

Experiment No 1

Name of Student

M.Sc II Roll No

Title of Experiment- To write a program to sense the available networks using Arduino

Program Arduino Code:

```
#include <ESP8266WiFi.h>
void setup() {
  Serial.begin(115200);
  WiFi.disconnect(); // disconnect previously connected access point
  delay(200); // delay 200ms

  Serial.println("***** WiFi Scan Started *****");
}

void loop() {

  int n = WiFi.scanNetworks(); // WiFi.scanNetworks will return the number of networks found

  Serial.println("Scan done");

  if (n == 0)
    Serial.println("No Network Found");
  else
  {
    Serial.print(n);
    Serial.println(" Networks found");
    for (int i = 0; i < n; ++i)
    {
      // Print SSID, RSSI, MAC, Encryption for each network found
      Serial.print(i + 1); //Sr. No
      Serial.print(": ");
      Serial.print(WiFi.SSID(i)); //SSID
      Serial.print(" (");
      Serial.print(WiFi.RSSI(i)); //Signal Strength
      Serial.print(") MAC:");
      Serial.print(WiFi.BSSIDstr(i));
      Serial.println((WiFi.encryptionType(i) == ENC_TYPE_NONE)? " Unsecured" : " Secured"
    );
      delay(10);
    }
  }
  Serial.println("");

  delay(6000); // delay 6sec
}
```

Experiment No 2

Name of Student

M.Sc II Roll No

Title of Experiment- To write a program to measure the distance using ultrasonic sensor and make LED blink using Arduino.

Program

```
int trigPin = D4;
int echoPin = D8;

void setup()
{
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  Serial.begin(9600);
}

void loop()
{
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);

  digitalWrite(trigPin, HIGH);          //set the trigger pin high to provide a bus;
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
  int duration = pulseIn(echoPin, HIGH); //used to check duration of wave (tx &
rx);
  int distance = duration * 0.034 / 2;
  Serial.print("Distance in cm is: ");
  Serial.println(distance);
  delay(100);
}
```

Experiment No 3

Name of Student

M.Sc II Roll No

Title of Experiment- To write a program to detects the vibration of an object with sensor using Arduino.

Program

```
int vibrationSensorPin = A0;
int counter;          // count n samples
int newValue;
int minValue;
int maxValue;
void setup()
{
  Serial.begin(115200);
  counter = 0;          // start at the begin
  minValue = analogRead(vibrationSensorPin);
  maxValue = analogRead(vibrationSensorPin); // give them a value from the sensor to start with
}

void loop()
{
  newValue = analogRead(vibrationSensorPin);
  if ( newValue >= maxValue)
  {
    maxValue = newValue;
  }
  else
  {
    minValue = newValue;    }
  counter++;
  if ( counter == 50)
  {
    Serial.print(minValue);
    Serial.print(" ");
    Serial.print(maxValue);
    Serial.print(" ");

    if ((maxValue - minValue) > 250)
      Serial.println("Vibration Detected");
    else
      Serial.println("Vibration NOT detected");

    counter = 0;          // start at the begin
    minValue = analogRead(vibrationSensorPin);
    maxValue = analogRead(vibrationSensorPin); // give them a value from the sensor to start
    with
  }
  delay( 20);    }
```

Experiment No 4



Name of Student

M.Sc II Roll No

Title of Experiment- To write a program to connect with the available Wi-Fi using Arduino.

Program

```
#include <ESP8266WiFi.h>

// Replace with your actual Wi-Fi credentials
const char* ssid = "RedmiNote8Pro"; //  Enter your Wi-Fi name (SSID)
const char* password = "12345678"; //  Enter your Wi-Fi password

void setup() {
  Serial.begin(115200);
  delay(100);

  // Start Wi-Fi connection
  Serial.println();
  Serial.println("Connecting to WiFi...");

  WiFi.begin(ssid, password); // Connect to WiFi

  // Wait until connected
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }

  Serial.println();
  Serial.println("WiFi connected!");
  Serial.print("IP Address: ");
  Serial.println(WiFi.localIP());
}

void loop() {
  // You can add tasks here that require WiFi connection
}
```

Experiment No 5

Name of Student

M.Sc II Roll No

Title of Experiment- To write a program to get temperature notification using Arduino..

Program

```
#include <DHT.h>
```

```
/* Interfacing Temperature and Humidity Sensor (DHT11)-using One Wire  
Protocol */
```

```
#include<DHT.h>                //define library for sensor  
#define DHTTYPE DHT11          //define macro  
int dhtSensorPin = 6;  
DHT dht(dhtSensorPin, DHTTYPE); //pin initialization  
float t, h;
```

```
void setup()  
{  
  Serial.begin(9600);  
  dht.begin();  
  pinMode(dhtSensorPin, INPUT);  
  delay(2000);  
}
```

Experiment No 6

Name of Student

M.Sc II Roll No

Title of Experiment- To write a program for LDR to vary the light intensity of LED using Arduino

Program

```
// Pin Definitions
#define LDR_PIN A0    // LDR connected to analog pin A0
#define LED_PIN D4    // LED connected to digital pin D4 (GPIO2)

void setup() {
  Serial.begin(115200);    // Start serial monitor
  pinMode(LED_PIN, OUTPUT); // Set LED pin as output
}

void loop() {
  int ldrValue = analogRead(LDR_PIN); // Read analog value from LDR
  Serial.print("LDR Value: ");
  Serial.println(ldrValue);

  // Adjust threshold as needed. Lower value = brighter environment
  int threshold = 500;

  if (ldrValue < threshold) {
    digitalWrite(LED_PIN, LOW); // Turn OFF LED (LOW = OFF for D4 on
NodeMCU)
  } else {
    digitalWrite(LED_PIN, HIGH); // Turn ON LED
  }

  delay(500); // Delay for stability
}
```

Experiment No 7

Name of Student

M.Sc. II Roll No

Title of Experiment-

Run some python programs on Pi like:

- a) Read your name and print Hello message with name
- b) Read two numbers and print their sum, difference, product and division.
- c) Word and character count of a given string.
- d) Area of a given shape (rectangle, triangle and circle) reading shape and appropriate values from standard input.

Program

```
# hello_name.py
name = input("Enter your name: ")
print(f'Hello, {name}! Welcome to Raspberry Pi.')
```

```
# basic_math.py
a = float(input("Enter first number: "))
b = float(input("Enter second number: "))

print(f'Sum = {a + b}')
print(f'Difference = {a - b}')
print(f'Product = {a * b}')
if b != 0:
    print(f'Division = {a / b}')
else:
    print("Division by zero is not allowed.")
```

```
# count_words_chars.py
text = input("Enter a string: ")

words = text.split()
num_words = len(words)
num_chars = len(text)

print(f'Word count: {num_words}')
print(f'Character count (including spaces): {num_chars}')
```

```
# area_calculator.py
import math

shape = input("Enter shape (rectangle/triangle/circle): ").lower()

if shape == "rectangle":
    length = float(input("Enter length: "))
    breadth = float(input("Enter breadth: "))
    area = length * breadth
    print(f'Area of rectangle = {area:.2f}')

elif shape == "triangle":
    base = float(input("Enter base: "))
    height = float(input("Enter height: "))
    area = 0.5 * base * height
    print(f'Area of triangle = {area:.2f}')

elif shape == "circle":
    radius = float(input("Enter radius: "))
    area = math.pi * radius ** 2
    print(f'Area of circle = {area:.2f}')

else:
    print("Invalid shape entered.")
```


Experiment No 8

Name of Student

M.Sc. II Roll No

Title of Experiment

Run some python programs on Pi like: a) Print a name 'n' time, where name and n are read from standard input, using for and while loops. b) Handle Divided by Zero Exception. c) Print current time for 10 times with an interval of 10 seconds. d) Read a file line byline and print the word count of each line

```
# print_name_n_times.py
name = input("Enter your name: ")
n = int(input("How many times to print your name? "))
```

```
print("\nUsing for loop:")
for i in range(n):
    print(f"{i+1}: {name}")
```

```
print("\nUsing while loop:")
count = 0
while count < n:
    print(f"{count+1}: {name}")
    count += 1
```

```
# divide_exception.py
try:
    num1 = float(input("Enter numerator: "))
    num2 = float(input("Enter denominator: "))
    result = num1 / num2
    print(f"Result = {result}")
except ZeroDivisionError:
    print("Error: Division by zero is not allowed.")
```

```
# print_time_interval.py
import time
from datetime import datetime
```

```
print("Printing current time every 10 seconds (10 times):")
for i in range(10):
    print(f"{i+1}: {datetime.now().strftime('%Y-%m-%d %H:%M:%S')}")
    time.sleep(10)
```

```
# file_word_count.py
file_path = input("Enter file path (e.g., /home/pi/test.txt): ")

try:
    with open(file_path, 'r') as f:
        line_num = 1
        for line in f:
            words = line.strip().split()
            print(f'Line {line_num}: {len(words)} words')
            line_num += 1
except FileNotFoundError:
    print("File not found. Please check the path.")
```

