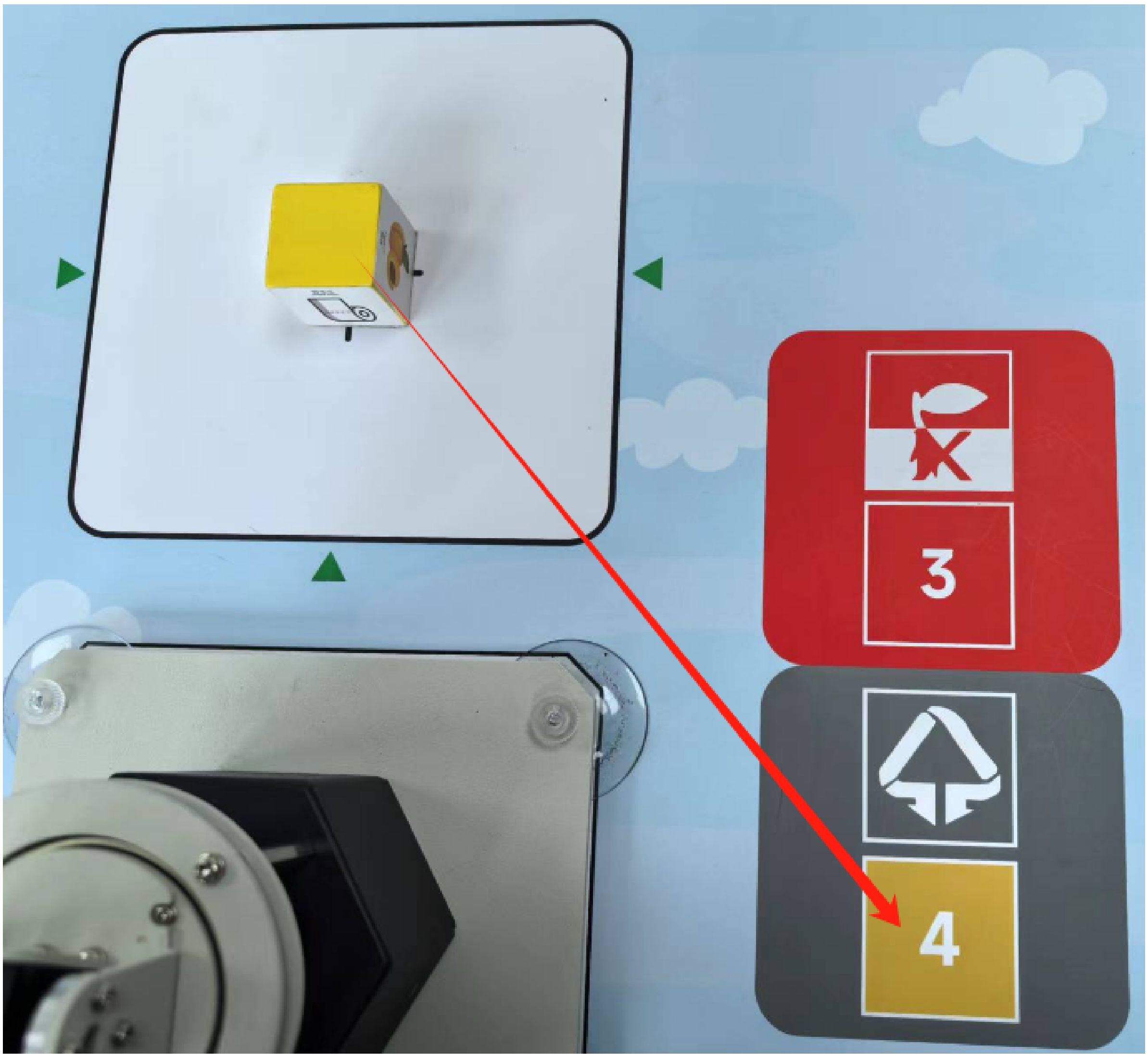
Robotic arm clamps blocks

1. Introduction to gameplay

The purpose of this experiment is to move blocks from the middle cross area to the surrounding blocks of different colors. First, put the yellow block in the cross area, and then run the code unit to the sixth unit in sequence (grab a block from the cross block position and put it in the yellow block position). At this time, the robot arm will automatically grab the block placed in the cross area, then put it in the yellow area, and then return to the preparation position. Before running the seventh code unit, you need to put the red block in the cross area, and then run the seventh unit (grab a block from the cross block position and put it in the red block position). In this way, the red block will also be grabbed to the red area, and the operation method of other blocks is the same.



