

EOSC 211 – Week10 – Worksheet 2 – Debugging

Group #
Name

Exercise 1: We have a record of speeds for a moving object (say, a drifter). We want to see how long the object moves at a constant speed. In particular, we want to write code which will measure the length of time that the speed is less than `maxspd` and greater than `minspd` (this is called a “run”). For example if the speeds are stored in a vector:

```
spd=[5 1 5 5 5 10 5 1 5 5 5 1 2 2 5] with minspd=4 and maxspd=6,
```

then we have 3 runs of length 1 and 2 runs of length 3, with no other runs. We would want to store this information in another variable in which the `i`th value was the number of runs of length `i`, i.e.:

```
runs=[3 0 2 0 0 ...].
```

Here is some code we have started to write to calculate runs in this way. However, there are 5 small bugs in this code - find and fix them.

```
function runs=runlength(spd,minspd,maxspd)
% RUNLENGTH calculates run lengths statistics
%
% Inputs
% spd: a time series vector of track speeds
% minspd and maxspd: the lower and upper limits of speed for a run
%
% Outputs
% runs: a vector in which runs(i) is the number of runs of i points.

N=length(minspd);
runs=zeros(1,N);
runlen=NaN;
isrun=0;
for i=1:N
    if spd(k) >= minspd | spd(k) <= maxspd
        isrun=1;
        runlen=runlen+1;
    else (spd(k)<minspd | spd(k)> maxspd) && isrun
        runs(runlen)=runs(runlen)+1;
        runlen=0;
        isrun=0;
    end
end
if isrun
    runs(runlen)=runs(runlen)+1;
end;
```

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Exercise 2: Now, to calculate the mean runlength, we have 3 runs of length 1 and 2 of length 3, so the mean is $(3*1 + 2*3)/(3 + 2)$. This piece of code is supposed to compute the mean runlength, but it doesn't work. Fix the 3 small bugs.

```
sumr=0;
rbar=0;
while k=1:N
    rbar = rbar*k + runs(k);
    sumr = sumr + runs(k);
end;
rbar = rbar-sumr;
```