“Raspberry pi course”

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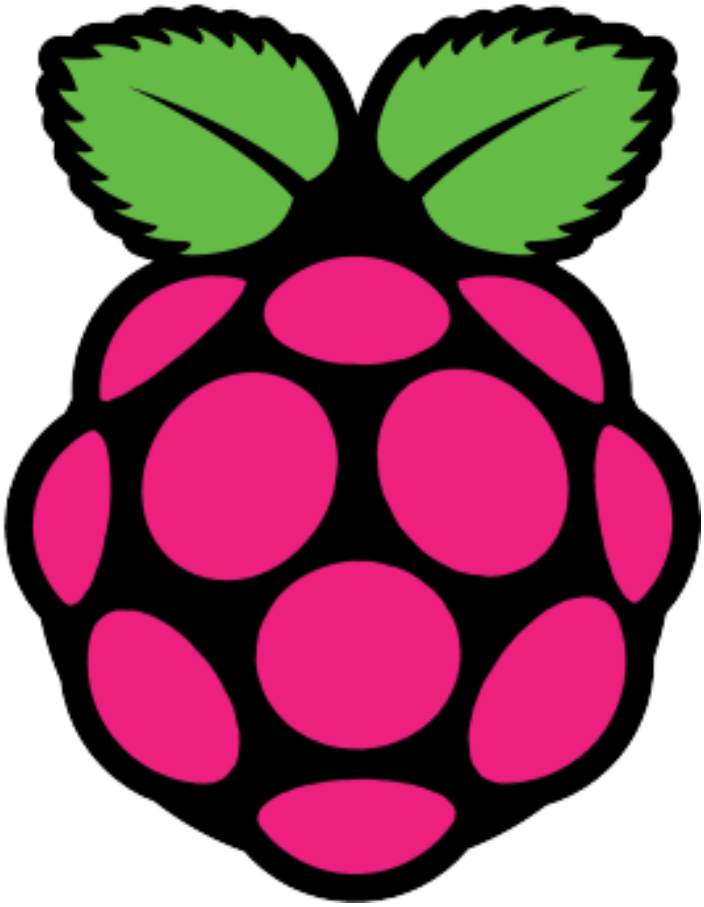

SESSION NO.“7”

- ULTRASONIC SENSOR
- 4*4 MATRIX KETPAD
- SERVO MOTOR

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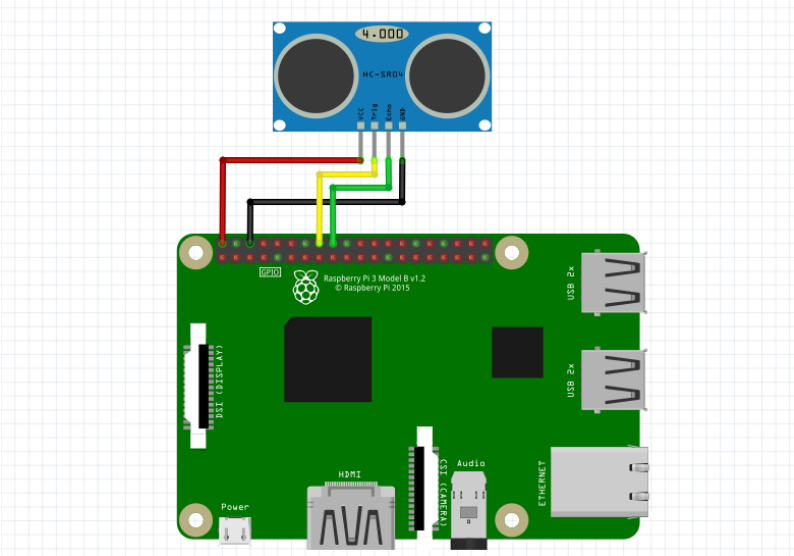
ULTRASONIC SENSOR

