COMP 3980: Assignment 3
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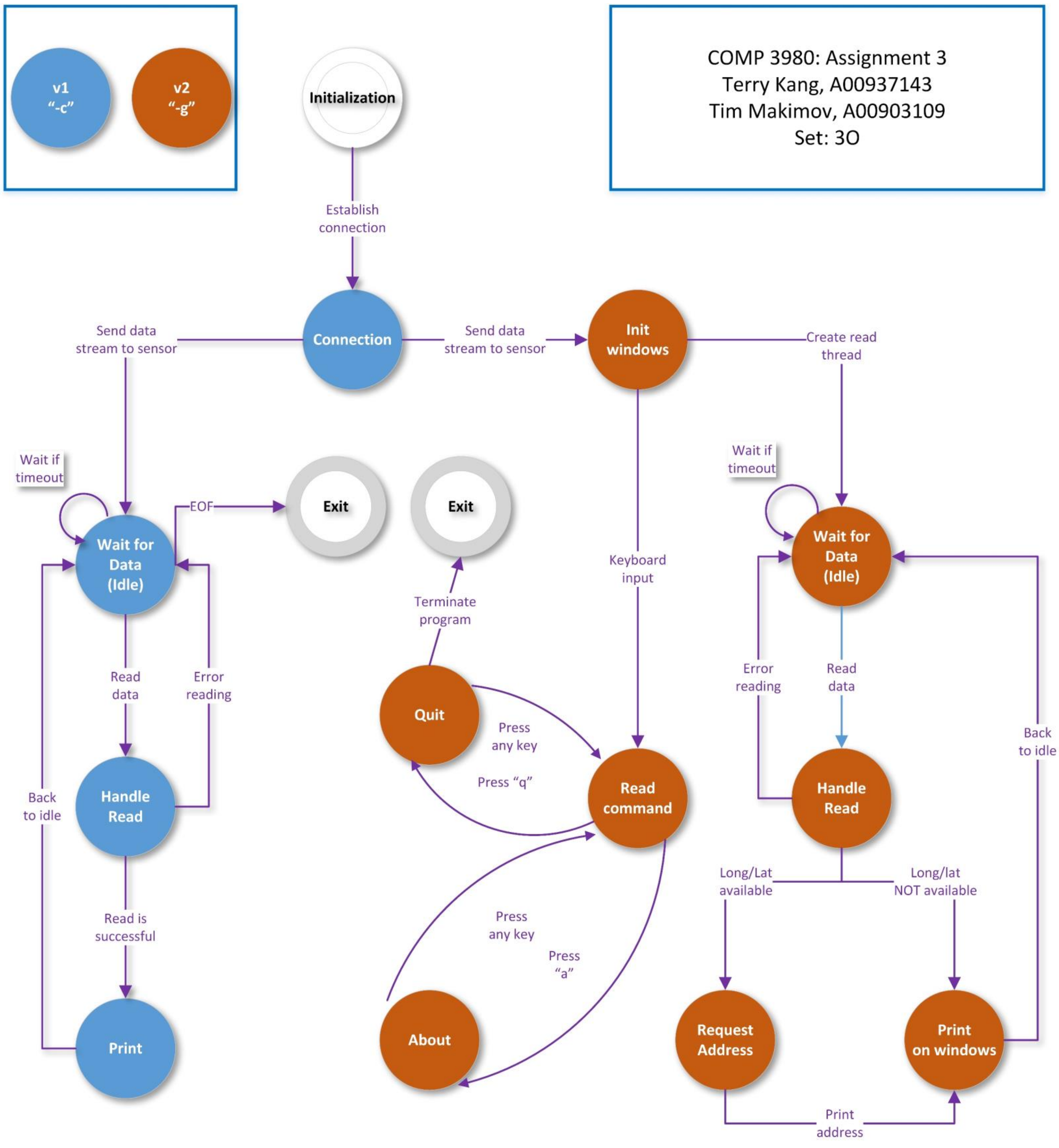
Set: 3O



PSEUDOCODE

V1

Initialization

- Define structure variable for GPS
- Establish socket connection to gps daemon
- Check if source device is not NULL (check if device is detected)

Connection

- Send data stream to sensor to start data report
- Send flags to sensor

Waiting for GPS data

- Set GPS timeout
- Wait for GPS data, if timed out – continue
- If there's data, read GPS data

