Experiment 1

Controlling LED lights using Raspberry Pi

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Aim :- To control 4 LEDS and make up a synchronized dance pattern out of it using a Raspberry pi 4.

Equipment Required:-

1. LED lights (4 pieces)

2. micro-controller.-Raspberry pie 4

3. Female to female jumper wires. 4. Desktop

4. Adapters and connectors

5. Desktop

Process :- Below are the attached images that illustrate the connection of GPIO pin numbers 2, 3, 4, and 17 of the Raspberry Pi 4 to the 1st (D0), 2nd (D1), 3rd (D2), and 4th (D3) LED lights, respectively.:-
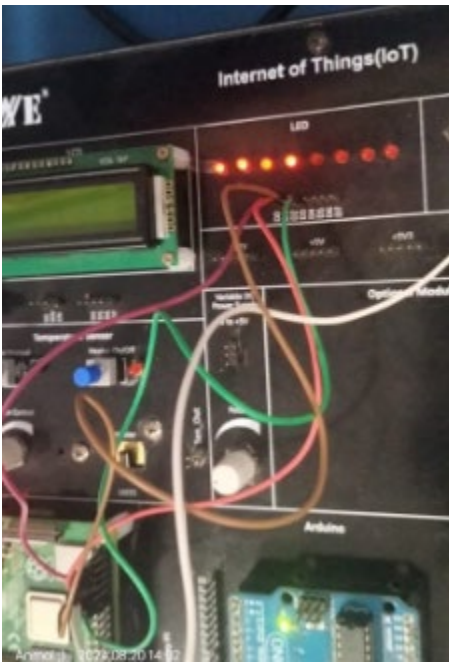
Results:- Below is the drive link attached for the output video showing the dancing pattern of led lights:-

Drive link:

https://drive.google.com/file/d/1wBzizGo3X44aMy0ULN_0qqz5sNVZ6tR9/view?usp=sharing

Conclusion: In this experiment, we successfully programmed the Raspberry Pi to control LEDs in a coordinated and visually appealing sequence, showcasing our understanding of GPIO manipulation, timing control, and creative pattern design.

Code written on "Thonny" environment is below:-

```
Import Rpi.GPIO as GPIO

Import time

L1 = 2

L2 = 3

L3 = 4

L4 = 17

GPIO.setmode(GPIO.BCM)

GPIO.setup(L1, GPIO.OUT)

GPIO.setup(L2, GPIO.OUT)

GPIO.setup(L3, GPIO.OUT)

GPIO.setup(L4, GPIO.OUT)
```

```python
GPIO.output(L1, GPIO.HIGH)
GPIO.output(L2, GPIO.HIGH)
GPIO.output(L3, GPIO.HIGH)
GPIO.output(L4, GPIO.HIGH)
while True :
GPIO.output(L1, GPIO.LOW)
time.sleep(1)
GPIO.output(L1, GPIO.HIGH)
GPIO.output(L2, GPIO.LOW)
time.sleep(1)
GPIO.output(L2, GPIO.HIGH)
GPIO.output(L3, GPIO.LOW)
time.sleep(1)
GPIO.output(L3, GPIO.HIGH)
GPIO.output(L4, GPIO.LOW)
time.sleep(1)
GPIO.output(L4, GPIO.HIGH)
GPIO.output(L1, GPIO.LOW)
time.sleep(1)
GPIO.output(L1, GPIO.HIGH)
GPIO.output(L2, GPIO.LOW)
time.sleep(1)
GPIO.output(L2, GPIO.HIGH)
for i in range(4):
GPIO.output(L1, GPIO.LOW)
time.sleep(0.1)
GPIO.output(L1, GPIO.HIGH)
GPIO.output(L2, GPIO.LOW)
time.sleep(0.1)
GPIO.output(L2, GPIO.HIGH)
GPIO.output(L3, GPIO.LOW)
time.sleep(0.1)
```

```
GPIO.output(L3, GPIO.HIGH)
GPIO.output(L4, GPIO.LOW)
time.sleep(0.1)
GPIO.output(L4, GPIO.HIGH)
for i in range(4):
GPIO.output(L4, GPIO.LOW)
time.sleep(0.1)
GPIO.output(L4, GPIO.HIGH)
GPIO.output(L3, GPIO.LOW)
time.sleep(0.1)
GPIO.output(L3, GPIO.HIGH)
GPIO.output(L2, GPIO.LOW)
time.sleep(0.1)
GPIO.output(L2, GPIO.HIGH)
GPIO.output(L1, GPIO. LOW)
time.sleep(0.1)
GPIO.output(L1, GPIO.HIGH)
for i in range(4):
GPIO.output(L4, GPIO.LOW
GPIO.output(L2, GPIO.LOW)
time.sleep(0.25)
GPIO.output(L4, GPIO.HIGH)
GPIO.output(L2, GPIO.HIGH)
GPIO.output(L1, GPIO.LOW
GPIO.output(L3, GPIO.LOW)
Time.sleep(0.25)
GPIO.output(L1, GPIO.HIGH)
GPIO.output(L3, GPIO.HIGH)
for i in range(4):
GPIO.output(L4, GPIO.LOW
GPIO.output(L2, GPIO.LOW)
GPIO.output(L1, GPIO.LOW)
```

```
GPIO.output(L3, GPIO.LOW)

time.sleep(0.25)

GPIO.output(L4, GPIO.HIGH)

GPIO.output(L2, GPIO.HIGH)

GPIO.output(L1, GPIO.HIGH)

GPIO.output(L3, GPIO.HIGH)

time.sleep(0.25)

GPIO.cleanup()
```