Candidate Test MM Aviation

To get a better picture of your code style and as a basis for discussion, we want you to complete this task. In the attached C# solution, there are some basic models, functions, and unit tests. The task is to complete the solution to meet all the requirements below. The requirements are from an actual standard for aviation (CAP746), but a bit simplified.

The function FormatWind must be completed and there must be added unit tests to cover all cases.

Skill test

Format description

General format: $dddffGf_mf_mKTd_nd_nd_nVd_xd_xd_x$

Where

- ddd is the average surface wind direction over the previous 10 minutes
- ff is the average surface wind speed over the previous 10 minutes
- f_m is the maximum surface wind gust speed over the previous 10 minutes
- d_n and dx describe the variation in surface wind direction (in clockwise order) over the previous 10 minutes is the surface wind speed

Requirements

1. The maximum wind (gust) within the last 10 minutes shall be reported only if it exceeds the average speed by 10 knots or more.
2. Variations in wind direction shall be reported only when the total variation in direction over the previous ten-minute period is 60 degrees or more or but less than 180 degrees and the average wind speed is greater than 3 knots. Variations are reported in clockwise order (e.g. 290V090 or 170V250).
3. The average wind direction shall not be included for variable winds when the total variation in direction over the previous ten-minute period is 60 degrees or more or but less than 180 degrees and the wind speed is 3 knots or less; the wind in this case shall be reported as variable.
4. The average wind direction shall not be included for variable winds when the total variation in direction over the previous ten-minute period is 180 degrees or more or where it is not possible to report a average direction e.g. when a thunderstorm passes over the aerodrome. The wind should be reported as variable and no reference should be made to the two extreme directions between which the wind has varied.
5. When the wind speed is less than 1 knot, this should be reported as calm.

Range and increments

1. The surface wind direction average and variations in direction shall be rounded to the nearest 10 degrees.
2. Wind directions of 005, 015 degrees etc. should be rounded down.

3. Surface wind direction is reported between 010 and 360 degrees.
4. The surface wind average speed and maximum speed shall be rounded to the nearest knot in the METAR. Surface wind speed is reported between 01 and 99 knots. If the speed is 100 knots or more, the wind speed should be encoded as “P99” (see example 7 below).
5. Calm is encoded as ‘00000KT’.
6. Variable is encoded ‘VRB’.
7. Missing values shall be encodes with /.

Examples of METAR surface wind coding

1. 02008KT wind zero two zero degrees, 8 knots
2. 00000KT wind calm
3. VRB02KT wind variable, 2 knots (the variation in direction over the previous ten-minute period has been 60 degrees or more or but less than 180 degrees and the wind speed is 3 knots or less)
4. 33022G34KT wind three three zero degrees, 22 knots, max 34 knots
5. 16016KT 120V190 wind one six zero degrees, sixteen knots, varying between 120 degrees and 190 degrees
6. 21015G28KT 180V270 wind two one zero degrees, 15 knots, max 28 knots varying between 180 degrees and 270 degrees
7. 27070GP99KT wind two seven zero degrees, 70 knots, max 100 knots or more
8. ///12KT when average wind direction is missing