**Programming Assignment #5 Spring, 2019**

I have a Geiger Counter (<https://en.wikipedia.org/wiki/Geiger_counter>) that measures beta, gamma, and X-ray radiation in counts per minute.

I don’t have any strong radioactive sources in my home that I know of, so I assume the Geiger counter is measuring only the natural background radiation in the local environment of the counter. (<https://en.wikipedia.org/wiki/Background_radiation>)

Some of the background radiation measured comes from the decay of radioactive isotopes in the earth. Another component of the background radiation comes from cosmic rays, originating in outer space.

Average background radiation counts per minute varies somewhat by geographic location, due to differing amounts of radioactive elements. (*you can find a map on the internet if you are interested)*

Also, our atmosphere helps shield us from the cosmic ray component of the background. The Wikipedia article above notes that the city of Denver, Colorado (5200 feet elevation) receives approximately twice the amount of radiation from cosmic rays as a city at sea level.

The raw data file logged by the Geiger counter is formatted as a **.csv** file. This is a standard file format that can be produced by Microsoft Excel and other spreadsheet programs.

( <https://en.wikipedia.org/wiki/Comma-separated_values>)

The file looks like the following when displayed using the ***vi*** text editor. (it may display quite differently in other text editors or in Excel):

GQ Electronics LLC, GMC Data Viewer,Version 2.40

Date Time,uSv/h,CPM,#1,#2,#3,#4,#5,#6,#7,#8,#9,#10,#11,#12,#13,#14,#15,#16,#17,#18,#19,#20,#21,#22,#23,#24,#25,#26,#27,#28,#29,#30,#31,#32,#33,#34,#35,#36,#37,#38,#39,#40,#41,#42,#43,#44,#45,#46,#47,#48,#49,#50,#51,#52,#53,#54,#55,#56,#57,#58,#59,#60,

FEDERAL-WAY,,,

2018-04-06 17:13,Every Minute,16,

2018-04-06 17:14,Every Minute,18,

2018-04-06 17:15,Every Minute,15,

2018-04-06 17:16,Every Minute,15,

There is an option on the Geiger counter to log location data – those are the lines in the file that contain the string “Federal Way”.

After I inspected the log file, I found that every time the location was written to the log file, the Geiger counter skipped logging one or two minutes of data. I turned off the location logging around the end of April in the file, and never turned it back on. I am fairly sure that after the last occurrence in the file of the string “Federal Way”, every minute of data was correctly written to the log file.

For this project, you are only interested in lines that look like the last few above: The time and date the data was taken, and the number of counts per minute (the integer at the end of the line).

Your program will read a file with the above format named “7\_04\_18.csv”. A link to the file is located under the Resources block in WAMAP.

The file consists of around 3 months of background radiation measurements, one measurement per minute. The first data line in the file shows that at time 17:13 on April 6th, 2018, 16 radiation events were counted.

For this programming project:

1. ***Find the maximum number of counts per minute in the file and write all of the data lines to the console that are within 5 counts of the maximum number of counts per minute.***  (If the maximum number of counts per minute in the file is 55, write all lines to the console that have readings greater than 50 counts perminute)

You may print each line to the console exactly as it appears in the file, or write just the date and counts per minute:

Date Counts per minute

5-06-18 55

6-17-18 53

. .

Examining the data values printed above, make an educated guess at the answer to this question:

“ I took the Geiger counter with me on a camping trip, and stayed for at least one full day at an elevation of 4500 feet. My house is at 500 feet above sea level. I expect that I might see a slightly higher set of readings when at altitude since there is less atmospheric screening of cosmic rays. What is the date that I was most likely to be away on that camping trip? “

Include your answer in the bottom of your header comment block.