Handle Read

- If error is returned print error and return to Waiting state
- If data is returned send it to Print state

Print

- Loop through all satellite's channels to check which ones are used
- Check if there any visible satellites
- For all visible satellites print the struct data
- Check if fix is available or not. If it's available, print latitude, longitude
- Else print n/a

Exit

- If user presses EOF – close program

V2

Initialization

- Read argument from user
- If the passing argument is incorrect, show usage and exit
- Establish socket connection to gps daemon
- Check if source device is not NULL (check if device is detected)

Connection

- Send data stream to sensor to start data report
- Send flags to sensor
- If the argument is ‘-c’, go to waiting state of version 1 without ncurses
- If the argument is ‘-g’, go to init window state.

Handle Read

- If error is returned print error and return to Waiting state
- If data is returned send it to Print state

Print

- Loop through all satellite’s channels to check which ones are used
- Check if there any visible satellites
- For all visible satellites print the struct data
- Check if fix is available or not. If it’s available, print latitude, longitude
- Else print n/a

Exit

- If user presses EOF – close program

Init WIndows

- Initialize windows and display full screen with ncurses
- Create a thread for reading data from GPS.
- Start reading command from user for selecting menu.

Read Command

- While reading command
- If press ‘a’ or ‘A’, create a window for about and pop it up.
- If press ‘q’ or ‘Q’, create a window for quit menu and pop it up

Quit

- Wait for command
- If press ‘y’, exit program
- If press ‘n’, close quit window

About

- Shows the information of this program
- Wait for command
- If press any key, close window

Waiting for GPS data v2

- Set GPS timeout
- Wait for GPS data, if timed out – continue

- If there’s data, read GPS data

Handle Read v2

- If error is returned print error and return to Waiting state
- If data is returned and the fix is available, send the latitude and longitude to request address state
- If fix is not available, go to pinrt on window state

Request Address

- Send a request to google maps api with the passed latitude and longitude
- Get a response
- If successful, send address to print state to print

Print on Windows

- Loop through all satellite’s channels to check which ones are used
- Check if there any visible satellites
- For all visible satellites display the satellite info on window.
- Check if fix is available or not. If it’s available, diplays the information including latitude, longitude, altitude, speed, status, etc
- Else print n/a

TESTING

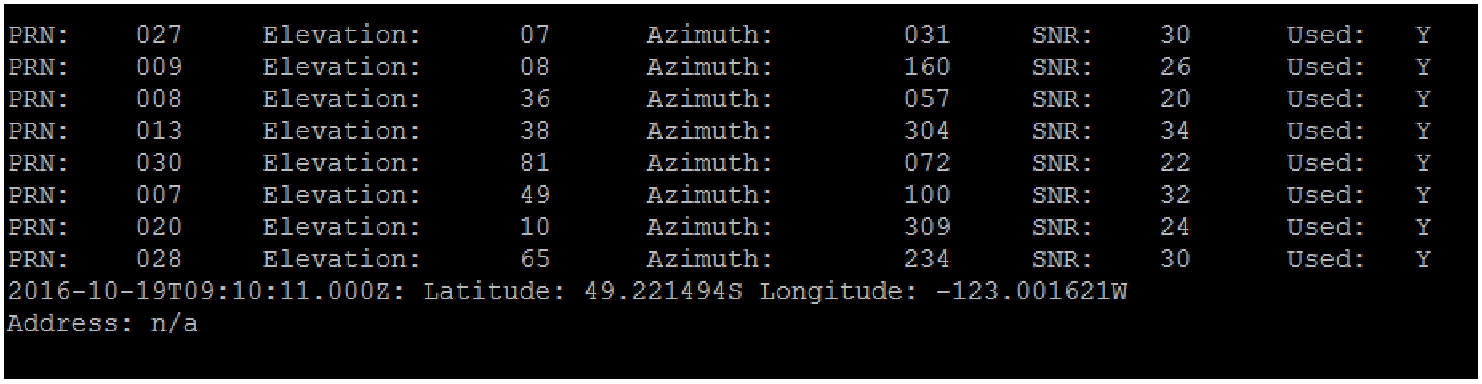
Testing procedures for “gpsReader” program

Currently there’re 2 versions of the program: v1 and v2. The v1 version has the minimum requirement features and the v2 version has basic GUI implemented using ncurses as well as postal address output based on latitude and longitude.