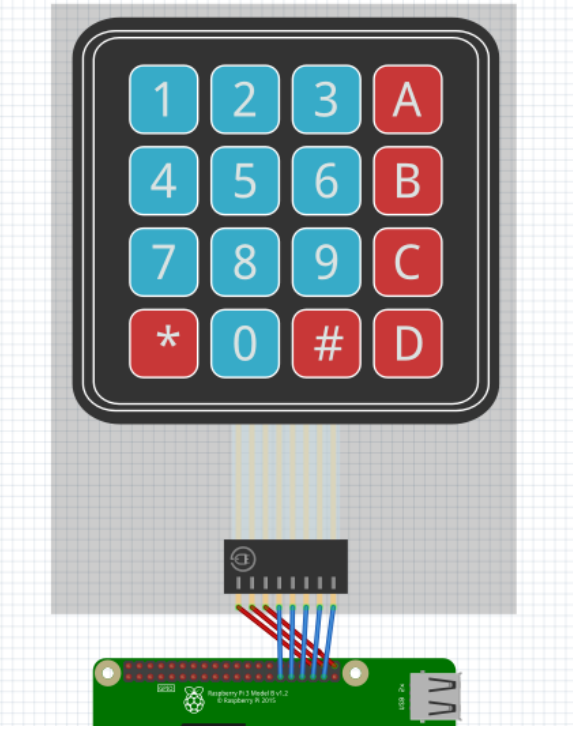


EXAMPLE CODE :

```
import RPi.GPIO as GPIO
import time
GPIO.setmode(GPIO.BCM)
#You can use whichever GPIO pins you want
GPIO_TRIGGER = 23
GPIO_ECHO = 24
GPIO.setup(GPIO_TRIGGER, GPIO.OUT)
GPIO.setup(GPIO_ECHO, GPIO.IN)
def distance():
    GPIO.output(GPIO_TRIGGER, True)
    time.sleep(0.00001)
    GPIO.output(GPIO_TRIGGER, False)
    StartTime = time.time()
    StopTime = time.time()
    while GPIO.input(GPIO_ECHO) == 0:
```

```
        StartTime = time.time()
    while GPIO.input(GPIO_ECHO) == 1:
        StopTime = time.time()
    TimeElapsed = StopTime - StartTime
    distance = (TimeElapsed * 34300) / 2
    return distance
if __name__ == '__main__':
    try:
        while True:
            dist = distance()
            print ("Distance = %.1f cm" % dist)
            time.sleep(1)
    except KeyboardInterrupt:
        print("Program stopped by User")
        GPIO.cleanup()
```

