1 Logging Data From Serial Ports Exercise

Make sure you are using Python 2.7

Exercise 1.
Import the `serial` module and open the serial port with the appropriate parameters.

Exercise 2.
Get a reading from the temperature probe.

Exercise 3.
Add a date and time reading to your output, using sensible choices for format, timezone, etc.

Exercise 4.
Prove to yourself that there is a potential problem with a "gap" between the reading and the timestamp.

Exercise 5.
Add a loop to your code to continuously log the reading and time. What would be a good exit condition? Hint: try `dir(serial.Serial)` to see what methods might be of use.

Exercise 6.
Rewrite your code to use `readline()`.

Exercise 7.
Alter your code to write the data out to a file.

Solution 1.

```
#!/usr/bin/python2.7
import serial

ser = serial.Serial(
    port='/dev/ttyUSB0',
    baudrate=9600,
    bytesize=serial.EIGHTBITS,
    parity=serial.PARITY_NONE,
    stopbits=serial.STOPBITS_ONE
```

Solution 2.

`print ser.read(size=8)`

"8" here is specific to the Papouch thermometer device.

Solution 4.

Compare:

```
print datetime.utcnow().isoformat(), ser.read(size=8)
```

and:

```
datastring = ser.read(size=8)
print datetime.utcnow().isoformat(), datastring
```

(run each one a few times in succession, and look at the differences between the timestamps)

Solution 5.

Several ways, but the simplest is:

```
while ser.isOpen():
    datastring = ser.read(size=8)
    print datetime.utcnow().isoformat(), datastring
```

Solution 6.

```
import io

sio = io.TextIOWrapper(io.BufferedRWPair(ser, ser, 1), encoding='ascii', newline='\r')

while ser.isOpen():
    datastring = sio.readline()
    print datetime.utcnow().isoformat(), datastring
```

Solution 7.

```
#!/usr/bin/python
'''This version of the readserial program demonstrates
using python to write an output file'''

from datetime import datetime
import serial, io

outfile='/tmp/serial-temperature.tsv'

ser = serial.Serial(
   port='/dev/ttyUSB0',
   baudrate=9600,
)

sio = io.TextIOWrapper(
   io.BufferedRWPair(ser, ser, 1),
   encoding='ascii', newline='\r'
)

with open(outfile,'a') as f: #appends to existing file
   while ser.isOpen():
      datastring = sio.readline()
      #\t is tab; \n is line separator
      f.write(datetime.utcnow().isoformat() + '\t' + datastring + '\n')
      f.flush() #included to force the system to write to disk

ser.close()
```

(see `python/exercises/example_code/ldfsp.py` in your `ncas-isc` checkout)