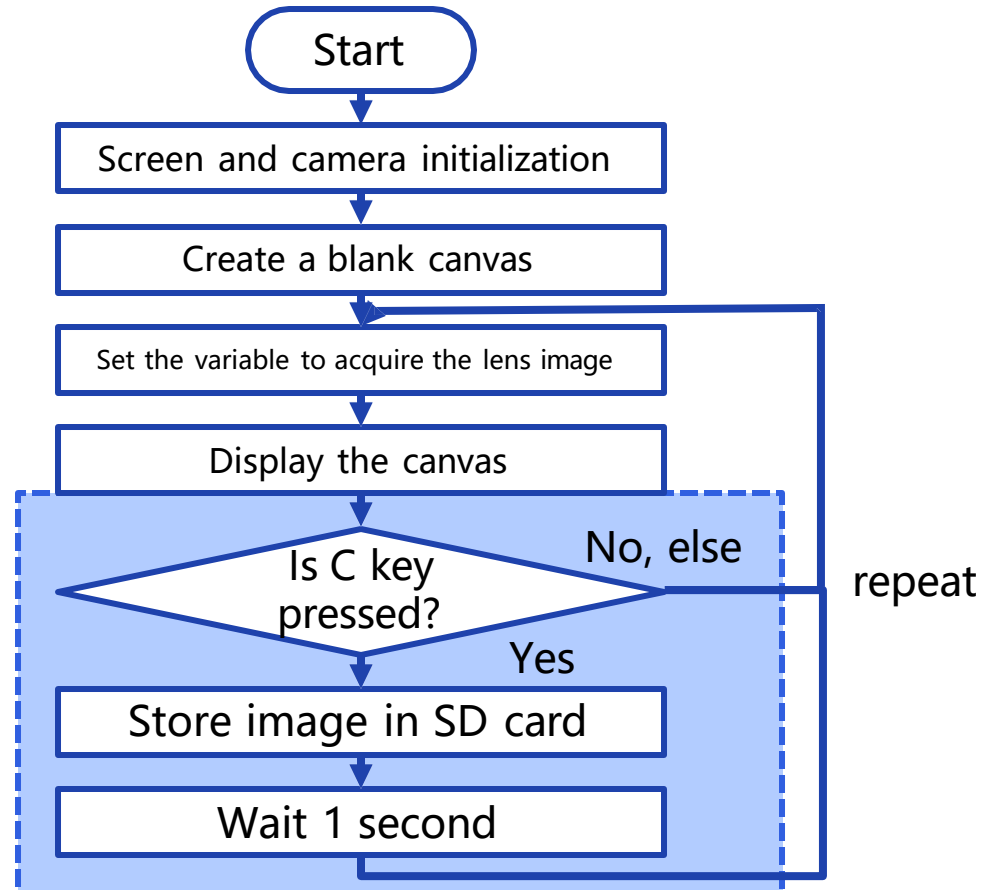
Camera Screen Display



Activity 3:

Continuing from Activity 2, press the C button to complete the photo storage function

Block Sequence



Camera Screen Display



Activity 3: Continuing from Activity 2, press the C button to complete the photo storage function

Blocks Used

Screen



Show Canvas canvas

Create Blank Canvas: canvas Size: Width 320 Height 240

Logic



Camera

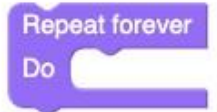


Get the Image Captured from Camera

Time

Wait 1 Seconds

Loops



Basic

When Button A is Pressed

Image Process

Set Canvas canvas Saved to Local Path: "/root/user/img/saved.jpg"

● Camera Screen Display



Activity 3: Continuing from Activity 2, press the C button to complete the photo storage function

**Block
Explanation**

Set Canvas canvas Saved to Local Path: “ /root/user/img/saved.jpg ”

