A diagram of a raspberry pi

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Program:

import RPi.GPIO as GPIO

import time

GPIO.setmode(GPIO.BOARD)

led\_pin = 11

GPIO.setup(led\_pin, GPIO.OUT)

try:

while True:

GPIO.output(led\_pin, GPIO.HIGH)

print(f"LED set to HIGH (pin {led\_pin})")

time.sleep(0.5)

GPIO.output(led\_pin, GPIO.LOW)

print(f"LED set to LOW (pin {led\_pin})")

time.sleep(0.5)

except KeyboardInterrupt:

GPIO.cleanup()

print("Program stopped")

Output:

A screen shot of a computer program

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Write a program using Arduino to control 3 LEDs. - (ON/OFF) Blinking

Program:

const int green = 12;

const int blue = 11;

const int red = 10;

void setup()

{

pinMode(green,OUTPUT);

pinMode(blue,OUTPUT);

pinMode(red, OUTPUT);

}

void loop()

{

digitalWrite(green,HIGH);

digitalWrite(blue,LOW);

digitalWrite(red,LOW);

delay(1000);

digitalWrite(green,LOW);

digitalWrite(blue,HIGH);

digitalWrite(red,LOW);

delay(1000);

digitalWrite(green,LOW);

digitalWrite(blue,LOW);

digitalWrite(red,HIGH);

delay(1000);

}

Output:

A circuit board with wires connected to it

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Experiment 6

Create a program that illuminates the green LED if the counter is less than 100, illuminates the yellow LED if the counter is between 101 and 200 and illuminates the red LED if the counter is greater than 200

Program:

const int greenLedPin = 13; // Green LED pin

const int yellowLedPin = 12; // Yellow LED pin

const int redLedPin = 11; // Red LED pin

int counter = 0;

void setup() {

pinMode(greenLedPin, OUTPUT);

pinMode(yellowLedPin, OUTPUT);

pinMode(redLedPin, OUTPUT);

Serial.begin(9600);

}

void loop() {

counter++;

Serial.print("Counter: ");

Serial.println(counter);

if (counter < 100) {

digitalWrite(greenLedPin, HIGH);

digitalWrite(yellowLedPin, LOW);

digitalWrite(redLedPin, LOW);

} else if (counter >= 100 && counter <= 200) {

digitalWrite(greenLedPin, LOW);

digitalWrite(yellowLedPin, HIGH);

digitalWrite(redLedPin, LOW);

} else if (counter > 200) {

digitalWrite(greenLedPin, LOW);

digitalWrite(yellowLedPin, LOW);

digitalWrite(redLedPin, HIGH);

}

if (counter >= 300) {

counter = 0;

}

delay(100);

}

Output:

A screenshot of a computer program

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Create a program so that when the user enters ‘b’ the green light blinks, ‘g’ the green light is illuminated ‘y’ the yellow light is illuminated and ‘r’ the red light is illuminated

Program:

const int greenLedPin = 13;

const int yellowLedPin = 12;

const int redLedPin = 11;

void setup() {

pinMode(greenLedPin, OUTPUT);

pinMode(yellowLedPin, OUTPUT);

pinMode(redLedPin, OUTPUT);

Serial.begin(9600);

Serial.println("Enter 'b' for blink, 'g' for green, 'y' for yellow, 'r' for red:");

}

void loop() {

if (Serial.available() > 0) {

char input = Serial.read();

Serial.println(input);

switch (input) {

case 'b':

blinkGreen();

break;

case 'g':

digitalWrite(greenLedPin, HIGH);

digitalWrite(yellowLedPin, LOW);

digitalWrite(redLedPin, LOW);

break;

case 'y':

digitalWrite(greenLedPin, LOW);

digitalWrite(yellowLedPin, HIGH);

digitalWrite(redLedPin, LOW);

break;

case 'r':

digitalWrite(greenLedPin, LOW);

digitalWrite(yellowLedPin, LOW);

digitalWrite(redLedPin, HIGH);

break;

default:

Serial.println("Invalid input.");

}

}

}

void blinkGreen() {

for (int i = 0; i < 5; i++) { // Blink 5 times

digitalWrite(greenLedPin, HIGH);

delay(250);

digitalWrite(greenLedPin, LOW);

delay(250);

}

}

Output:

A computer screen shot of a computer

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Experiment 8

Write a program that asks the user for a number and outputs the number squared that is entered

Program: (Arduino Uno)

void setup()