V1

<u>GPS signal and connection testing</u>

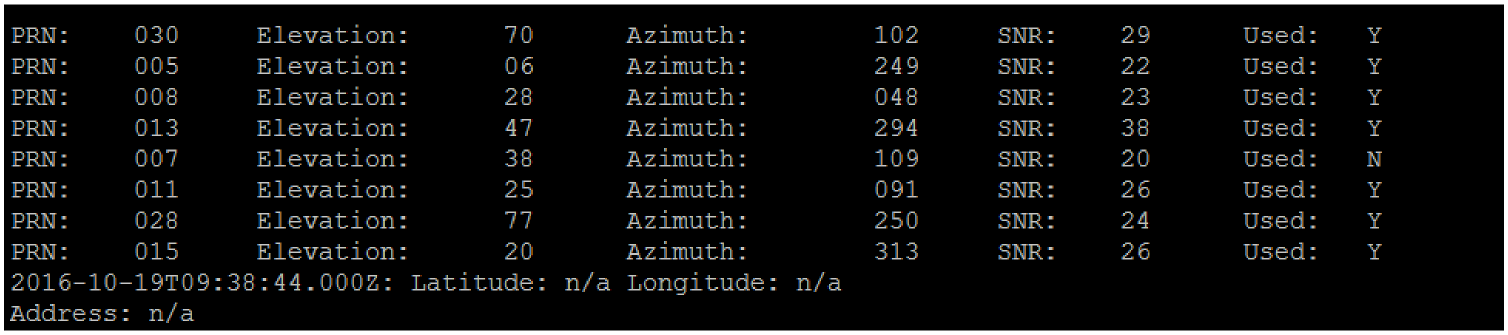
a) Getting fix and reading GPS data



```
PRN:    027     Elevation:      07      Azimuth:        031     SNR:    30      Used:   Y
PRN:    009     Elevation:      08      Azimuth:        160     SNR:    26      Used:   Y
PRN:    008     Elevation:      36      Azimuth:        057     SNR:    20      Used:   Y
PRN:    013     Elevation:      38      Azimuth:        304     SNR:    34      Used:   Y
PRN:    030     Elevation:      81      Azimuth:        072     SNR:    22      Used:   Y
PRN:    007     Elevation:      49      Azimuth:        100     SNR:    32      Used:   Y
PRN:    020     Elevation:      10      Azimuth:        309     SNR:    24      Used:   Y
PRN:    028     Elevation:      65      Azimuth:        234     SNR:    30      Used:   Y
2016-10-19T09:10:11.000Z: Latitude: 49.221494S Longitude: -123.001621W
Address: n/a
```

Result: Passed

b) Getting no fix – no GPS data can be read



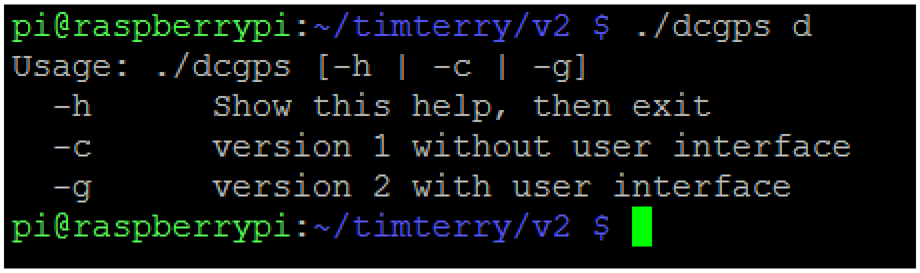
```
PRN:    030     Elevation:      70      Azimuth:        102     SNR:    29      Used:   Y
PRN:    005     Elevation:      06      Azimuth:        249     SNR:    22      Used:   Y
PRN:    008     Elevation:      28      Azimuth:        048     SNR:    23      Used:   Y
PRN:    013     Elevation:      47      Azimuth:        294     SNR:    38      Used:   Y
PRN:    007     Elevation:      38      Azimuth:        109     SNR:    20      Used:   N
PRN:    011     Elevation:      25      Azimuth:        091     SNR:    26      Used:   Y
PRN:    028     Elevation:      77      Azimuth:        250     SNR:    24      Used:   Y
PRN:    015     Elevation:      20      Azimuth:        313     SNR:    26      Used:   Y
2016-10-19T09:38:44.000Z: Latitude: n/a Longitude: n/a
Address: n/a
```