/root/**user**/img/

**File
path**

Note that the pictures
are placed under the
user folder

saved

**Image
name**

.jpg

**Image
Format**

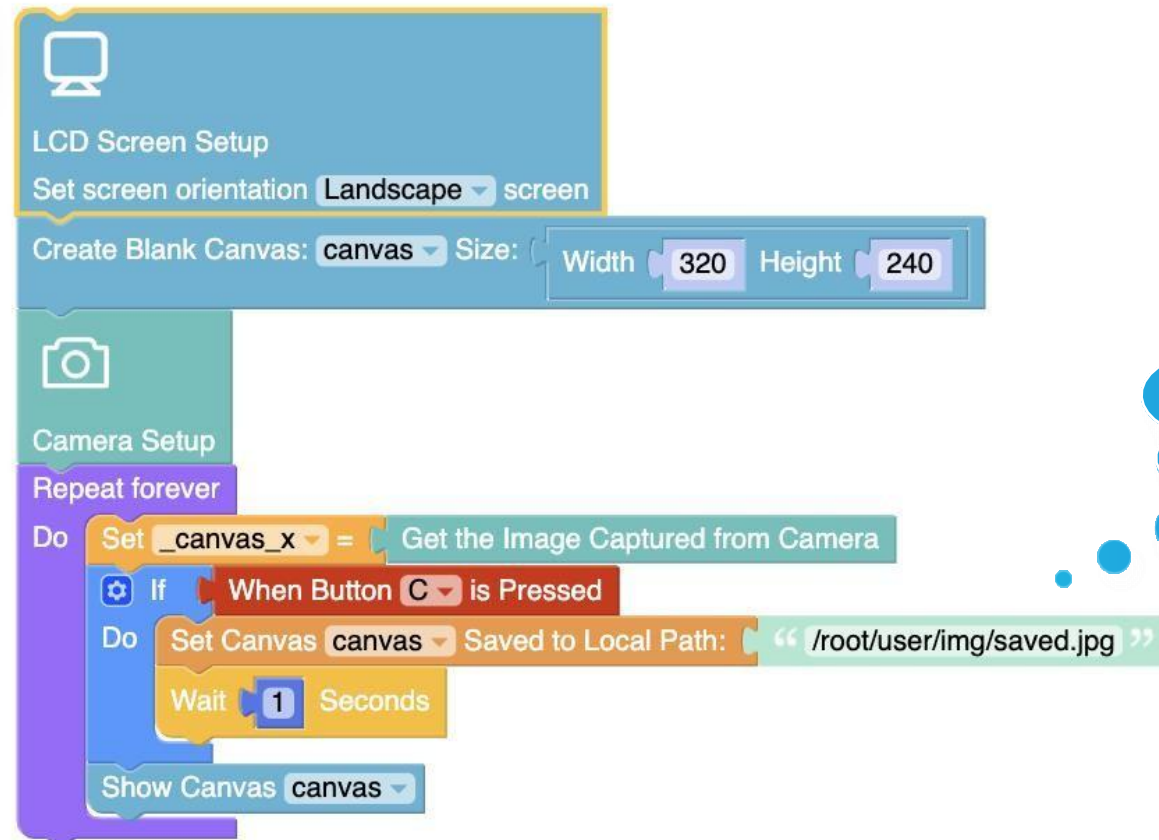
● Camera Screen Display



Activity 3:

Continuing from Activity 2, press the C button to complete the photo storage function

Block Reference

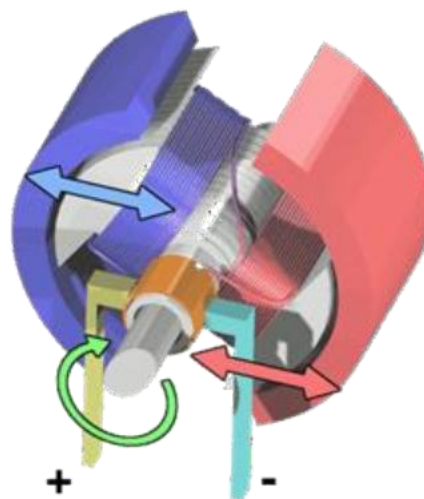
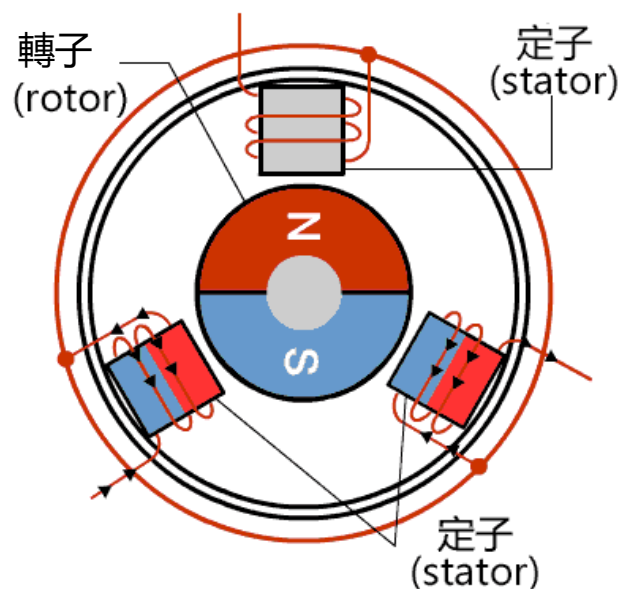


Pay attention when
modifying the file
path

FOUR.

Motor and Servo

● Meet TT Motors

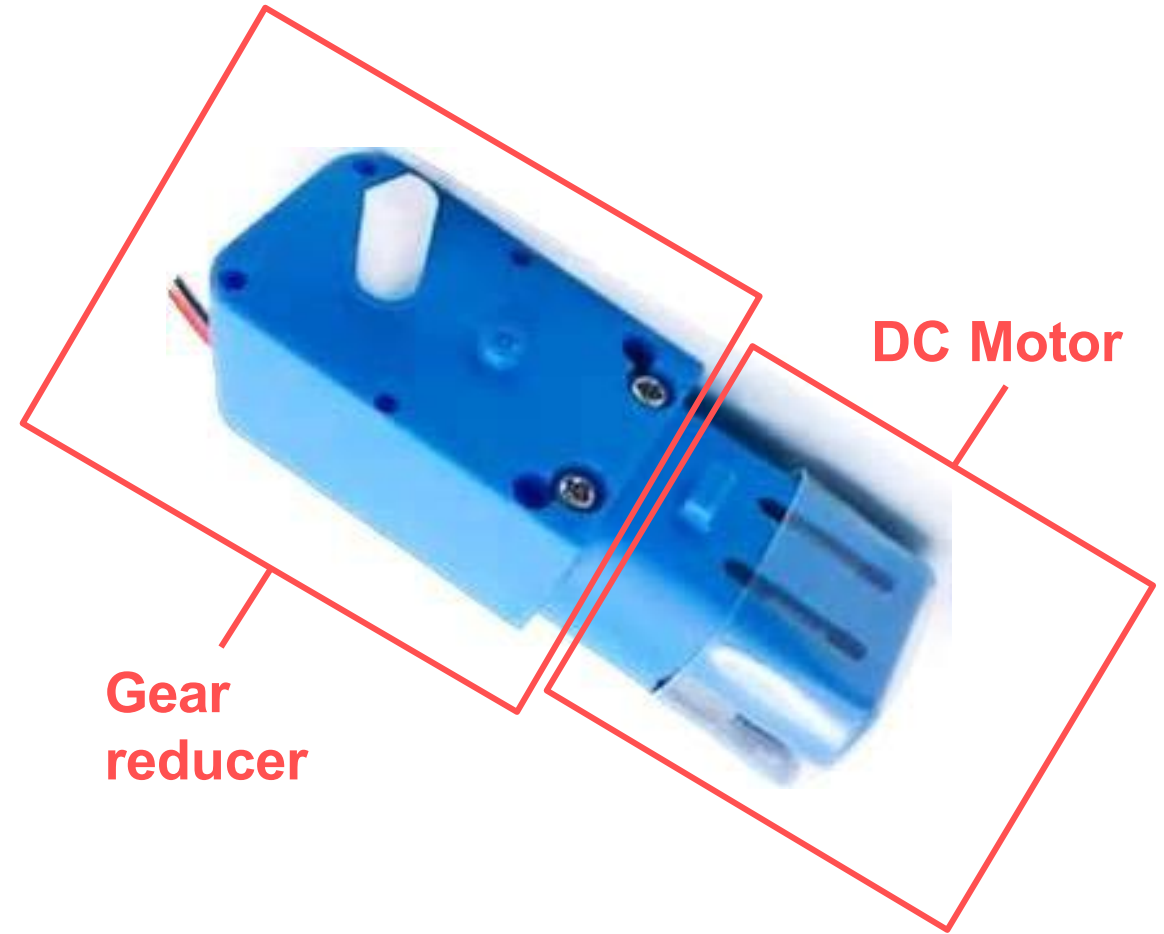


TT motor, also known as electric motor, is an electrical equipment that converts electrical energy into kinetic energy and is used to drive other devices.

● Meet TT Motors

DC reducer motor also known as a gear reducer motor, is composed of an ordinary DC motor and a supporting gear reducer.

The function of the gear reducer is to reduce the speed and increase the torque to provide strong power.



