ECE 4180 Embedded Systems and Design

Introduction:
The aim of the mini-project is to send the GPS information of a particular location as an SMS using the Enfora 1218 modem via the mbed microcontroller.
It involves two steps:
Read the GPS information in the form of latitude and longitude co-ordinates of the current location.
Send the information as a text message through the Enfora 1218 modem (GSM modem) .

Requirements:
Mbed microcontroller chip: NXP LPC1768, GPS modem, RS 232 serial port with adapter, GSM modem: Enfora 1218.

Implementation:
Step 1: The interface with the modem was established through the hyper-terminal and also various signal were observed using realterm. The GSM modem was tested for receiving and sending the SMS using AT commands. The purpose behind this step was to get ourselves acquainted with the working of the GSM modem.

Step2: After a thorough understanding of the procedure to send a text message through the GSM modem was achieved, we proceeded to hardwire the commands in the code.

Step3: The final step was to accept the latitude and longitude information from the GPS modem. This information is appended in the message commands used to communicate with the GSM modem. Thus the information is sent as a text message to the phone number mentioned in the code.

Program:

```
#include "mbed.h"
#include <string.h>
#include "GPS.h"

GPS gps(p9,p10);
Serial gsm(p28,p27);
Serial pc(USBTX,USBRX);

int main() {

gsm.baud(115200);
```

```
    pc.baud(115200);

    char buf[40];
    char buf1[40];
    char buf2= 0x1A;
    gsm.printf("AT\r\n");
    gsm.scanf("%s",buf);
    pc.printf("%s\n",buf);
    gsm.scanf("%s",buf1);
    pc.printf("%s\n",buf1);

    gsm.printf("AT+CSMP=17,167,0,0\r\n");
    gsm.scanf("%s",buf);
    gsm.scanf("%s",buf1);
    pc.printf("%s\n",buf);
    pc.printf("%s\n",buf1);

    gsm.printf("AT+CMGF=1\r\n");
    gsm.scanf("%s",buf);
    gsm.scanf("%s",buf1);
    pc.printf("%s\n",buf);
    pc.printf("%s\n",buf1);

    gsm.printf("AT+CMGS=\"16XXXXXXXX6\"\r\n");
    gsm.scanf("%s",buf);
    gsm.scanf("%s",buf1);
    pc.printf("%s\n",buf);
    pc.printf("%s\n",buf1);

    gsm.printf("latitude = %f   longitude = %f %c\r\n",gps.latitude,gps.longitude,buf2);
    gsm.scanf("%s",buf);
    gsm.scanf("%s",buf1);
    pc.printf("%s\n",buf);
    pc.printf("%s\n",buf1);
    pc.printf("end of operation");

    return 0;
}
```
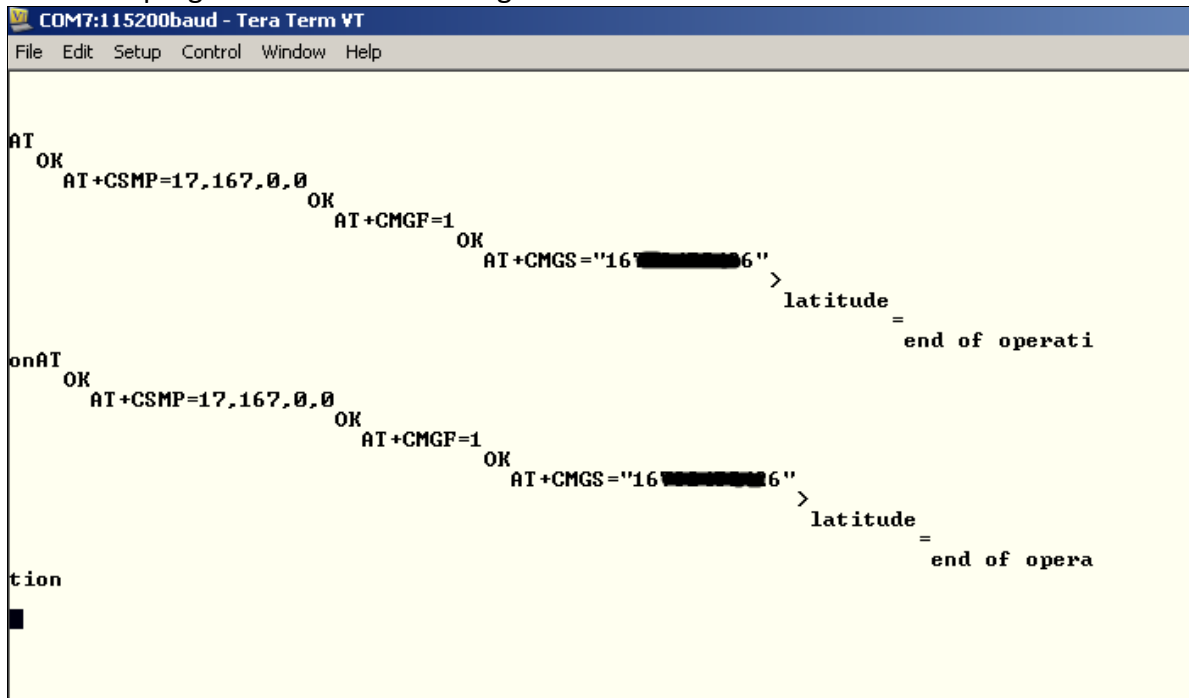
Results and Observations:

When the program is run the following is observed in the teraterm window.

```
COM7:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help

AT
   OK
      AT+CSMP=17,167,0,0
                      OK
                        AT+CMGF=1
                             OK
                               AT+CMGS="16         6"
                                               >
                                                 latitude
                                                         =
                                                           end of operati
onAT
     OK
        AT+CSMP=17,167,0,0
                        OK
                          AT+CMGF=1
                               OK
                                 AT+CMGS="16         6"
                                                 >
                                                   latitude
                                                           =
                                                             end of opera
tion

■
```
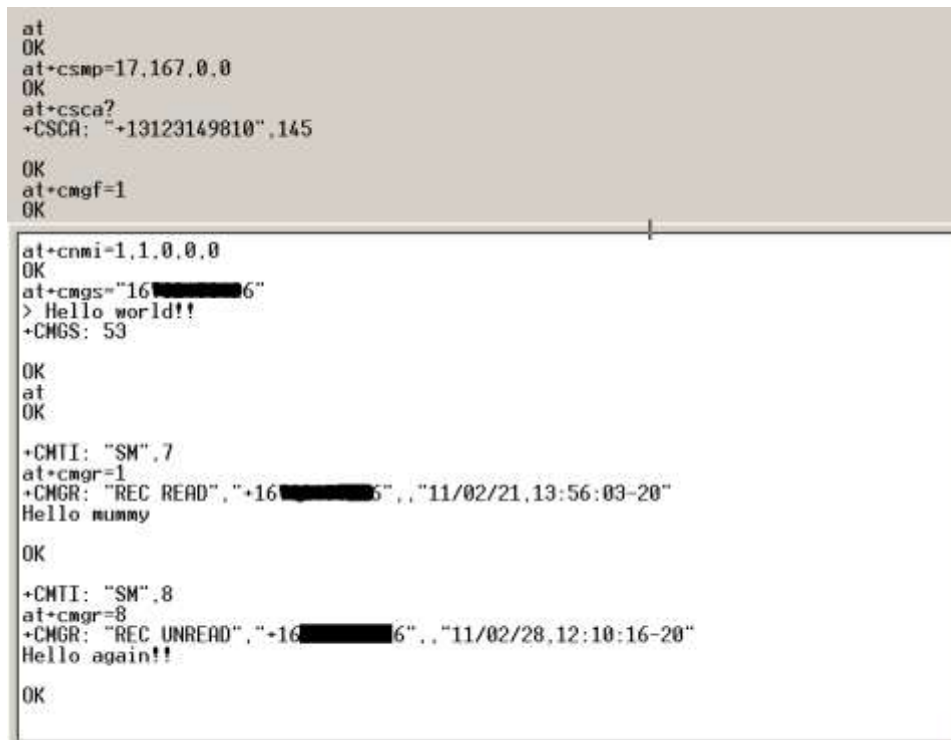
For reference, the set of commands when run independently directly through the teraterm
when the modem is connected to PC are as shown:

```
at
OK
at+csmp=17,167,0,0
OK
at+csca?
+CSCA:  "+13123149810",145

OK
at+cmgf=1
OK
```

```
at+cnmi=1,1,0,0,0
OK
at+cmgs="16         6"
> Hello world!!
+CMGS: 53

OK
at
OK

+CMTI: "SM",7
at+cmgr=1
+CMGR: "REC READ","+16         6",,"11/02/21,13:56:03-20"
Hello mummy

OK

+CMTI: "SM",8
at+cmgr=8
+CMGR: "REC UNREAD","+16         6",,"11/02/28,12:10:16-20"
Hello again!!

OK
```

A few pictures of the hardware setup required for the project: