LAB – 6 Switching a High-Power DC Device

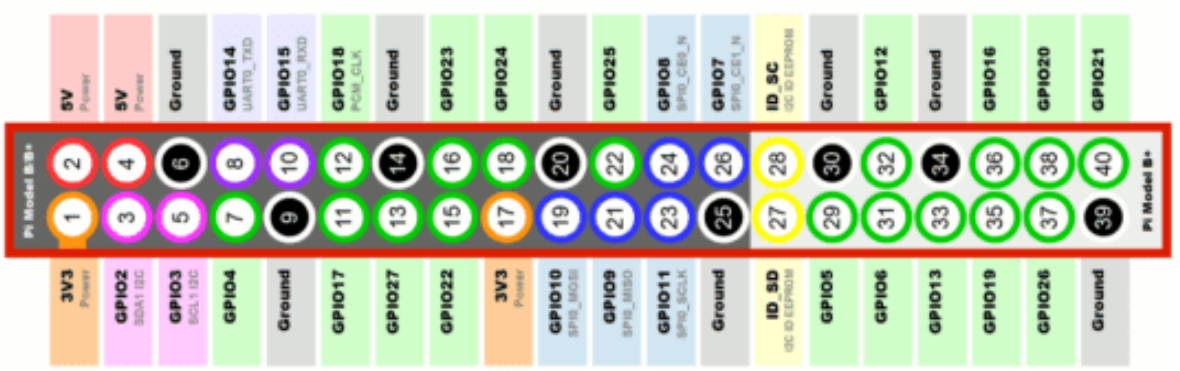
Aim:

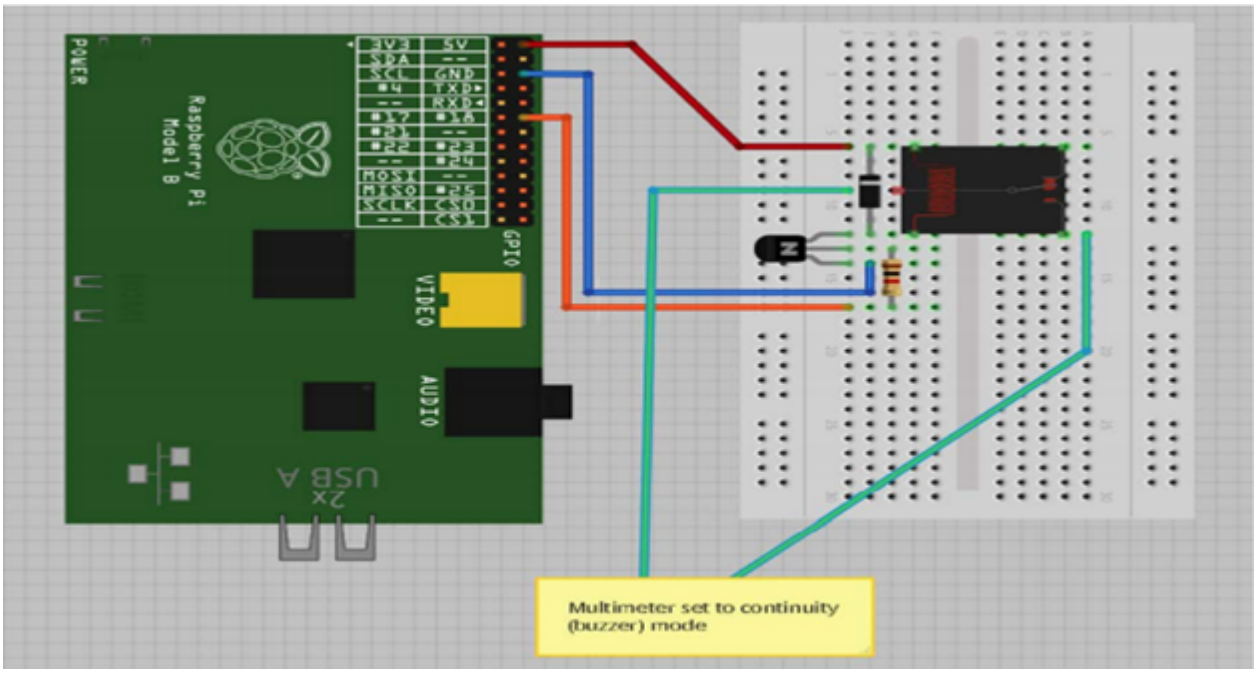
To write a program to switch a high-power DC device using a relay or transistor.

Task:

1. Write a Python program to switch a high-power DC device using a relay.

Pin & Circuit Diagram:





Algorithm:

1.Start
2.Import the **RPI** Python module to control the GPIO on Raspberry Pi.
3.Set the GPIO mode as **BCM** i.e. Broadcom SOC Channel.
4.Configure GPIO pin 3 as output.
5.Run an infinite while loop to continuously prompt the user for input with the message and store the input in the variable.
6.Check the value of x:

- If x is equal to 'ON', execute the following steps:
    1. Set GPIO pin 3 to HIGH (True) to turn on the relay.
    2. Add a delay of 1 second using the sleep function to keep the relay on for a second.
- If x is equal to 'OFF', execute the following steps:
    1. Set GPIO pin 3 to LOW (False) to turn off the relay.
    2. Add a delay of 1 second using the sleep function to keep the relay off for a second.
- If x is neither 'ON' nor 'OFF', print "Invalid Entry" to inform the user of an invalid input.

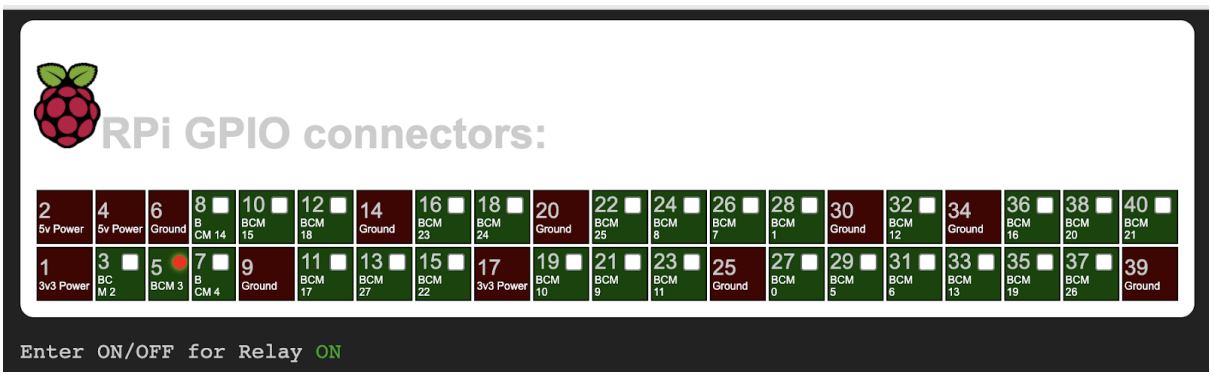
7.Exit

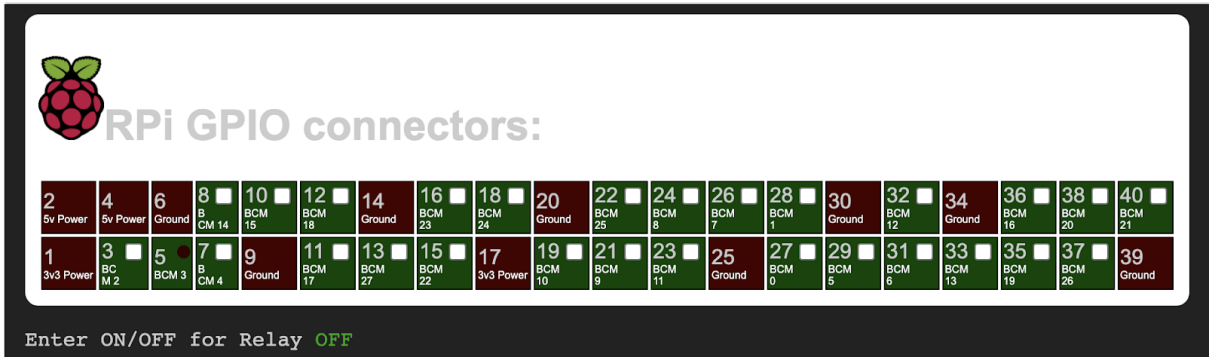
Programs:

relay.py

```
import RPi.GPIO as GPIO
from time import sleep
GPIO.setmode(GPIO.BCM)
GPIO.setup(3,GPIO.OUT)
while True:
  x=input("Enter ON/OFF for Relay")
  if x=='ON':
    GPIO.output(3,True)
    sleep(1)
  elif x=='OFF':
    GPIO.output(3,False)
    sleep(1)
  else :
    print("Invalid Entry")
```

Output:





Pre Lab Questions:

1. Can we switch a high-power device using a conventional GPIO pin? Justify your answer.
2. With the aid of a diagram, write the working of a relay.
3. Write the characteristics of a high power MOSFET transistor.

Post Lab Questions:

1. What are the limitations of relay?

2. Explain how to switch 110 V or 240 V AC devices using Raspberry Pi.

Result:

Thus,the python code for switching a high-power DC device using a relay in Raspberry Pi was written and successfully tested.