● Meet TT Motors

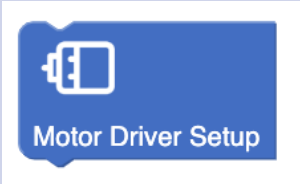
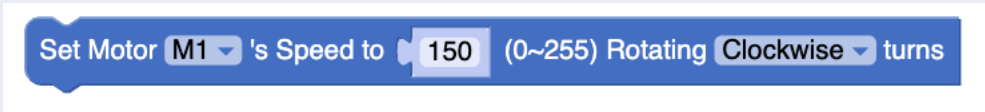
- Rated voltage: 4.5-6V
- No-load speed: 90 ± 10 rpm (depending on the reduction ratio)
- Load Current: 190mA (250mA max)
- Maximum torque: 0.8Kg·cm
- Wire length: 15cm
- TT motor is a DC reducer motor and can be used in DIY scenarios with speed and torque requirements, the speed can be adjusted which can recognize forward and reverse rotation with low noise.



Usage of TT Motors

Instruction
Description

Power

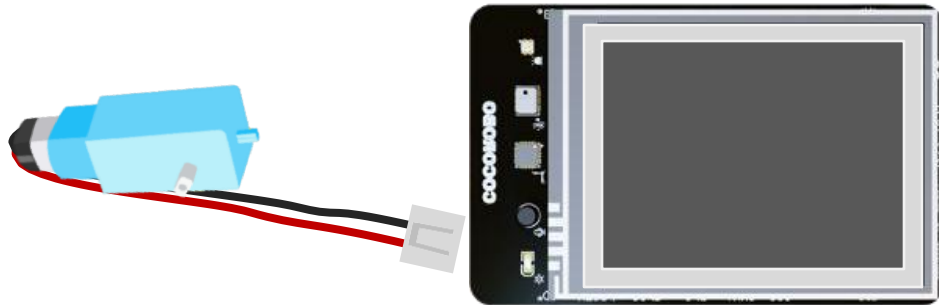
Block Icon	Introduction
 The icon shows a blue block with a white motor symbol and the text "Motor Driver Setup".	Initializes the TT motor
 The icon shows a blue block with the text "Set Motor M1's Speed to 150 (0~255) Rotating Clockwise turns".	Set the specified number for the TT motor to rotate at a certain speed/direction

● Power on the Motor



Activity 1: Rotate the TT motor clockwise at a speed of 50.

Connect the module to the
TT motor



Use
blocks



Motor Driver Setup

Set Motor **M1** 's Speed to **150** (0~255) Rotating **Clockwise** turns

● Power on the Motor



Activity 1: Rotate the TT motor clockwise at a speed of 50.

Block
Reference



Motor Driver Setup

Set Motor **M1** 's Speed to **150** (0~255) Rotating **Clockwise** turns

● Servo Motors Introduction

“Servo Motor”

A servo motor is a motor that acts according to commands.

The servo motor can recognize its position and control its action speed.

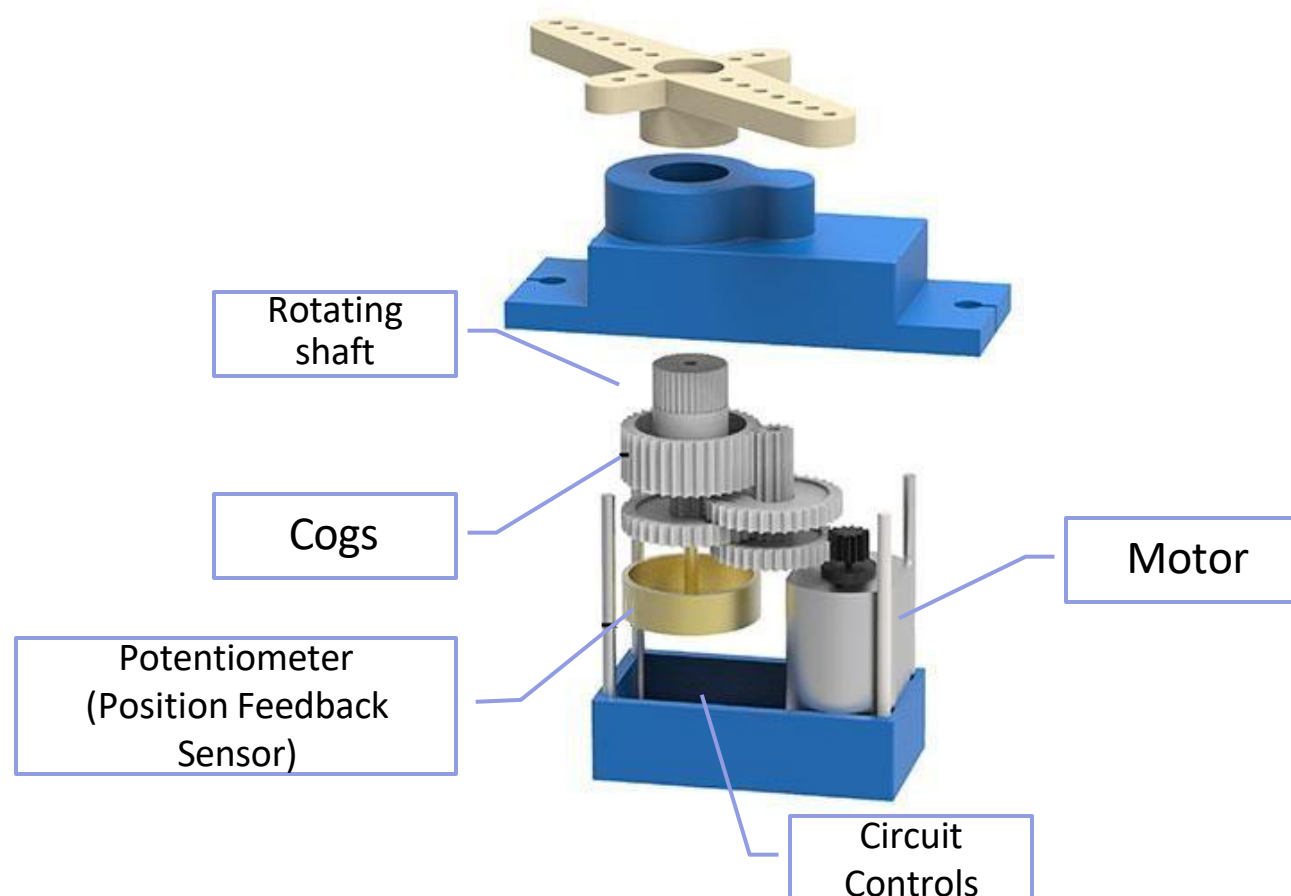


▲ SG90 Servo Motor



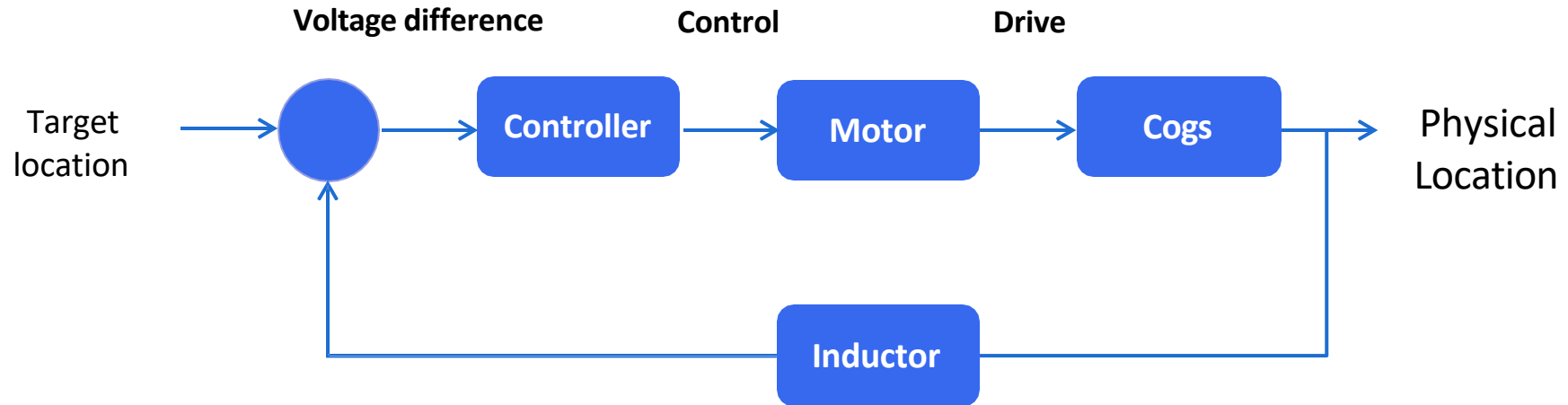
▲ MG90 Servo Motor

● Servo Motors Introduction



圖源: <https://learn.thestempedia.com/wp-content/uploads/2018/05/Servo-Motor.jpg>

Servo Motors Introduction



The position detector (angle sensor) is its input sensor, and the resistance value of the position detector will change the position of the servo motor rotation. By reading the resistance value in the control circuit, the speed and direction of the motor can be adjusted appropriately according to the resistance value, so that the motor rotates at a specified angle. This enables precise rotation control of the servo motor.

