

# SIT107 - Software Engineering 1: Connecting The Cyber And Physical Worlds

## Task 3.1P Using the Data Logger Shield in Arduino

In this task, we will learn about using an SD card to save sensor data.

Pre-requisites: You must do the following before this task

1. **Attend Class (Lecture) & Seminar**
2. **Task 2.2P**
3. Read <https://learn.adafruit.com/adafruit-data-logger-shield/using-the-real-timeclock>
4. **Read this sheet from top to bottom**

## Task Objective

In this task, you will write a program to detect motion and save the detected motion readings to an SD card, using a data logger shield.

## Hardware Required

Arduino Board

USB cable

SD Card (SanDisk 8Gb Ultra SDHC Memory Card)

Adafruit Assembled Data Logging Shield for Arduino

(<https://tronixlabs.com.au/arduino/shields/sd-card/adafruit-assembled-data-loggingshield-for-arduino-australia/> )

CR1220 Coin Cell Battery

(<https://tronixlabs.com.au/power/battery/nonrechargeable/cr1220-coin-cell-battery-australia/> )

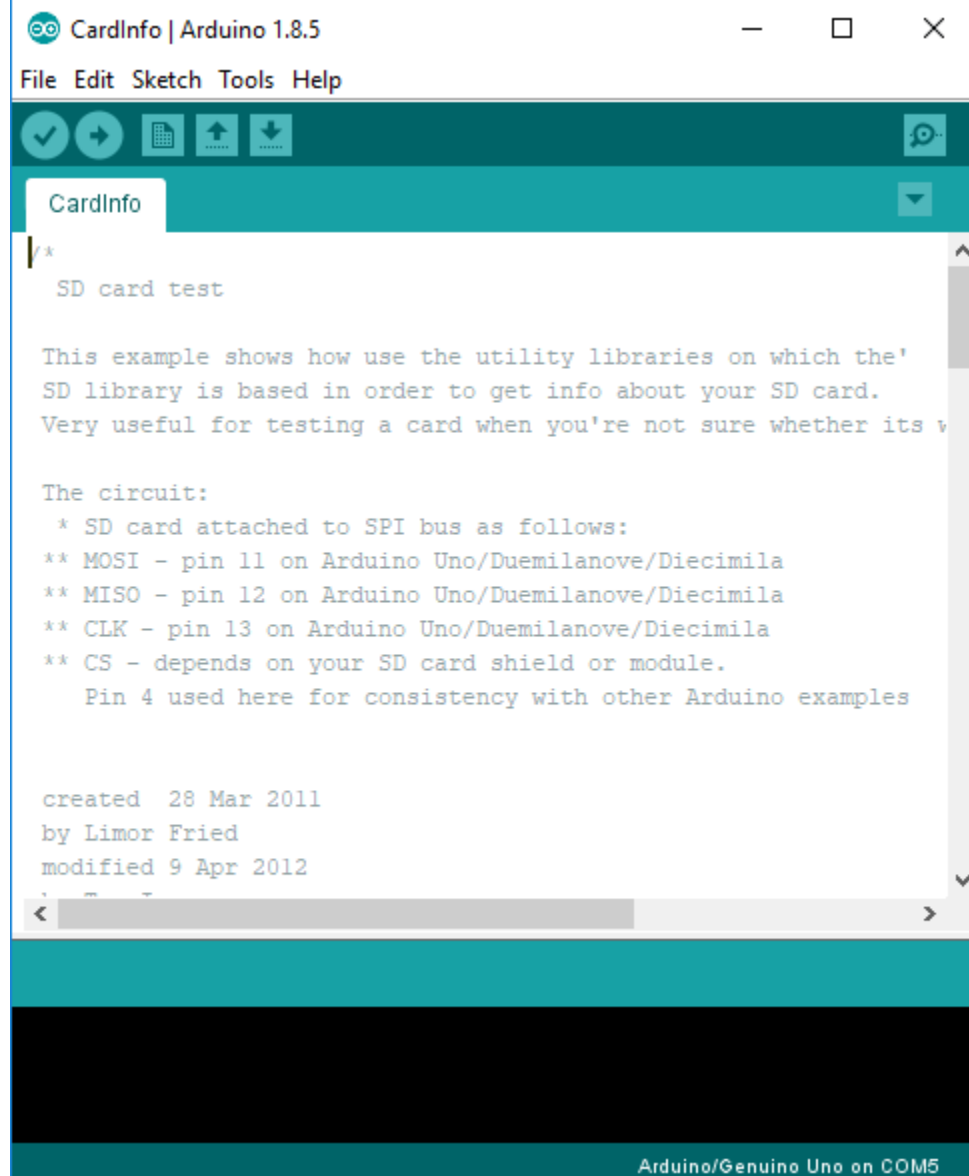
HCSR505 PIR Passive Infra Red Motion Detector

(<https://tronixlabs.com.au/sensors/motion/hcsr505-pir-passive-infra-red-motion-detectoraustralia/> )

## Task Submission Details

There are 3 questions in this task. Answer all of them and submit to OnTrack.

Q1. Follow the steps in “Setting Up The SD Card Activity Sheet”. At the end of activity, take a screenshot of the Serial Monitor and include in the submission.



The screenshot shows the Arduino IDE interface with the Serial Monitor open. The title bar reads "CardInfo | Arduino 1.8.5". The menu bar includes "File", "Edit", "Sketch", "Tools", and "Help". The toolbar contains icons for running, stopping, and other IDE functions. The Serial Monitor tab is active, displaying the output of the "CardInfo" sketch. The output text is as follows:

```
*  
SD card test  
  
This example shows how use the utility libraries on which the'  
SD library is based in order to get info about your SD card.  
Very useful for testing a card when you're not sure whether its v  
  
The circuit:  
* SD card attached to SPI bus as follows:  
** MOSI - pin 11 on Arduino Uno/Duemilanove/Diecimila  
** MISO - pin 12 on Arduino Uno/Duemilanove/Diecimila  
** CLK - pin 13 on Arduino Uno/Duemilanove/Diecimila  
** CS - depends on your SD card shield or module.  
    Pin 4 used here for consistency with other Arduino examples  
  
created 28 Mar 2011  
by Limor Fried  
modified 9 Apr 2012
```

At the bottom of the IDE window, the status bar indicates "Arduino/Genuino Uno on COM5".

Q2. Follow the steps in “Using the Real Time Clock Activity Sheet”.

- a. At the end of activity, take a screenshot of the Serial Monitor and include in the submission.

```
RTC is NOT running!
2011/1/0 (Friday) 0:12:56
  since midnight 1/1/1970 = 1293754376s = 14974d
  now + 7d + 30s: 2011/1/7 12:43:2

2011/1/0 (Friday) 0:12:59
  since midnight 1/1/1970 = 1293754379s = 14974d
  now + 7d + 30s: 2011/1/7 12:43:5

2011/1/0 (Friday) 0:13:2
  since midnight 1/1/1970 = 1293754382s = 14974d
  now + 7d + 30s: 2011/1/7 12:43:8

2011/1/0 (Friday) 0:13:5
  since midnight 1/1/1970 = 1293754385s = 14974d
  now + 7d + 30s: 2011/1/7 12:43:11

2011/1/0 (Friday) 0:13:8
  since midnight 1/1/1970 = 1293754388s = 14974d
  now + 7d + 30s: 2011/1/7 12:43:14

2011/1/0 (Friday) 0:13:11
  since midnight 1/1/1970 = 1293754391s = 14974d
  now + 7d + 30s: 2011/1/7 12:43:17

2011/1/0 (Friday) 0:13:14
  since midnight 1/1/1970 = 1293754394s = 14974d
  now + 7d + 30s: 2011/1/7 12:43:20

2011/1/0 (Friday) 0:13:17
  since midnight 1/1/1970 = 1293754397s = 14974d
  now + 7d + 30s: 2011/1/7 12:43:23

2011/1/0 (Friday) 0:13:20
  since midnight 1/1/1970 = 1293754400s = 14974d
  now + 7d + 30s: 2011/1/7 12:43:26

2011/1/0 (Friday) 0:13:23
  since midnight 1/1/1970 = 1293754403s = 14974d
  now + 7d + 30s: 2011/1/7 12:43:29

2011/1/0 (Friday) 0:13:26
  since midnight 1/1/1970 = 1293754406s = 14974d
  now + 7d + 30s: 2011/1/7 12:43:32
```

- b. Examine the code. What does the following line of code do? `DateTime now = rtc.now();`

(Hint: refer to <https://learn.adafruit.com/adafruit-data-logger-shield/using-the-real-time-clock> )

This defines `DateTime now` as the Real time Clock time.

Q3. Now you are ready to start logging data to file! Follow the steps in “Saving Motion Data Activity Sheet”.

- a. At the end of activity, take a screenshot of the Serial Monitor and include in the submission.
- b. Run your program. Wave your hand in front of the motion sensor and observe the ‘Active’ state, then stop and wait until you see an ‘Inactive’ state on the Serial Monitor. Keep doing this for for three minutes so that you get both ‘Active’ and ‘Inactive’ data. At the end of three minutes, unplug the USB. This will switch off the Arduino board. Next, retrieve the .csv file containing motion sensor data from the SD card. Upload the .csv file to the ‘SensorData’ Github repository created in Task 2.2P. Include the link to your file here.

## References

<https://learn.adafruit.com/adafruit-data-logger-shield/using-the-sd-card>