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%  Original by: Robert B Harris
%  Modified for Matlab by: Hector Escobar
%  Last Modified: September 18, 2010
%  Modified: September 16, 2010.
%  Modifications: Addapted for Matlab. Fixed bug where sod didn't show up.
%  Number of satellites tracked added.

%  [sod, lats, longs, hts, sats] = readNMEApos(fname)
%
%     Reads NMEA messages recorded to a text file, and transforms the GPGGA
%     (position fix) messages into four vectors:
%
%        sod   -- Seconds of day.
%        lats  -- Latitude, with decimal fractions, in whole degrees.
%                 North is positive.
%        longs -- Longitude, same units as latitude. East is positive.
%        hts   -- Height above ellipsoid, in meters.
%        sats  -- Number of satellites in view

function [sod, lats, longs, hts, sats] = readNMEAposV3(fname)
fid = fopen(fname,'rt');

numRead = 0;
numGood = 0;
numGoodPos = 0;

% First read -- count number of spaces

tline=fgetl(fid);
while ischar(tline)

   numRead = numRead+1;

   % Extract the recorded checksum
   csumidx = findstr(tline,'*');
   ocsum = hex2dec(tline(end-1:end));

   % Comput expected checksum
   ccsum = 0;
   for k=2:(csumidx-1)
     ccsum = bitxor(ccsum,abs(tline(k)));
   end;

   if (ocsum==ccsum)
      numGood = numGood+1;
      if (tline(2:6)=='GPGGA')
         numGoodPos = numGoodPos+1;
      end
   end

   tline = fgetl(fid);
end

fclose(fid);

fprintf('Read %d lines of data\n', numRead);
fprintf('%d passed checksum.\n', numGood);
fprintf('%d good position fixes.\n', numGoodPos);


% Second read -- store GPGGA information
sod = zeros(numGoodPos,1);
lats = sod;
longs = sod;
hts = sod;
sats=sod;
fid = fopen(fname);
tline=fgetl(fid);

idx = 0;

while ischar(tline)
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```
   % Extract the recorded checksum
   csumidx = findstr(tline,'*');
   ocsum = hex2dec(tline(end-1:end));

   % Comput expected checksum
   ccsum = 0;
   for k=2:(csumidx-1)
     ccsum = bitxor(ccsum,abs(tline(k)));
   end;

   if (ocsum==ccsum)
      if (tline(2:6)=='GPGGA')
         idx = idx+1;
         cidx = findstr(tline,',');
         sodStr = tline((cidx(1)+1):(cidx(2)-1));
         latStr = tline((cidx(2)+1):(cidx(3)-1));
         latDirStr = tline(cidx(3)+1);
         lonStr = tline((cidx(4)+1):(cidx(5)-1));
         lonDirStr = tline(cidx(5)+1);
         htStr = tline((cidx(9)+1):(cidx(10)-1));
         sats(idx)=str2num(tline((cidx(7)+1):(cidx(8)-1)));
         sod(idx) = str2num(sodStr(1:2))*3600 + str2num(sodStr(3:4))*60+str2num(sodStr(5:
(length(sodStr)-4)));

         latSgn=1;
         if (latDirStr=='S')
            latSgn=-1;
         end

         lonSgn=1;
         if (lonDirStr=='W')
            lonSgn=-1;
         end


         lats(idx) = latSgn*(str2num(latStr(1:2))+str2num(latStr(3:length(latStr)))/60);
         longs(idx) = lonSgn*(str2num(lonStr(1:3))+str2num(lonStr(4:length(lonStr)))/60);
         hts(idx) = str2num(htStr);
      end
   end

   tline = fgetl(fid);
end

fclose(fid);
```