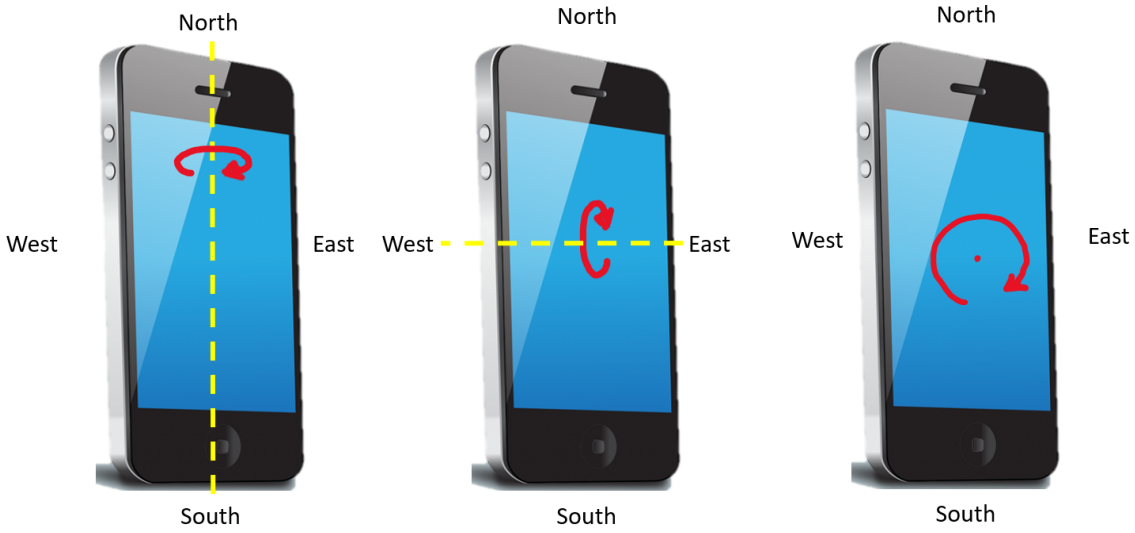
Programming the Raspberry Pi Pico and Writing to the SD Card

Due Jun 16 by 11:59pm **Points** 0 **Submitting** a text entry box

The objective of this assignment is to program the Raspberry Pi Pico to write data to an SD card. The format of the data on the SD card should match the format of the data collected using the Multi Record feature on the app "Physics Toolbox Sensor Suite". In future assignments, you will tape or attach your flight controller to your cell phone to collect data. The data from your flight controller will need to match the data from the phone.



Writing Zeros to the SD Card

Connect your Raspberry Pi Pico and your SD Card Module to your PCB (Printed Circuit Board). Program the Raspberry Pi Pico to create a .csv file and write it to the SD card. The .csv file should have the following headers:

time	gFx	gFy	gFz	wx	wy	wz	p	Bx	By	Bz	Azimuth	Pitch	Roll	Latitude	Longitude	Speed (m/s)

Program the Raspberry Pi Pico to write the time to the .csv file under the "time" column in units of seconds. Write zeros under all the other columns. For example, the .csv file should look something like this:

time	gFx	gFy	gFz	wx	wy	wz	p	Bx	By	Bz	Azimuth	Pitch	Roll	Latitude	Longitude	Speed (m/s)
0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.001415	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.011223	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.014867	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.019046	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.020739	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.022488	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Some Code To Get You Started

```
/*
  SD card connection

  This example shows how to write data to an SD card file
  The circuit:
   SD card attached to SPI bus as follows:
   // Arduino-pico core
   ** MISO - pin 16
   ** MOSI - pin 19
   ** CS   - pin 17
   ** SCK  - pin 18

   // Arduino-mbed core
   ** MISO - pin 4
   ** MOSI - pin 3
   ** CS   - pin 5
   ** SCK  - pin 2
*/


#if !defined(ARDUINO_ARCH_RP2040)
#error For RP2040 only
#endif

#if defined(ARDUINO_ARCH_MBED)

#define PIN_SD_MOSI PIN_SPI_MOSI
#define PIN_SD_MISO PIN_SPI_MISO
#define PIN_SD_SCK PIN_SPI_SCK
#define PIN_SD_SS PIN_SPI_SS

#else

#define PIN_SD_MOSI PIN_SPI0_MOSI
#define PIN_SD_MISO PIN_SPI0_MISO
#define PIN_SD_SCK PIN_SPI0_SCK
#define PIN_SD_SS PIN_SPI0_SS

#endif

#define _RP2040_SD_LOGLEVEL_ 0

#include <SPI.h>
#include <SD.h>

void setup() {
  // Open serial communications and wait for port to open:
  Serial.begin(9600);
  delay(1000);
  if (!Serial) {
     ConnectedToComputer = false;
  }
  delay(1000);

#if defined(ARDUINO_ARCH_MBED)
  Serial.print("Starting SD Card ReadWrite on MBED ");
#else
  Serial.print("Starting SD Card ReadWrite on ");
#endif

  Serial.println(BOARD_NAME);

  Serial.print("Initializing SD card with SS = ");
  Serial.println(PIN_SD_SS);
  Serial.print("SCK = ");
  Serial.println(PIN_SD_SCK);
  Serial.print("MOSI = ");
  Serial.println(PIN_SD_MOSI);
  Serial.print("MISO = ");
  Serial.println(PIN_SD_MISO);


  if (!SD.begin(PIN_SD_SS)) {
    Serial.println("Initialization failed!");
    return;
  }
  Serial.println("Initialization done.");

  //create the SD card file and open it for writing
  File dataFile = SD.open("SDdata.csv", FILE_WRITE);

  //If it opened correctly, write the header to it
  if (dataFile) {
```

```
    String headerString = "time,";
    headerString += "gFx,gFy,gFz,wx,wy,wz,p,Bx,By,Bz,Azimuth,Pitch,Roll,Latitude,Longitude,Speed (m/s)";
    dataFile.println(headerString);
    dataFile.close();
  } else {
    Serial.println("Failed to open the file");
  }
}

void loop(){

}
```

What to Submit

To get credit for this assignment, demonstrate your working code to the instructor. Also do the following:

1. Copy and paste your Raspberry Pi Pico code into the Text Entry box.

The instructor should be able to run your code to verify that it works.