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## Part 2: Automated GPS Data Processing

### 2. 1: Download the data and import into MATLAB

```
function [] = getGPSdata(filename)

nHeaderLine = 0;
fid = fopen( fullfile('H:\Classes_Teaching_Fall 2016\Computation
\GEOS397\Homework\07', filename), 'r' );
line = fgetl( fid ); % get the first line
nHeaderLine = nHeaderLine + 1;
line = fgetl( fid ); % get the second line
while strcmp(line(1:2), '% ')
nHeaderLine = nHeaderLine + 1;
line = fgetl( fid ); % get the second line
end
nHeaderLine = nHeaderLine + 1;
fclose(fid);

fileID=fopen(filename);
C=textscan(fileID, '%.4f %.0f %.0f %.4f %.4f %.4f %.4f %.4f
%.4f', 'HeaderLines', nHeaderLine);
fclose(fileID);
```

*Not enough input arguments.*

```
Error in getGPSdata (line 6)
fid = fopen( fullfile('H:\Classes_Teaching_Fall 2016\Computation
\GEOS397\Homework\07', filename), 'r' );
```

### 2.2: Strip out the relevant data

```
tDecyear      = C{1}; % Time [decimal year]
tIntyear      = C{2}; % Time [integer year]
tDaynum       = C{3}; % Time [integer day number]
Nposition     = C{4}; % North Position [m]
Eposition     = C{5}; % East Position [m]
vertPosition  = C{6}; % Vertical Position [m]

% 2.3: Process the GPS data
stationName   = filename(1:4); % pulls first four
characters = station name
totalTime     = tDecyear(end)-tDecyear(1); % time elapsed in
decimal years
```

---

```

numDays          = length(tDaynum);           % number of days
elapsed
totEdisplacement = (Eposition(end) - Eposition(1))*100; % East
displacement [cm]
totNdisplacement = (Nposition(end) - Nposition(1))*100; % North
displacement [cm]
totVdisplacement = (vertPosition(end) - vertPosition(1))*100; % Vert
displacement [cm]
meanEvelocity    = totEdisplacement/totalTime; % East velocity [cm/
yr]
meanNvelocity    = totNdisplacement/totalTime; % North velocity
[cm/yr]
meanVertvelocity = totVdisplacement/totalTime; % Vertical velocity
[cm/yr]

fprintf ('Site Name: %s\n',stationName)
fprintf ('Time span: %2.2f [yrs]\n', totalTime)
fprintf ('Number of days with data: %d\n', numDays)
fprintf ('Total north displacement:      %.2f [cm]\n',
totNdisplacement)
fprintf ('Total east displacement:      %.2f [cm]\n',
totEdisplacement)
fprintf ('Total vertical displacement:  %.2f [cm]\n',
totVdisplacement)
fprintf ('Avg north velocity:          %.2f [cm/yr]\n', meanNvelocity)
fprintf ('Avg east velocity:          %.2f [cm/yr]\n', meanEvelocity)
fprintf ('Avg vertical velocity:      %.2f [cm/yr]\n\n', meanVertvelocity)

```

## 2.4: Plot the GPS data

```

h = figure;
str=sprintf('North, East and Vertical Displacement at Station %s \n',
stationName);
subplot (3,1,1)
plot(tDecyear, Nposition, 'ob-', 'MarkerSize',3);
title(str)
xlabel('Time [yr]')
ylabel('North Displacement [cm]', 'FontSize',7.5)
hold on;
subplot (3,1,2)
plot (tDecyear, Eposition, '-or', 'MarkerSize',3);
xlabel('Time [yr]')
ylabel('East Displacement [cm]', 'FontSize',7.5)
hold on;
subplot (3,1,3)
plot (tDecyear, vertPosition, '-og', 'MarkerSize',3);
xlabel('Time [yr]')
ylabel('Vertical Displacement [cm]', 'FontSize',7.5)

end

```

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