“Raspberry pi course”

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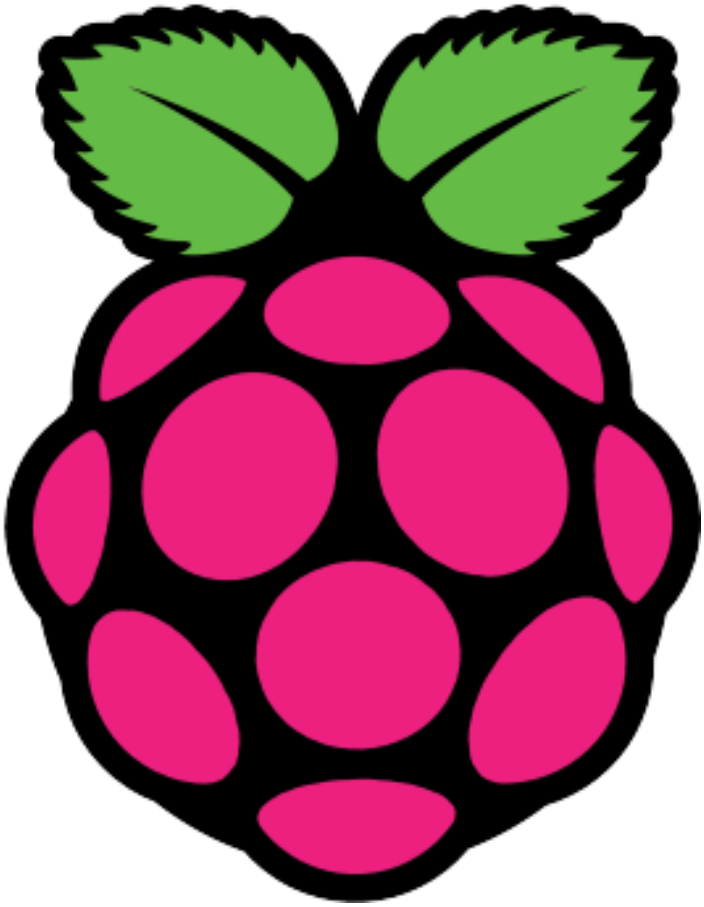

SESSION NO.“7”

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

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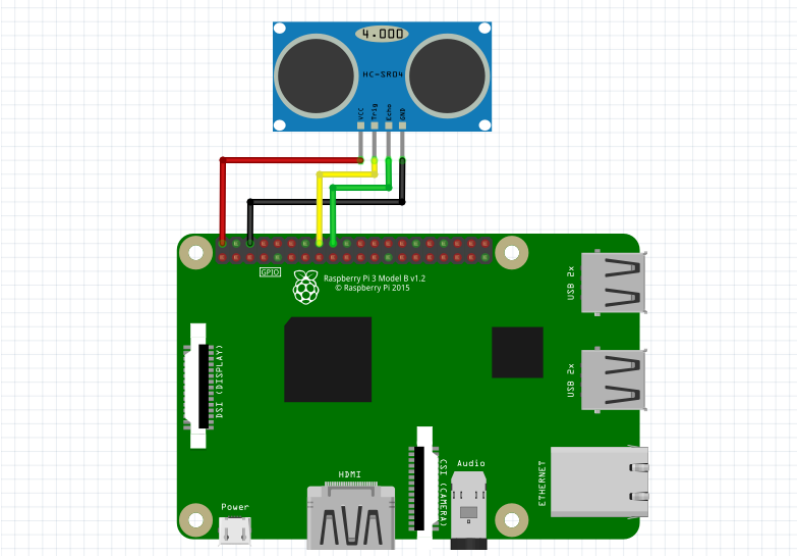
ULTRASONIC SENSOR

