def get\_minimums(cert, area, instructed, vfr, daytime, minimums):

Returns the most advantageous minimums for the given flight category.

The minimums is the 2-dimensional list (table) of minimums, including the header.

The header for this table is as follows:

CATEGORY CONDITIONS AREA TIME CEILING VISIBILITY WIND CROSSWIND

The values in the first four columns are strings, while the values in the last

four columns are numbers. CEILING is a measurement in ft, while VISIBILITY is in

miles. Both WIND and CROSSWIND are speeds in knots.

This function first searches the table for rows that match the function parameters.

It is possible for more than one row to be a match. A row is a match if ALL four

of the first four columns match.

|  |
| --- |
| The first column (CATEGORY) has values 'Student', 'Certified', '50 Hours', or 'Dual'.  If the value 'Student', it is a match if cert is PILOT\_STUDENT or higher. If the value is 'Certified', it is a match if cert is PILOT\_CERTIFIED or higher. If it is '50 Hours', it is only a match if cert is PILOT\_50\_HOURS. The value 'Dual' only matches if instructed is True and [even] if cert is PILOT\_INVALID or PILOT\_NOVICE. |
| The second column (CONDITIONS) has values 'VMC' and 'IMC'. A flight filed as VFR  (visual flight rules) is subject to VMC (visual meteorological conditions) minimums. Similarly, a fight filed as IFR is subject to IMC minimums. |
| The third column (AREA) has values 'Pattern', 'Practice Area', 'Local',  'Cross Country', or 'Any'. Flights that are in the pattern or practice area match 'Local' as well. All flights match 'Any'. |
| The fourth column (TIME) has values 'Day' or 'Night'. The value 'Day' is only  a match if daytime is True. If it is False, 'Night' is the only match. |

Once the function finds the all matching rows, it searches for the most advantageous values for CEILING, VISIBILITY, WIND, and CROSSWIND. Lower values of CEILING and VISIBILITY are better. Higher values for WIND and CROSSWIND are better. It then returns this four values as a list of four floats (in the same order they appear) in the table.

Example: Suppose minimums is the table

CATEGORY CONDITIONS AREA TIME CEILING VISIBILITY WIND CROSSWIND

Student VMC Pattern Day 2000 5 20 8

Student VMC Practice Area Day 3000 10 20 8

Certified VMC Local Day 3000 5 20 20

Certified VMC Practice Area Night 3000 10 20 10

50 Hours VMC Local Day 3000 10 20 10

Dual VMC Any Day 2000 10 30 10

Dual IMC Any Day 500 0.75 30 20

The call get\_minimums(PILOT\_CERTIFIED,'Practice Area',ins:True,V:True,Day:True,minimums) matches all of the following rows:

Student VMC Practice Area Day 3000 10 20 8

Certified VMC Local Day 3000 5 20 20

Dual VMC Any Day 20004 10 30 10

The answer in this case is [2000,5,30,20]. 2000 and 5 are the least CEILING and

VISIBILITY values while 30 and 20 are the largest wind values.

If there are no rows that match the parameters (e.g. a novice pilot with no

instructor), this function returns None.

Parameter cert: The pilot certification

Precondition: cert is an int and one of PILOT\_NOVICE, PILOT\_STUDENT, PILOT\_CERTIFIED, PILOT\_50\_HOURS, or PILOT\_INVALID.

Parameter area: The flight area for this flight plan

Precondition: area is a string and one of 'Pattern', 'Practice Area' or 'Cross Country'

Parameter instructed: Whether an instructor is present

Precondition: instructed is a boolean

Parameter vfr: Whether the pilot has filed this as an VFR flight

Precondition: vfr is a boolean

Parameter daytime: Whether this flight is during the day

Precondition: daytime is boolean

Parameter minimums: The table of allowed minimums

Precondition: minimums is a 2d-list (table) as described above, including header

*# Find all rows that can apply to this student*

*# Find the best values for each column of the row*

*# HINT: remember to use get\_best\_value to find best value in list of matches*