Experiment No 9

Name of Student

M.Sc. II Roll No

Title of Experiment

Run some python programs on Pi like a) Light an LED through Python program b) Get input from two switches and switch on corresponding LEDs c) Flash an LED at a given-on time and off time cycle, where the two times are taken from a file

Program 1

```
# Program to interface LED to Raspberry Pi
```

```
import RPi.GPIO as GPIO
```

```
import time
```

```
GPIO.setmode(GPIO.BOARD)
```

```
GPIO.setup(8,GPIO.OUT)
```

```
GPIO.setup(10,GPIO.OUT)
```

```
GPIO.setup(16,GPIO.OUT)
```

```
GPIO.setup(18,GPIO.OUT)
```

```
GPIO.setup(22,GPIO.OUT)
```

```
GPIO.setup(24,GPIO.OUT)
```

```
GPIO.setup(26,GPIO.OUT)
```

```
GPIO.setup(32,GPIO.OUT)
```

```
GPIO.output(8,False)
```

```
GPIO.output(10,False)
```

```
GPIO.output(16,False)
```

```
GPIO.output(18,False)
```

```
GPIO.output(22,False)
```

```
GPIO.output(24,False)
```

```
GPIO.output(26,False)
```

```
GPIO.output(32,False)
```

```
while(True):
```

```
    GPIO.output(8,True)
```

```
    GPIO.output(10,True)
```

```
    GPIO.output(16,True)
```

```
    GPIO.output(18,True)
```

```
    GPIO.output(22,True)
```

```
    GPIO.output(24,True)
```

```
    GPIO.output(26,True)
```

```
    GPIO.output(32,True)
```

```
    print("LED ON")
```

```
    time.sleep(2)
```

```
GPIO.output(8,False)
GPIO.output(10,False)
GPIO.output(16,False)
GPIO.output(18,False)
GPIO.output(22,False)
GPIO.output(24,False)
GPIO.output(26,False)
GPIO.output(32,False)
print("LED OFF")
time.sleep(2)
```

Program 2

Program to interface LED to Raspberry Pi

```
import RPi.GPIO as GPIO
import time
GPIO.setmode(GPIO.BOARD)
GPIO.setup(8,GPIO.OUT)
GPIO.setup(10,GPIO.OUT)
GPIO.setup(16,GPIO.OUT)
GPIO.setup(18,GPIO.OUT)
GPIO.setup(22,GPIO.OUT)
GPIO.setup(24,GPIO.OUT)
GPIO.setup(26,GPIO.OUT)
GPIO.setup(32,GPIO.OUT)
GPIO.output(8,False)
GPIO.output(10,False)
GPIO.output(16,False)
GPIO.output(18,False)
GPIO.output(22,False)
GPIO.output(24,False)
GPIO.output(26,False)
GPIO.output(32,False)
while(True):
    GPIO.output(8,True)
    time.sleep(0.2)
    GPIO.output(10,True)
    time.sleep(0.2)
    GPIO.output(16,True)
    time.sleep(0.2)
    GPIO.output(18,True)
    time.sleep(0.2)
    GPIO.output(22,True)
    time.sleep(0.2)
```

```
GPIO.output(24,True)
time.sleep(0.2)
GPIO.output(26,True)
time.sleep(0.2)
GPIO.output(32,True)
time.sleep(0.2)
GPIO.output(8,False)
time.sleep(0.2)
GPIO.output(10,False)
time.sleep(0.2)
```

```
GPIO.output(16,False)
time.sleep(0.2)
GPIO.output(18,False)
time.sleep(0.2)
GPIO.output(22,False)
time.sleep(0.2)
GPIO.output(24,False)
time.sleep(0.2)
GPIO.output(26,False)
time.sleep(0.2)
GPIO.output(32,False)
time.sleep(0.2)
```

Program 3

Program to take feedback from the switch using Raspberry Pi

```
import RPi.GPIO as GPIO
import time
GPIO.setmode(GPIO.BOARD)
GPIO.setup(8,GPIO.IN)
GPIO.setup(10,GPIO.OUT)
GPIO.output(10,False)
y=0
dcount=0
while(True):
    x=GPIO.input(8)
    #single pressed
    if(x==0):
        GPIO.output(10,True)
        print("Switch Pressed")
    else:
        GPIO.output(10,False)
        print("Switch Released")
```