2. Code content

Code path:

```
~/dofbot_ws/src/dofbot_ctrl/scripts/09.clamp_block.ipynb
```

The following code content needs to be executed according to the actual step, and cannot be run all at once. Before clamping the building block, you need to put the building block in the middle cross building block position, and only one building block can be placed at a time.

```python
#!/usr/bin/env python3
#coding=utf-8
import time
from Arm_Lib import Arm_Device

# Create a robotic arm object
Arm = Arm_Device()
time.sleep(.1)


from dofbot_utils.robot_controller import Robot_Controller
robot = Robot_Controller()
```

```python
# Define the function of clamping blocks, enable=1: clamp, =0: release
def arm_clamp_block(enable):
    if enable == 0:
        Arm.Arm_serial_servo_write(6, 60, 400)
    else:
        Arm.Arm_serial_servo_write(6, 135, 400)
    time.sleep(.5)


# Define the function of moving the robot arm and control the movement of servos 1-5 at the same time, p=[S1,S2,S3,S4,S5]
def arm_move(p, s_time = 500):
    for i in range(5):
        id = i + 1
        if id == 5:
            time.sleep(.1)
            Arm.Arm_serial_servo_write(id, p[i], int(s_time*1.2))
        else :
            Arm.Arm_serial_servo_write(id, p[i], s_time)
        time.sleep(.01)
    time.sleep(s_time/1000)

# The robot moves up
def arm_move_up():
    Arm.Arm_serial_servo_write(2, 90, 1500)
    Arm.Arm_serial_servo_write(3, 90, 1500)
    Arm.Arm_serial_servo_write(4, 90, 1500)
    time.sleep(.1)
```

```
# Define variable parameters in different positions
p_mould = robot.P_LOOK_AT
p_top = robot.P_TOP
p_Brown = robot.P_CENTER

p_Yellow = robot.P_YELLOW
p_Red = robot.P_RED

p_Green = robot.P_GREEN
p_Blue = robot.P_BLUE
```

```
# Move the robot arm to a position ready to grasp
arm_clamp_block(0)
arm_move(p_mould, 1000)
time.sleep(1)
```

```
# Grab a block from the center of the recognition area and place it on the position of the yellow block.
arm_move(p_top, 1000)
arm_move(p_Brown, 1000)
arm_clamp_block(1)
arm_move(p_top, 1000)
arm_move(p_Yellow, 1000)
arm_clamp_block(0)
arm_move(p_mould, 1000)
time.sleep(1)
```

```
# Grab a block from the center of the recognition area and place it on the position of the red block.
arm_move(p_top, 1000)
arm_move(p_Brown, 1000)
arm_clamp_block(1)
arm_move(p_top, 1000)
arm_move(p_Red, 1000)
arm_clamp_block(0)
arm_move_up()
arm_move(p_mould, 1100)
time.sleep(1)
```

```
# Grab a block from the center of the recognition area and place it on the position of the green block.
arm_move(p_top, 1000)
arm_move(p_Brown, 1000)
arm_clamp_block(1)
arm_move(p_top, 1000)
arm_move(p_Green, 1000)
arm_clamp_block(0)
arm_move_up()
arm_move(p_mould, 1100)
time.sleep(1)
```

```
# Grab a block from the center of the recognition area and place it on the blue block.
arm_move(p_top, 1000)
arm_move(p_Brown, 1000)
arm_clamp_block(1)
arm_move(p_top, 1000)
arm_move(p_Blue, 1000)
arm_clamp_block(0)
arm_move_up()
arm_move(p_mould, 1100)
time.sleep(1)
```

```
del Arm # Release the Arm object
```