

Python Programming Assignment #1C

Overview: Currency conversion task

Assuming that one US dollar can exchange for 33 Taiwanese dollars right now, your program will help people figure out the currency conversion task described below. The task is to ask the user to tell you the numbers of pennies, nickels, dimes, and quarters the user has respectively in terms of US currency, and then reports the following information to the user:

- the total amount of money entirely in terms of US cents only,
- the total amount of money in terms of US dollars and cents in the standard format,
- the equivalent total entirely in terms of Taiwanese cents only, and
- the equivalent total in terms of Taiwanese dollars and cents in the standard format.

Example 1: If the user tells the program that he/she has 3 pennies, 2 nickels, 3 dimes, and 4 quarters. The program should calculate and report that

- the total is 143 US cents,
- it equals 1 US dollar and 43 US cents,
- it can be exchanged for 4719 Taiwanese cents, and
- it equals 47 Taiwanese dollars and 19 Taiwanese cents.

Variables, integer division, and modulo operation:

In your program, you should use several variables for storing and processing (i) the information of the numbers of different kinds of coins and the amount of dollars and cents in different currencies and (ii) the total amount of money entirely in terms of US cents and the equivalent amount entirely in Taiwanese cents.

You can first calculate the total amount of money entirely in terms of US cents based on the numbers of different kinds of coins the user has, store the result in a corresponding variable, and then use `/` and `%`, (the integer division operator and the modulo operator) to help you determine the amount in the standard format of dollars and cents in US currency as shown in the following example.

Example 2: Consider what we have in *Example 1*. It is easy to calculate that all together we have 143 US cents in total. Apply floor division to divide 143 by 100 and you get 1. And $143 \% 100$ gives you 43. Therefore, we know the amount of money in the standard format is 1 US dollar (the result of the integer division $143 / 100$) and 43 US cents (the result of the modulus operation $143 \% 100$).

You can also multiply the total amount entirely in US cents by 33 to get the equivalent of the total amount entirely in Taiwanese cents and then proceed in a similar fashion mentioned above to figure the amount in the standard format of dollars and cents in Taiwanese currency.

Example 3: Consider what we have in *Example 2*. All together we have 143 US cents in total. Multiply 143 by 33 and you get 4719. . Apply floor division to divide 4719 by 100 and you get 47. And $4719 \% 100$ gives you 19. Therefore, we know it equals 47 Taiwanese dollars (the result of the integer division $4719 / 100$) and 19 Taiwanese cents (the result of the modulus operation $4719 \% 100$).

Stage 1. Write the program as a collection individual instructions:

Invoke IDLE Python GUI to work with Python under the interactive mode. Go to **File => New Window** under IDLE Python GUI to invoke a new editing Window. **Write down the program as a collection individual instructions for doing the following things one by one in order**, and save them in file, say *program1C.py*.

- a) Print a message to ask the user to enter the number of pennies.
- b) Use the *raw_input* function to read the number of pennies as a string and assign it into a variable *inputString*
- c) Use the *int* function to get the integer value from the *inputString* and assign the numerical value into another variable *pennies*
- d) Use similar steps as in a, b, and c above to read and store the number of nickels, the number of dimes, and the number of quarters in three other variables *nickels*, *dimes*, and *quarters*.
- e) Calculate the total amount entirely in US cents based on the values stored in *pennies*, *nickels*, *dimes*, and *quarters* and assign the result into another variable *TotalUsCents*. In other words, $TotalUsCents = pennies + 5 * nickels + 10 * dimes + 25 * quarters$. Print out a message about this amount in US cents.
- f) Print out another message in the standard format stating the amount as equivalent to $TotalUsCents/100$ US dollars and $TotalUsCents \% 100$ US cents based on the values stored in *TotalUsCents*
- g) Calculate the total amount in Taiwanese cents based on the exchange rate (1 US dollar to 33 Taiwanese dollars) and the value stored in *TotalUsCents* and then assign the result into another variable *TotalTaiwanCents*. In other words, $TotalTaiwanCents = 33 * TotalUsCents$. Print out a message about this amount in Taiwanese cents.
- h) Print out another message in the standard format stating the amount as equivalent to $TotalTaiwanCents/100$ US dollars and $TotalTaiwanCents \% 100$ US cents based on the values stored in *TotalTaiwanCents*.

Stage 2. Run and debug the program to make it work:

Save the program as a Python program file, for example *program1B.py*. Under the new window, go to **Run => Run Module** to run the whole program you have written above. Make sure your program can do what we want perfectly. If you encounter mistakes while running the program or if the results are not right, revisit your program and revise it to try to make it work.

Make sure your program can do the currency conversion correctly. For example, **Example 1:** If the user tells the program that he/she has 3 pennies, 2 nickels, 3 dimes, and 4 quarters. The program should calculate and report that

- (i) the total is 143 US cents,
- (ii) it equals 1 US dollar and 43 US cents,
- (iii) it can exchange for 4719 Taiwanese cents, and
- (iv) that equals 47 Taiwanese dollars and 19 Taiwanese cents.

Stage 3. Submission of your work:

In your weekly progress report,

- (i)** report how much time you have spent in this Python Programming #1C and **whether you have come to the class to spend time on it in the lab,**
- (ii)** report any problems you encountered in the process and whether the program you got in Stage 2 is working or not, and
- (iii)** copy and paste the contents of the Python program you got in Stage 3 into the weekly report.