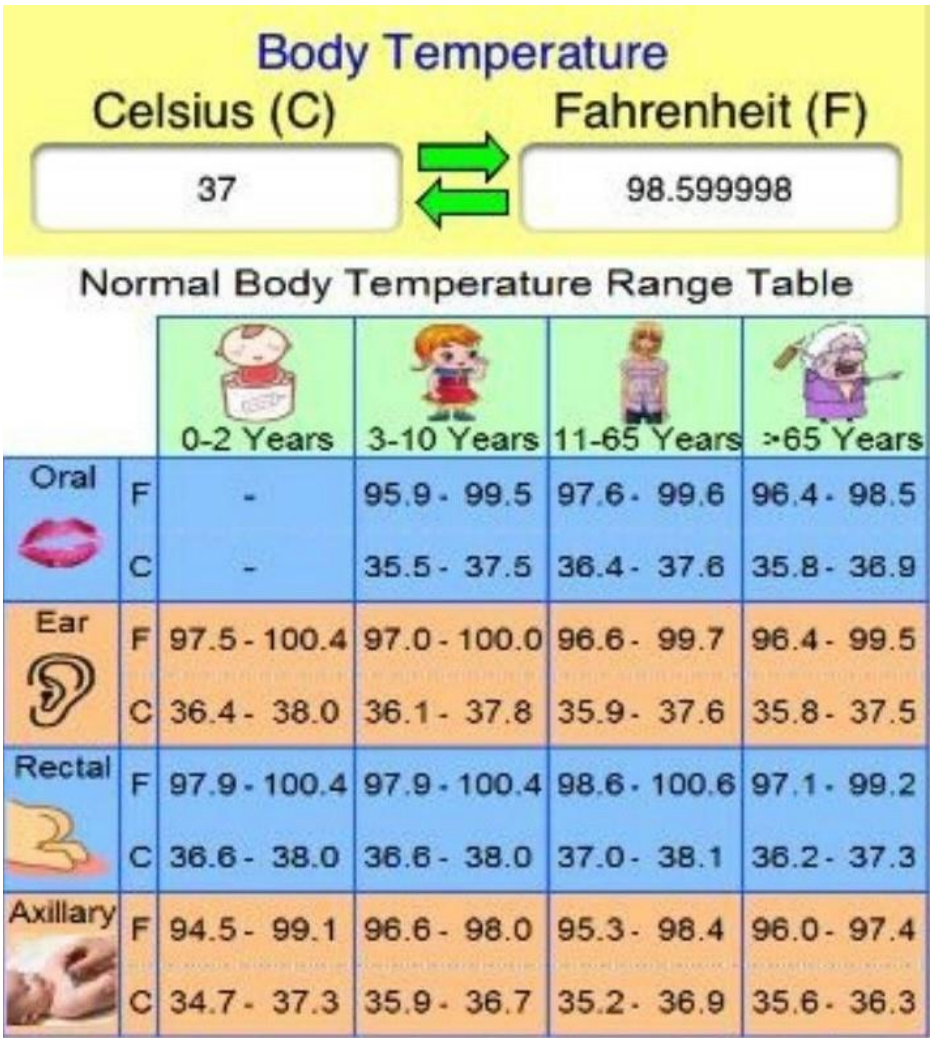
2020-2 Python Programming

HW4

Due: Nov 25 (Wed.) 23:50

Make a program to record the body temperature of people. (Don't forget to add comments to your codes.)

1. Save the normal body temperature range table (Celsius) provided below in a dictionary variable. The key of the dictionary is either the measurement site or the age group. For example, if the key is the measurement site, the value will be another dictionary which has the age group as its key and the temperature range as its value. Save the temperature range as Tuple.



Normal Body Temperature Range Table

		0-2 Years	3-10 Years	11-65 Years	>65 Years
Oral	F	-	95.9 - 99.5	97.6 - 99.6	96.4 - 98.5
	C	-	35.5 - 37.5	36.4 - 37.6	35.8 - 36.9
Ear	F	97.5 - 100.4	97.0 - 100.0	96.6 - 99.7	96.4 - 99.5
	C	36.4 - 38.0	36.1 - 37.8	35.9 - 37.6	35.8 - 37.5
Rectal	F	97.9 - 100.4	97.9 - 100.4	98.6 - 100.6	97.1 - 99.2
	C	36.6 - 38.0	36.6 - 38.0	37.0 - 38.1	36.2 - 37.3
Axillary	F	94.5 - 99.1	96.6 - 98.0	95.3 - 98.4	96.0 - 97.4
	C	34.7 - 37.3	35.9 - 36.7	35.2 - 36.9	35.6 - 36.3

2. Print out the welcome message including program introduction.

3. Receive his/her age group, the body temperature measurement site, and the body temperature in Celsius from the user. Take them together as a single string separated by comma (,). You must provide proper guidelines including the available options for the age group and body temperature measurement site to users in order to get the valid input.

4. Define a function to validate the user's input.
    a. Parameter : the list of age group, measurement site, temperature
    b. Check first if the number of values in the parameter is as expected and there's no null value or no spaces only value included.
    c. The age group and measurement site must be one of the given options (provided in the Q1 table)
    d. The body temperature must be a positive real number. (HINT: you cannot use the string methods to test if the value in a string is an integer such as .isdecimal(), .isdigit(), or .isnumber() to detect if it is a valid real number. Use the exception handling code. Try to convert the temperature to a float type. If it is not a real number, normally an error will be generated. You can catch the error using the except command. That's how you know if a given value is a valid real number or not.)
    e. Return: if everything is OK, return True. If there're problems, return an error message to specifically tell what and where's the problem.

