

# Python Competency Exercise – RMC Decode

V1.0.0.0

## Core Requirements

Write a decoder to convert NMEA 0183 RMC messages to a formatted JSON string.

1. Validate the checksum of the NMEA 0183 RMC message.
2. Convert the units of Latitude and Longitude from deg.min.sec to decimal degrees.
3. Convert SOG from knots to meters per second.
4. Output JSON string:

```
{
    "LAT": float,
    "LON": float,
    "SOG": float,
    "COG": int
}
```
5. Print JSON string to terminal
6. Save JSON string to a file with the name "rmc\_{unix timestamp now}.json", within a folder named using the current date.

Please consider OOP principles when implementing your solution.

All code written should comply with the Pep8 style guide.

A README.md should accompany the code.

Provide your solution using the pre-shared OneDrive folder location.

## Stretch Goal

Unit tests should be written to cover key areas of code. Use whatever testing framework you're familiar with.

## Comments

Please include any sources that you've used to complete the exercise.

## Reference

RMC Data:

*\$GPRMC,112000.000,A,5021.5874,N,00408.9009,W,9.09,309.61,201022,,,A\*74*

# \$GPRMC

SPAMTC,EN: RMC	Default Interval (m:ss.00) 0:1.00	Enabled By Default: No
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## Summary

NMEA 0183 standard Recommended Minimum Specific GNSS Data.

## Syntax

```
$GPRMC,<1>,<2>,<3>,<4>,<5>,<6>,<7>,<8>,<9>,<10>,<11>,<12>*hh<CR><LF>
```

## Fields

- <1> UTC of position, in the form hhmmss
- <2> Status: A = Data Valid; V = Navigation Receiver Warning
- <3> Latitude, to the nearest .0001 minute
- <4> N if field <2> is North Latitude  
S if field <2> is South Latitude
- <5> Longitude, to the nearest .0001 minute
- <6> E if field <4> is East Longitude  
W if field <4> is West Longitude
- <7> Speed Over Ground, knots, to the nearest 0.1 knot
- <8> Course Over Ground, degrees True, to the nearest 0.1 degree
- <9> Date: ddmmyy
- <10> Magnetic Variation, degrees E/W, to the nearest 0.1 degree
- <11> E if field <10> is degrees East  
W if field <10> is degrees West
- <12> Mode indicator:
  - A = Autonomous mode
  - D = Differential mode
  - E = Estimated (dead reckoning) mode
  - M = Manual input mode
  - S = Simulator mode
  - N = Data not valid

The only values transmitted by the WX Series WeatherStation Sensor for the Mode indicator are A, D, and N.

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