{

  Serial.begin(9600);

  Serial.println("Enter a number to calculate its square and cube");

}

void loop()

{

  if(Serial.available() > 0)

  {

  double num = Serial.parseInt();

    double square = num \* num;

    double cube = num \* num \* num;

    Serial.print("The square of: ");

    Serial.print(num);

    Serial.print(" is: ");

    Serial.println(square);

    Serial.print("The cube of: ");

    Serial.print(num);

    Serial.print(" is: ");

    Serial.println(cube);

    Serial.println("Enter another number to calc square and cube: ");

  }

}

Experiment 9

Write a program to control the colour of 3 LEDs by turning 1 potentiometer, (LED one is red, LED two is green and LED three is blue)

Program:

const int potPin = A0;

const int green = 11;

const int blue = 10;

const int red = 9;

void setup()

{

  pinMode(potPin, INPUT);

  pinMode(green, OUTPUT);

  pinMode(blue, OUTPUT);

  pinMode(red, OUTPUT);

  Serial.begin(9600);

}

void loop()

{

  int potValue = analogRead(potPin) / 4;

  Serial.print("Current Brightness (0-255): ");

  Serial.println(potValue);

  analogWrite(green,potValue);

  analogWrite(blue,potValue);

  analogWrite(red, potValue);

}

Output:

A circuit board with wires and a cable

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A diagram of a device

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A blue circuit board with wires

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A diagram of a circuit board

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Write a program read the temperature sensor and send the values of temperature and humidity to the serial monitor on the computer. Plot its graph.

#include <DHT.h>

const int dhtPin = 2;

const int dhtType = DHT11;  // DHT sensor type

DHT dht(dhtPin, dhtType);

void setup() {

  Serial.begin(9600);

  dht.begin();

  Serial.println("DHT11 Temp/Humidity Monitor");

  Serial.println("------------------------");

  delay(1000);

}

void loop() {

  delay(2000);

  float tempC = dht.readTemperature();

  float humidity = dht.readHumidity();

  if (isnan(tempC) || isnan(humidity)) {

    Serial.println("Failed to read from DHT sensor!");

    return;

  }

  Serial.print(tempC, 1);

  Serial.print(',');

  Serial.println(humidity, 1);

}

Write a program so it displays the temperature in Fahrenheit as well as the maximum and minimum

temperatures it has seen.

#include <DHT.h>

const int dhtPin = 2;

const int dhtType = DHT11;  // DHT sensor type

DHT dht(dhtPin, dhtType);

float currentTemp;

float maxTemp = -100.0;  // Initialize to a very low value

float minTemp = 150.0;   // Initialize to a very high value

void setup() {

  Serial.begin(9600);

  dht.begin();

  Serial.println("DHT11 Temperature Monitor");

  Serial.println("------------------------");

  delay(1000);

}

void loop() {

  delay(2000);

  float tempC = dht.readTemperature();

  if (isnan(tempC)) {

    Serial.println("Failed to read from DHT sensor!");

    return;

  }

  currentTemp = (tempC \* 9.0 / 5.0) + 32.0;

  if (currentTemp > maxTemp) {

    maxTemp = currentTemp;

  }

  if (currentTemp < minTemp) {

    minTemp = currentTemp;

  }

  Serial.print("Current: ");

  Serial.print(currentTemp, 1);

  Serial.print(" F | Min: ");

  Serial.print(minTemp, 1);

  Serial.print(" F | Max: ");

  Serial.print(maxTemp, 1);

  Serial.println(" F");

}

Write a program using piezo element and use it to play a tune (8 notes) after someone knocks.

const int knockSensorPin = A0;

const int buzzerPin = 8;

const int threshold = 100;

const int tuneNotes[] = {100, 200, 300, 400, 500, 600, 700, 800};

const int noteCount = 8;

const int noteDuration = 150;

void setup() {

  pinMode(knockSensorPin, INPUT);

  pinMode(buzzerPin, OUTPUT);

  Serial.begin(9600);

}

void loop() {

  int sensorValue = analogRead(knockSensorPin);

  Serial.println(sensorValue);

  if (sensorValue >= threshold) {

    for (int i = 0; i < noteCount; i++) {

      tone(buzzerPin, tuneNotes[i], noteDuration);

      delay(noteDuration + 30);

    }

    delay(500);

  }

  delay(10);

}

A circuit board with wires connected to it

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A circuit board with wires and a microphone

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