Servo Motors Introduction

Combine the servo motor with either servo motor arm.

What is the maximum angle range of the servo motor that is turned by the rudder arm?

Servo Motor
Arm



▲ Servo motors and accessories



▲ Servo motor plus arm

● Servo Motors Introduction



Use a Type C Cable to connect the module to the computer

Servo Motors Introduction



Activity 2: Control the servo motor to rotate between 0 and 90 degrees.

Block
Explanation

Power



Set Servo on GPIO # **S1** Rotate to **90** Degree (0°~180°)

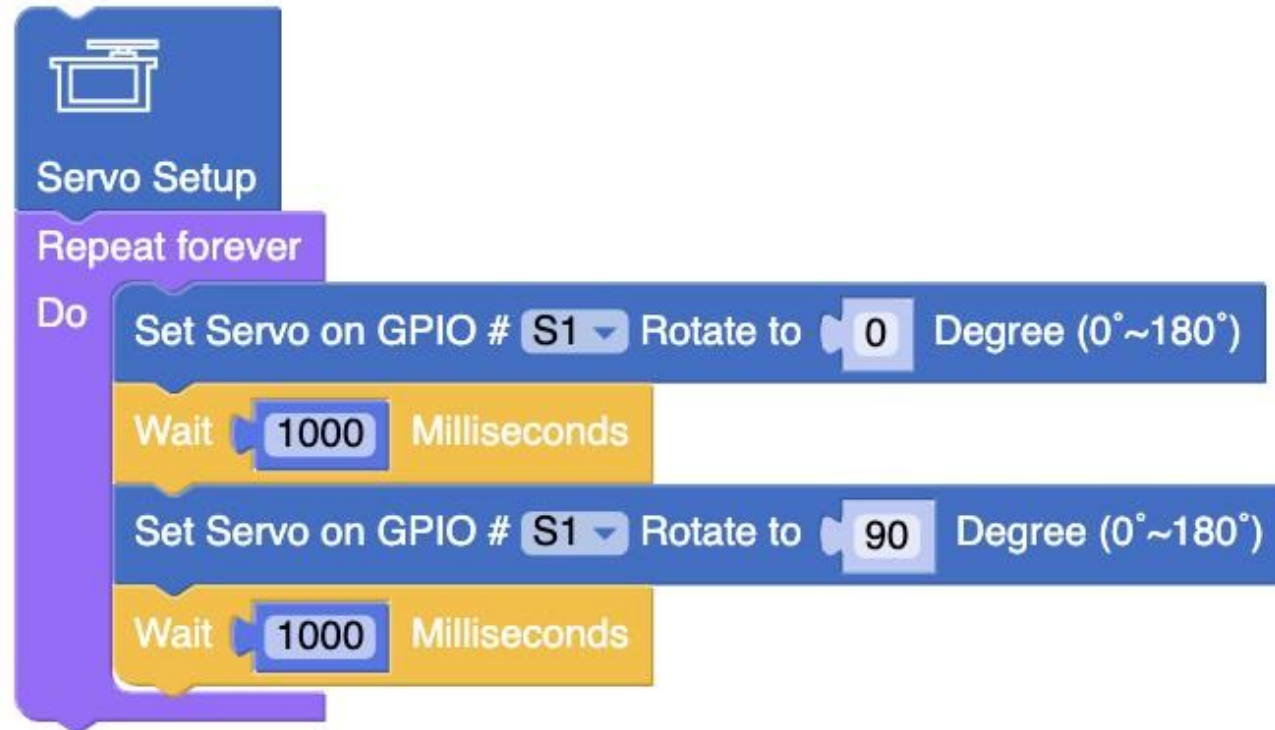
The pin corresponds to the serial number of the signal port on the module

Servo Motors Introduction



Activity 2: Control the servo motor to rotate between 0 and 90 degrees.

Block
Reference



P O W
E
See you!

T H A N K S

P
J U S T L E A V E P R E S E N T A T I O N T O O R I N