5. Call Q4 function and validate Q3 input.

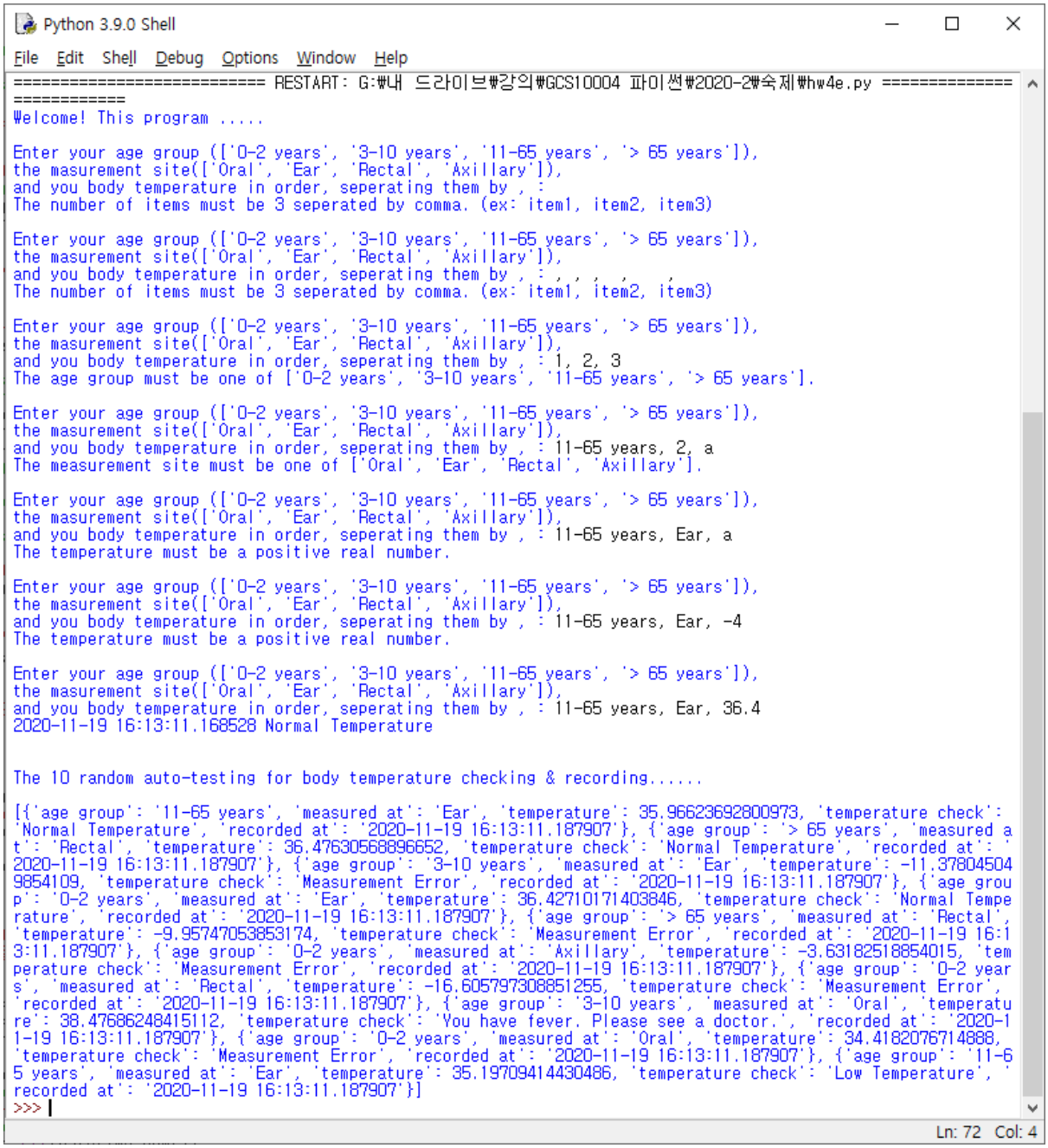
6. If Q3 input is not valid, print out the error message returned from Q4 function and keep repeating Q3 and Q5.

7. Define a function to check if his/her body temperature is normal or not.
    a. Parameters : age group, measurement site, temperature
    b. User the dictionary variable made in Q1 to check if the given temperature measured at the given measurement site for the given age group people is normal, high, low or not available.
    c. Return : A message for 4 different cases (normal, fever, low, error)

8. Call Q7 function and check the temperature for Q3 input case. Print out the returned message with the current date and time. use function now() in datetime

9. Define a function to make a random user input.
    a. No parameter
    b. Choose a random age group among the age group list in Q1 table.
    c. Choose a random measurement site among the measurement site list in Q1 table.
    d. Choose a random temperature from a slightly wider range than the normal body temperature ranges in Q1 table in order to have low or high temperature, too. Generate negative numbers with 30% probability for testing Q4 function. (HINT: decide the random probability first, then the random temperature according to the probability.)
    e. Return: a list of age group, measurement site, temperature

10. Make 10 random inputs using Q9 function.
    a. For each, test its validity using Q4 and check the temperature using Q7. Save the result in a dictionary. Items are the age group, measurement site, temperature, temperature check result, check date and time.
    b. If the input validity test result is not True, then do not run Q7 but save ‘error’ in the temperature check result item.
    c. Save the total 10 dictionary variables in a list and print out the list.



Remark)

1. You have to write your own message. If you use the same wording seen in the above example, the score for each message found same will be deducted.

2. When random testing, the probability to have negative body temperature is 30% (Q9-d). Therefore, as you see in the above example, the number of negative body temperatures among 10 data would not be exactly 3. It can be 2 or 4 as it follows the random probability.