Preliminary Task: Crypto Account

In this lab exam, you will handle some operations for our crypto coin exchange system. Your job is to handle some specific operations for a user account. Each input starts with currency code (T) and continues with balance in terms of Turkish liras. Initially, your account can only hold Turkish liras. Other currency types are B and E (bitCeng and Ether140). If any other currencies are given as input (in any step), this means error, you should print the following and do not permit the operation:

"Error: Operation could not be completed."

There are several tasks you need to handle and each task has a specific operation code. Each input line starts (except for the last task, read its own specifications) with this operation code to tell you which operation is given.

Operations:

Quit - 5 pts.

Operation Code: Q

If this operation code is given, your program returns 0. Before that, it shall print the following message:

”Bye...”

Input:

T 1000

Q

Output:

Bye...

Read Balance - 5 pts.

Operation Code: R

If this operation code is given, you should print the current money on your account, currency by currency separated with ”|”. The currency codes and their string version is given below:

T: TRY

B: BTC

E: ETH

For example, your account holds 100 T, 20 B and 30 E your read balance should print the output as follows:

Our account holds 100.00 TRY | 20.00 BTC | 30.00 ETH.

All read prints should have 2 decimals after the comma. **Also, there is 1 white space before and end of "|". Moreover, TRY will always appear in the output even if you have 0 TRY (BTC and ETH should not appear if they are 0).**

Again you should check the errors.

Input:

T 1000

R

Q

Output:

Our account holds 1000.00 TRY.

Bye...

For getting 5 pts, only complete printing for Turkish lira is enough, others will be used on the next tasks.

Deposit Money - 10 pts

Operation Code: D

If this operation is given you should increase the amount of the money in the account. The operation code is followed by the currency code and the amount. This operation does not print anything.

Again you should check the errors.

Input:

T 1000

R

D B 200

R

D O 200

Q

Output:

Our account holds 1000.00 TRY.

Our account holds 1000.00 TRY | 200.00 BTC.

Error: Operation could not be completed.

Bye...

Withdraw Money - 10 pts

Operation Code: W

This operation is similar to the deposit operation. You should decrease the amount of money in the account. The operation code is followed by the currency code and the amount. This operation does not print anything. Different than deposit if you don't have that much money in the account, you should print the following:

"Error: Insufficient funds."

Again you should check the errors.

Input:

T 1000

R

W T 200

R

W B 2000

W O 200

Q

Output:

Our account holds 1000.00 TRY.

Our account holds 800.00 TRY.

Error: Insufficient funds.

Error: Operation could not be completed.

Bye...

Exchange - 30 pts.

Operation Code: X

This operation code means that the user wants to exchange money between two currencies. The structure of this operation is given below:

operation_code selling_currency amount buying_currency

So, you need to sell the "amount" of your selling_currency in order to buy the buying_currency.

The exchange rates between our currencies are given below:

1 TRY: 0.0555 BTC

1 BTC: 18.0180 TRY

1 TRY: 0.0833 ETH

1 ETH: 12.0048 TRY

1 BTC: 1.5001 ETH

1 ETH: 0.6666 BTC

If the user wants to buy a currency that is supported by its balance, you should exchange the money and print the following:

”You have successfully bought %AMOUNT% %CURRENCY%."

If the user wants to buy a currency that is not supported by its balance, you should let him buy the maximum integer amount of that currency and print the following:

"This amount is too much, you have successfully bought %AMOUNT% %CURRENCY%."

For example, the user has 100 TRY in the account and wants to buy BTC using 200 TRY. You should let the user buy 5 BTC and keep the remaining TRY and print the following:

This amount is too much, you have successfully bought 5 BTC.

Again you should check the errors.

Input:

T 1000

R

X T 100 B

R

X T 2000 E

R

Q

Output:

Our account holds 1000.00 TRY.

You have successfully bought 5.55 BTC.

Our account holds 900.00 TRY | 5.55 BTC.

This amount is too much, you have successfully bought 74.00 ETH.

Our account holds 11.64 TRY | 5.55 BTC | 74.00 ETH.

Bye...

Suggestion Buy - 40 pts.

Operation Code: S

Our system suggests users a currency to buy, considering the following:

• Initial percentage of loss during the exchange.

• Expected percentage of gain of the currency.

• Percentage of loss during re-exchange.

The system only works for TRY to other currencies. User may directly buy bitCeng or Ether140 using suggestion buy. The structure of this operation is given below:

operation_code amount

currency_code1 loss_percentage1 expected_gain1

currency_code2 loss_percentage2 expected_gain2

Example:

S 1000

E 3 7

B 5 11

For each coin (Ether140 or bitCeng) you need to do the following calculation:

gain = (((amount - amount * loss_percentage)* (1+expected_gain)) * (1 - loss_percentage)) - amount

This can be clear if we check our example:

The user wants to suggest buy using 1000 TRY.

For Ether140:

User buys 1000 - 1000 * 0.03 = 970 TRY worth of Ether140.

Then, it becomes 970 * (1 + 0.07) = 1037.9 TRY worth of Ether140.

Converting back results in 1037.9 * 0.97 = 1006.76 TRY.

So, gain = 1006.76 - 1000 = 6.76 TRY.

For bitCeng:

User buys 1000 - 1000 * 0.05 = 950 TRY worth of bitCeng.

Then, it becomes 950 * (1+ 0.11) = 1054.5 TRY worth of bitCeng.

Converting back results in 1054.5 * 0.95 = 1001.77 TRY.

So, gain = 1001.77 - 1000 = 1.75 TRY.

Ether140 is better to buy using our algorithm, so by using the exchange operation, we buy the given amount of ETH. Also, print the following:

"%CURRENCY% is better with %GAIN% TRY gain. Buying it..."

If the gain is smaller than 0 for both currencies, print the following and do not exchange:

"Trading currently is not logical."

Again you should check the errors.

Input:

T 1050

R

S 1000

E 3 7

B 5 11

R

Q

Output:

Our account holds 1050.00 TRY.

ETH is better with 6.76 TRY gain. Buying it...

Our account holds 50 TRY | 83.3 ETH.

Bye..