Result: Passed

V2

1. **<u>Test arguments</u>**

   Incorrect argument is passed

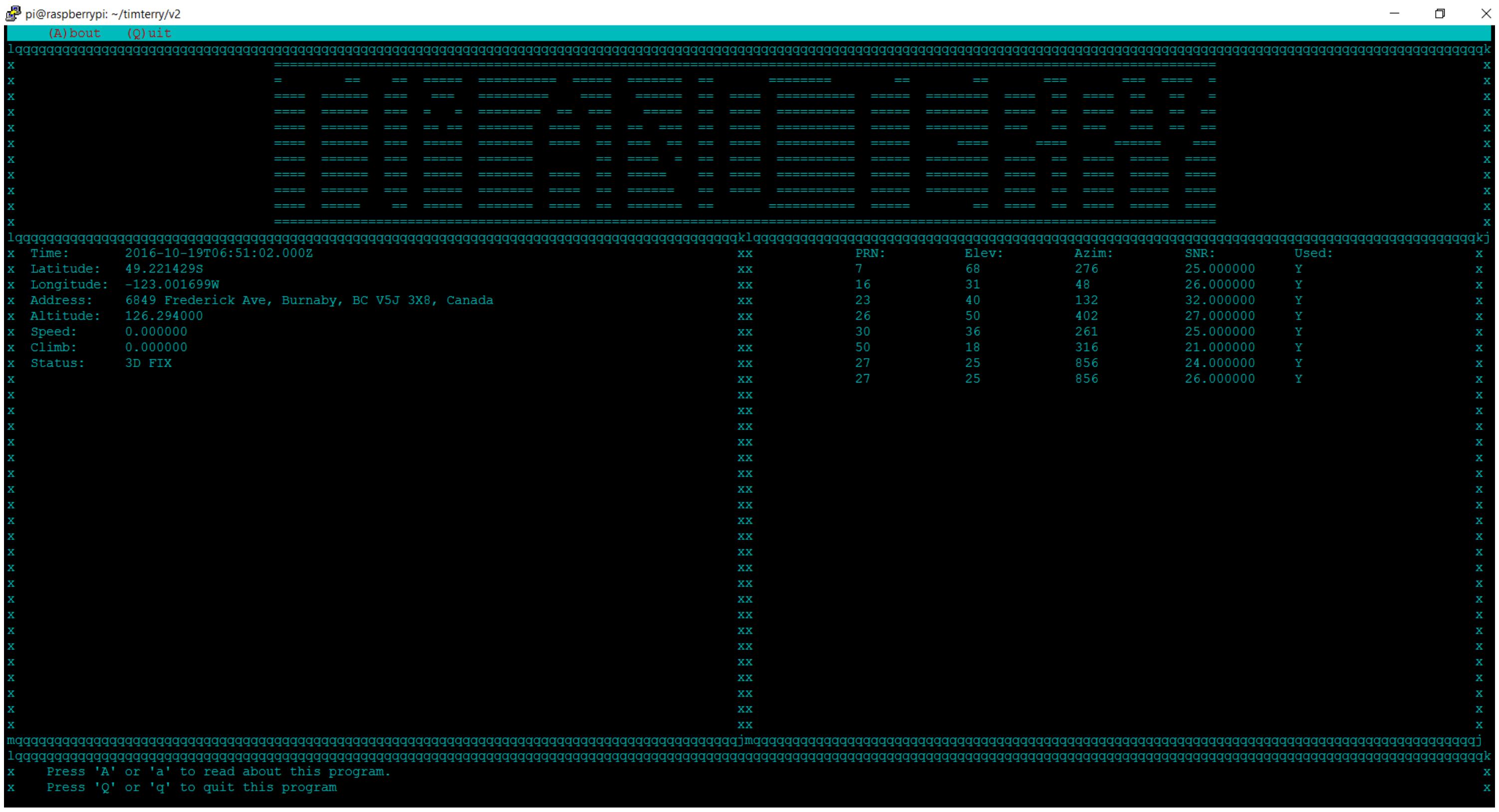


```
pi@raspberrypi:~/timterry/v2 $ ./dcgps d
Usage: ./dcgps [-h | -c | -g]
  -h      Show this help, then exit
  -c      version 1 without user interface
  -g      version 2 with user interface
pi@raspberrypi:~/timterry/v2 $
```

Result: Passed

2. **<u>GPS signal and connection testing</u>**

a) Getting fix and reading GPS data



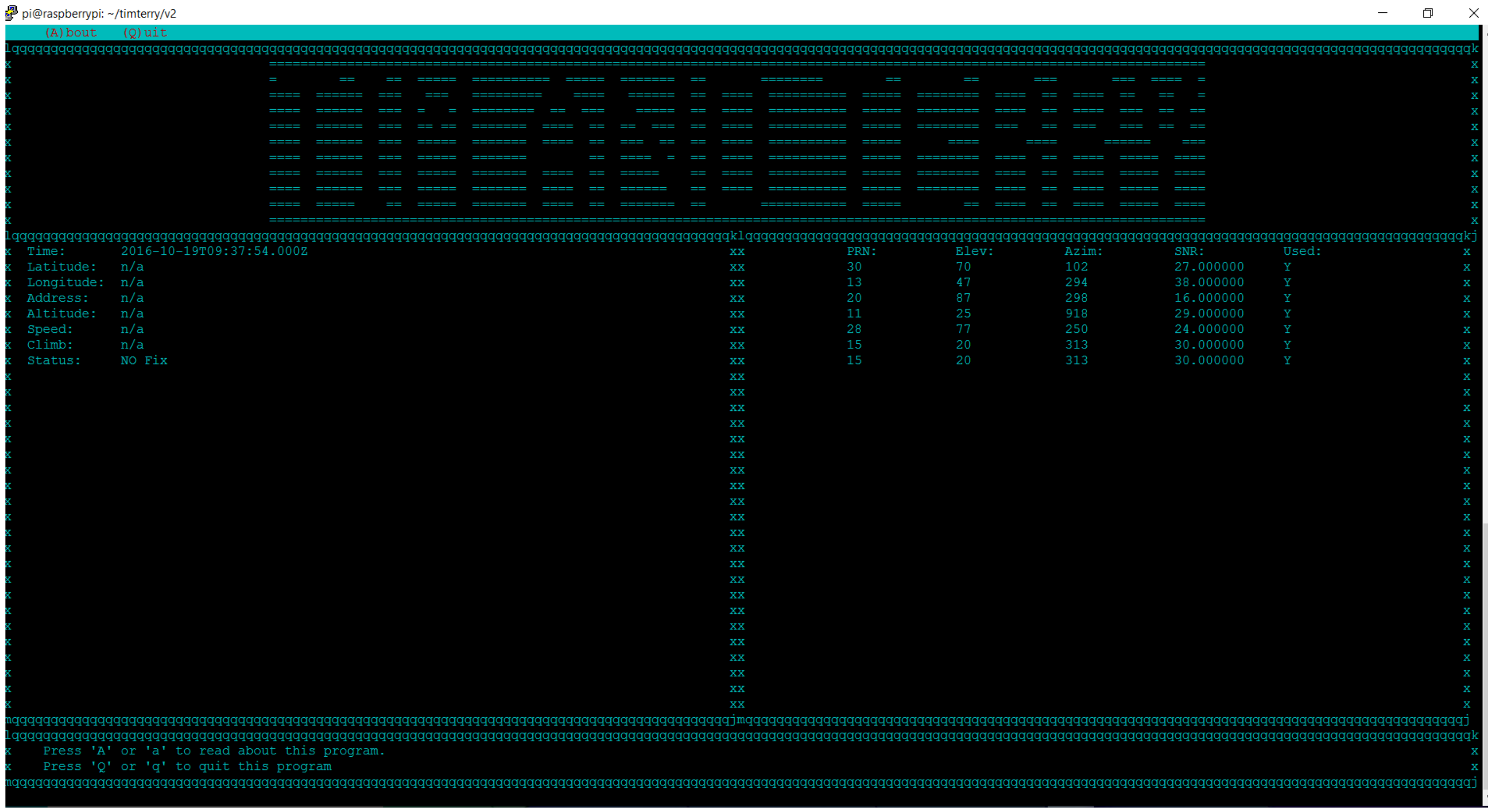
```
pi@raspberrypi: ~/timterry/v2
   (A)bout   (Q)uit

x Time:       2016-10-19T06:51:02.000Z                      xx        PRN:      Elev:     Azim:     SNR:        Used:      x
x Latitude:   49.221429S                                    xx        7         68        276       25.000000   Y          x
x Longitude:  -123.001699W                                  xx        16        31        48        26.000000   Y          x
x Address:    6849 Frederick Ave, Burnaby, BC V5J 3X8, Canada xx      23        40        132       32.000000   Y          x
x Altitude:   126.294000                                    xx        26        50        402       27.000000   Y          x
x Speed:      0.000000                                      xx        30        36        261       25.000000   Y          x
x Climb:      0.000000                                      xx        50        18        316       21.000000   Y          x
x Status:     3D FIX                                        xx        27        25        856       24.000000   Y          x
x                                                           xx        27        25        856       26.000000   Y          x

x   Press 'A' or 'a' to read about this program.
x   Press 'Q' or 'q' to quit this program
```

Result: Passed

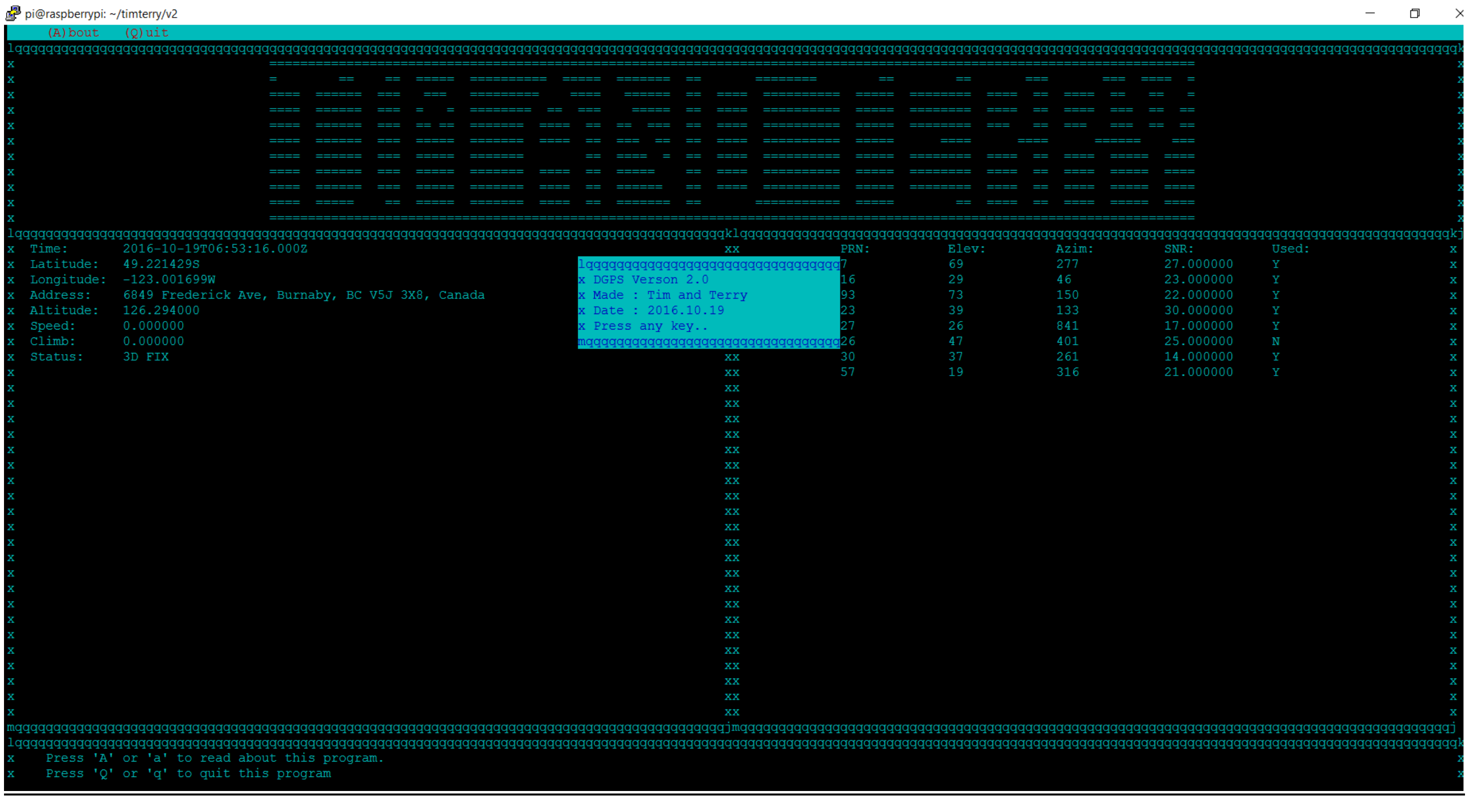
b) Getting no fix – no GPS data can’t be read



```
pi@raspberrypi: ~/timterry/v2
     (A)bout   (Q)uit
lqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqk
x                                  ========================================================================================================================                x
x                                  =       ==    ==  =====  ==========  =====  =======  ==       ========       ==        ==       ===       ===  ====  =                x
x                                  ====  ======  ===   ===   =========    ====   ======  ==  ====  ==========  =====  ========  ====  ==  ====  ==   ==   =                x
x                                  ====  ======  ===  =   =  ========  ==  ===    =====  ==  ====  ==========  =====  ========  ====  ==  ====  ===  ==  ==                x
x                                  ====  ======  ===  == ==  =======  ====  ==  ==  ===  ==  ====  ==========  =====  ========  ===   ==  ===   ===  ==  ==                x
x                                  ====  ======  ===  =====  =======  ====  ==  ===  ==  ==  ====  ==========  =====      ====      ====      ======    ===                x
x                                  ====  ======  ===  =====  =======        ==  ====  =  ==  ====  ==========  =====  ========  ====  ==  ====  =====  ====                x
x                                  ====  ======  ===  =====  =======  ====  ==  =====    ==  ====  ==========  =====  ========  ====  ==  ====  =====  ====                x
x                                  ====  ======  ===  =====  =======  ====  ==  ======   ==  ====  ==========  =====  ========  ====  ==  ====  =====  ====                x
x                                  ====  =====    ==  =====  =======  ====  ==  =======  ==      ==========  =====        ==  ====  ==  ====  =====  ====                x
x                                  ========================================================================================================================                x
lqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqklqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqkj
x  Time:        2016-10-19T09:37:54.000Z                                                     xx            PRN:          Elev:         Azim:         SNR:          Used:         x
x  Latitude:    n/a                                                                          xx            30            70            102           27.000000     Y             x
x  Longitude:   n/a                                                                          xx            13            47            294           38.000000     Y             x
x  Address:     n/a                                                                          xx            20            87            298           16.000000     Y             x
x  Altitude:    n/a                                                                          xx            11            25            918           29.000000     Y             x
x  Speed:       n/a                                                                          xx            28            77            250           24.000000     Y             x
x  Climb:       n/a                                                                          xx            15            20            313           30.000000     Y             x
x  Status:      NO Fix                                                                       xx            15            20            313           30.000000     Y             x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
x                                                                                            xx                                                                                x
mqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqjmqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqj
lqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqk
x    Press 'A' or 'a' to read about this program.                                                                                                                          x
x    Press 'Q' or 'q' to quit this program                                                                                                                                 x
mqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqj
```

Result: Passed

3. Test basic menu ad GUI

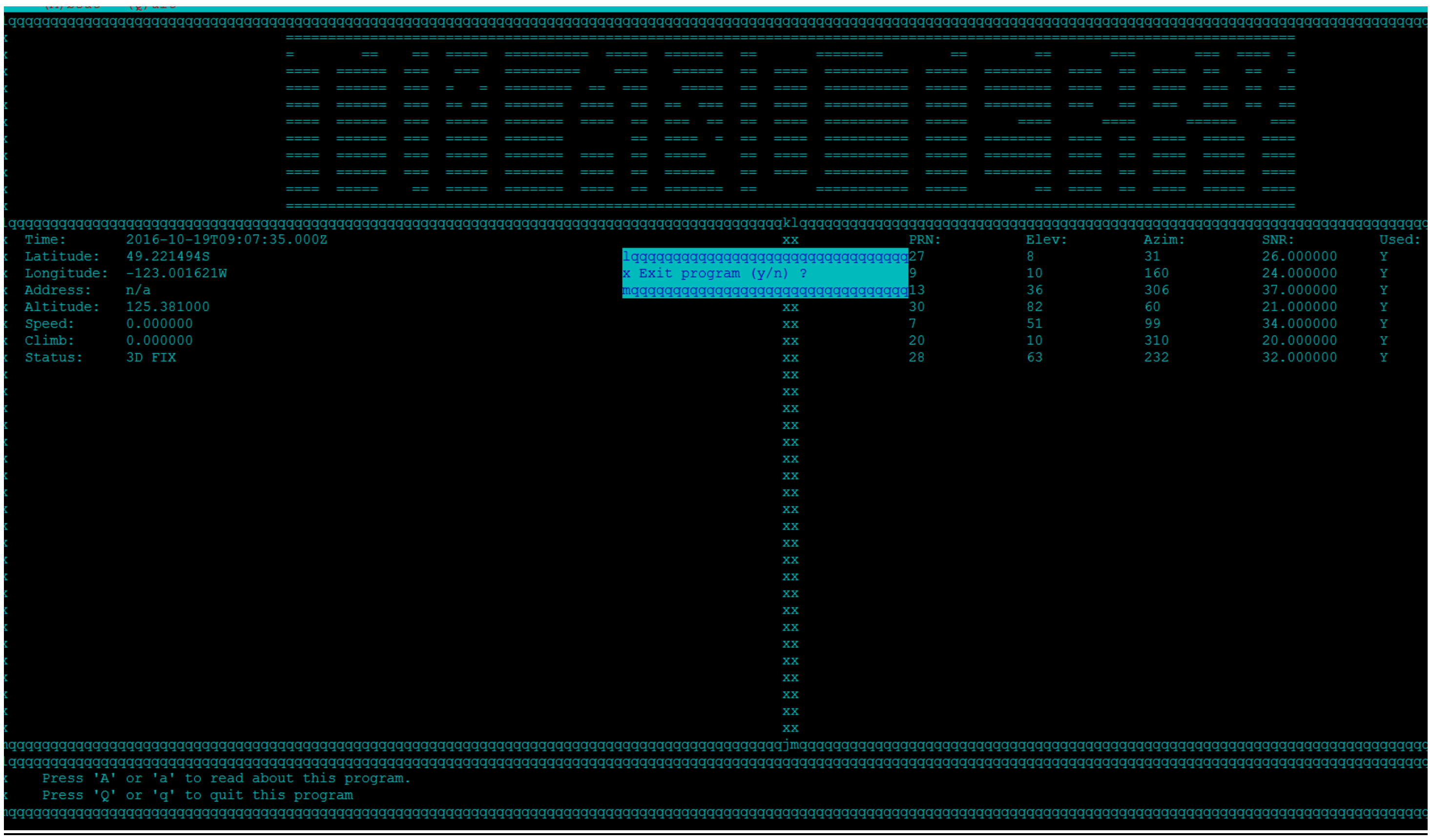


```
pi@raspberrypi: ~/timterry/v2
    (A)bout    (Q)uit

 Time:       2016-10-19T06:53:16.000Z                            PRN:      Elev:     Azim:     SNR:         Used:
 Latitude:   49.221429S                  lqqqqqqqqqqqqqqqqqqqqqq 7         69        277       27.000000    Y
 Longitude:  -123.001699W                x DGPS Verson 2.0       16        29        46        23.000000    Y
 Address:    6849 Frederick Ave, Burnaby, BC V5J 3X8, Canada     93        73        150       22.000000    Y
 Altitude:   126.294000                  x Date : 2016.10.19     23        39        133       30.000000    Y
 Speed:      0.000000                    x Press any key..       27        26        841       17.000000    Y
 Climb:      0.000000                    mqqqqqqqqqqqqqqqqqqqqqq 26        47        401       25.000000    N
 Status:     3D FIX                                              30        37        261       14.000000    Y
                                                                 57        19        316       21.000000    Y

   Press 'A' or 'a' to read about this program.
   Press 'Q' or 'q' to quit this program
```

(Popup reads: "DGPS Verson 2.0 / Made : Tim and Terry / Date : 2016.10.19 / Press any key..")



```
 Time:       2016-10-19T09:07:35.000Z                    PRN:      Elev:     Azim:     SNR:         Used:
 Latitude:   49.221494S             lqqqqqqqqqqqqqqqqqq  27        8         31        26.000000    Y
 Longitude:  -123.001621W           x Exit program (y/n) ?  9      10        160       24.000000    Y
 Address:    n/a                    mqqqqqqqqqqqqqqqqqq  13        36        306       37.000000    Y
 Altitude:   125.381000                                  30        82        60        21.000000    Y
 Speed:      0.000000                                    7         51        99        34.000000    Y
 Climb:      0.000000                                    20        10        310       20.000000    Y
 Status:     3D FIX                                      28        63        232       32.000000    Y

   Press 'A' or 'a' to read about this program.
   Press 'Q' or 'q' to quit this program
```

Result: Passed