4*4 KEYPAD

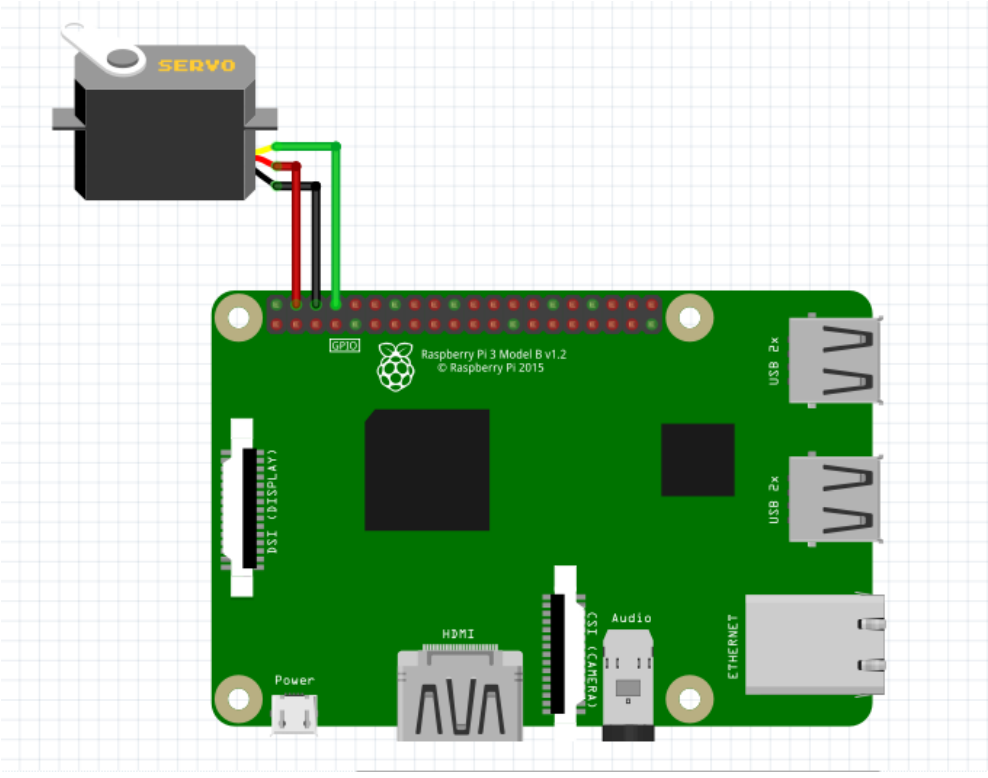


EXAMPLE CODE :

```
import RPi.GPIO as GPIO
import time
L1 = 16
L2 = 20
L3 = 21
L4 = 5
C1 = 6
C2 = 13
C3 = 19
C4 = 26
GPIO.setwarnings(False)
GPIO.setmode(GPIO.BCM)
GPIO.setup(L1, GPIO.OUT)
GPIO.setup(L2, GPIO.OUT)
GPIO.setup(L3, GPIO.OUT)
GPIO.setup(L4, GPIO.OUT)
GPIO.setup(C1, GPIO.IN, pull_up_down=GPIO.PUD_DOWN)
GPIO.setup(C2, GPIO.IN, pull_up_down=GPIO.PUD_DOWN)
GPIO.setup(C3, GPIO.IN, pull_up_down=GPIO.PUD_DOWN)
GPIO.setup(C4, GPIO.IN, pull_up_down=GPIO.PUD_DOWN)
def readLine(line, characters):
    GPIO.output(line, GPIO.HIGH)
    if(GPIO.input(C1) == 1):
        print(characters[0])
    if(GPIO.input(C2) == 1):
        print(characters[1])
```

```
    if(GPIO.input(C3) == 1):
        print(characters[2])
    if(GPIO.input(C4) == 1):
        print(characters[3])
    GPIO.output(line, GPIO.LOW)
try:
    while True:
        readLine(L1, ["1","2","3","A"])
        readLine(L2, ["4","5","6","B"])
        readLine(L3, ["7","8","9","C"])
        readLine(L4, ["*","0","#","D"])
        time.sleep(0.1)
except KeyboardInterrupt:
    print("\nProgram is stopped")
```

SERVO MOTOR



EXAMPLE CODE (1) :

```
# Import libraries
import RPi.GPIO as GPIO
import time
# Set GPIO numbering mode
GPIO.setmode(GPIO.BOARD)
# Set pin 11 as an output, and define as servo1 as
PWM pin
GPIO.setup(8,GPIO.OUT)
servo1 = GPIO.PWM(8,50) # pin 11 for servo1, pulse
50Hz
# Start PWM running, with value of 0 (pulse off)
servo1.start(0)
# Loop to allow user to set servo angle.
Try/finally allows exit
# with execution of servo.stop and GPIO cleanup :)
try:
    while True:
        #Ask user for angle and turn servo to it
        angle = float(input('Enter angle between 0
& 180: '))
        servo1.ChangeDutyCycle(2+(angle/18))
        time.sleep(0.5)
        servo1.ChangeDutyCycle(0)
finally:
```

```
    #Clean things up at the end
    servo1.stop()
    GPIO.cleanup()
    print("Goodbye!")
```

EXAMPLE CODE (2) :

```
import RPi.GPIO as GPIO
import time
servoPIN = 14
GPIO.setmode(GPIO.BCM)
GPIO.setup(servoPIN, GPIO.OUT)
p = GPIO.PWM(servoPIN, 50) # GPIO 14 for PWM with
50Hz
p.start(2) # Initialization
try:
    while True:
        for i in range(2,12,2):
                p.ChangeDutyCycle(i)
                time.sleep(0.5)
        for i in range(12,2,-2):
            p.ChangeDutyCycle(i)
            time.sleep(0.5)

except KeyboardInterrupt:
    p.stop()
    GPIO.cleanup()
```