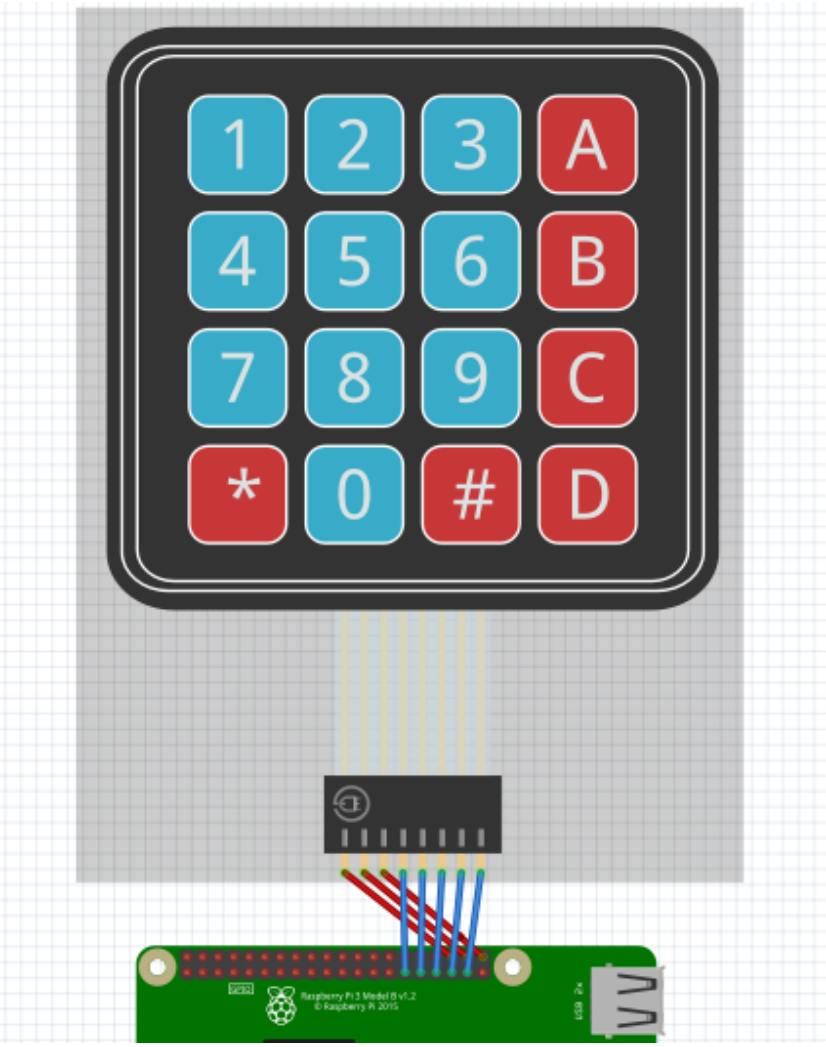


EXAMPLE CODE :

```
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

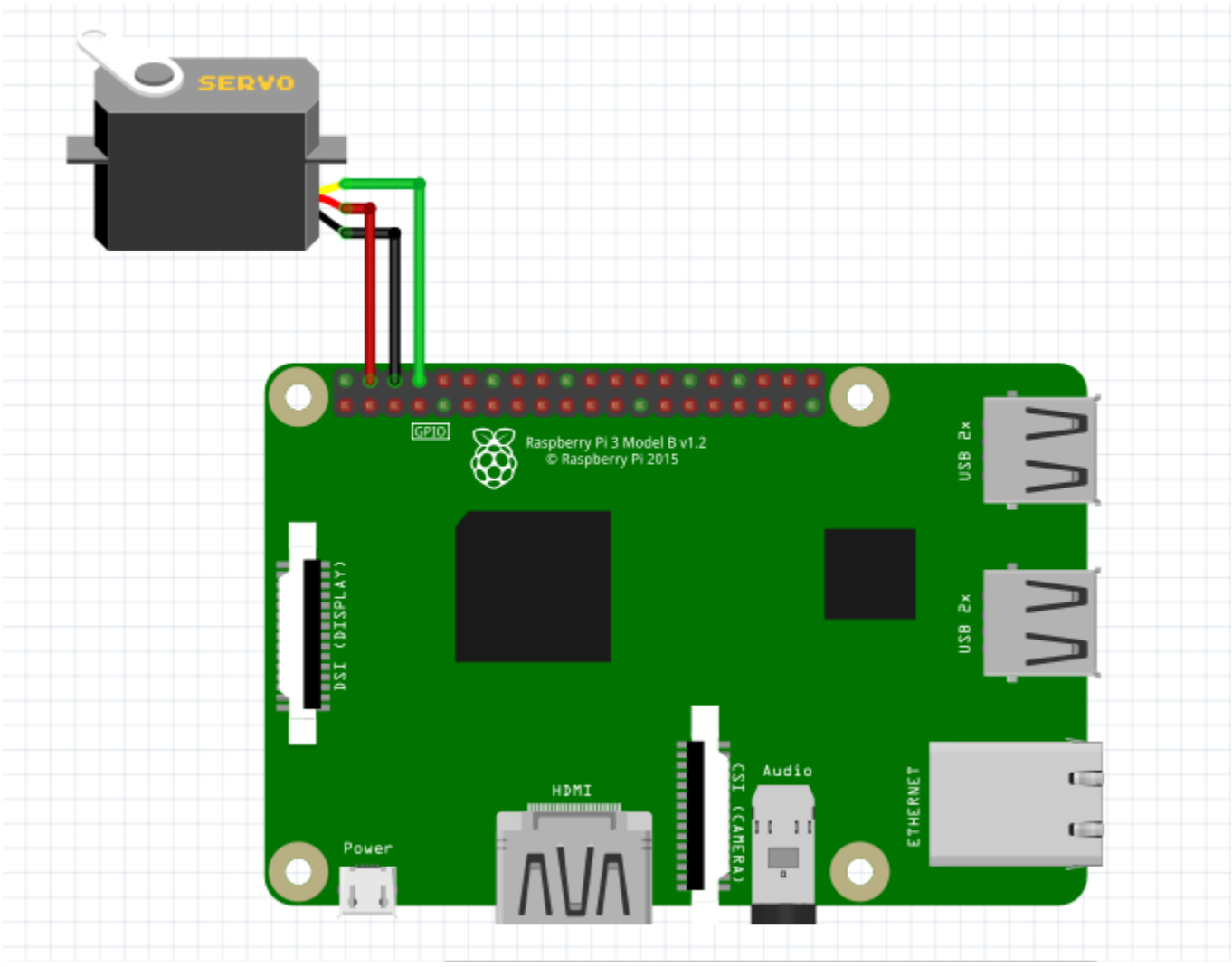


EXAMPLE CODE :

```
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()
```

With my best wishes:

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