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// Sara Falkson
//Accelerometer readings from Adafruit MPU6050 on RP2040

#include <Adafruit_MPU6050.h>
#include <Adafruit_Sensor.h>
#include <Wire.h>

Adafruit_MPU6050 mpu;

void setup(void) {
  Serial.begin(115200);
  while (!Serial) {
    delay(10); // Wait for the serial console to open
  }

  Serial.println("Adafruit MPU6050 test!");

  // Initialize the Wire library and join the I2C bus.
  // If you are using specific pins for SDA and SCL with your RP2040, specify them
  here. For example:
  // Wire.begin(4, 5); //SDA, SCL
  Wire.begin(); // Use default SDA (GPIO 4) and SCL (GPIO 5) on Raspberry Pi Pico

  // Try to initialize!
  if (!mpu.begin()) {
    Serial.println("Failed to find MPU6050 chip");
    while (1) {
      delay(10);
    }
  }
  Serial.println("MPU6050 Found!");

  mpu.setAccelerometerRange(MPU6050_RANGE_8_G);
  Serial.print("Accelerometer range set to: ");
  switch (mpu.getAccelerometerRange()) {
  case MPU6050_RANGE_2_G:
    Serial.println("+2G");
    break;
  case MPU6050_RANGE_4_G:
    Serial.println("+4G");
    break;
  case MPU6050_RANGE_8_G:
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    Serial.println("+8G");
    break;
case MPU6050_RANGE_16_G:
    Serial.println("+16G");
    break;
}
mpu.setGyroRange(MPU6050_RANGE_500_DEG);
Serial.print("Gyro range set to: ");
switch (mpu.getGyroRange()) {
case MPU6050_RANGE_250_DEG:
    Serial.println("+ 250 deg/s");
    break;
case MPU6050_RANGE_500_DEG:
    Serial.println("+ 500 deg/s");
    break;
case MPU6050_RANGE_1000_DEG:
    Serial.println("+ 1000 deg/s");
    break;
case MPU6050_RANGE_2000_DEG:
    Serial.println("+ 2000 deg/s");
    break;
}

mpu.setFilterBandwidth(MPU6050_BAND_5_HZ);
Serial.print("Filter bandwidth set to: ");
switch (mpu.getFilterBandwidth()) {
case MPU6050_BAND_260_HZ:
    Serial.println("260 Hz");
    break;
case MPU6050_BAND_184_HZ:
    Serial.println("184 Hz");
    break;
case MPU6050_BAND_94_HZ:
    Serial.println("94 Hz");
    break;
case MPU6050_BAND_44_HZ:
    Serial.println("44 Hz");
    break;
case MPU6050_BAND_21_HZ:
    Serial.println("21 Hz");
    break;
case MPU6050_BAND_10_HZ:

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        Serial.println("10 Hz");
        break;
    case MPU6050_BAND_5_HZ:
        Serial.println("5 Hz");
        break;
    }

    Serial.println("");
    delay(100);
}

void loop() {
    /* Get new sensor events with the readings */
    sensors_event_t a, g, temp;
    mpu.getEvent(&a, &g, &temp);

    /* Print out the values */
    Serial.print("Acceleration X: ");
    Serial.print(a.acceleration.x);
    Serial.print(", Y: ");
    Serial.print(a.acceleration.y);
    Serial.print(", Z: ");
    Serial.print(a.acceleration.z);
    Serial.println(" m/s^2");

    Serial.print("Rotation X: ");
    Serial.print(g.gyro.x);
    Serial.print(", Y: ");
    Serial.print(g.gyro.y);
    Serial.print(", Z: ");
    Serial.print(g.gyro.z);
    Serial.println(" rad/s");

    Serial.print("Temperature: ");
    Serial.print(temp.temperature);
    Serial.println(" degC");

    Serial.println("");
    delay(2000);
}

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