Problem 1

MyMoney

Sample IO Build Instructions

All Geektrust challenges are meant to be solved offline. Your score will be determined based on factors such as OOPS, readability, and scalability.

You should read what we look for in your solution before you start coding. It is NOT about just getting the right output.

Please go through the build instructions here

The challenge

You work at 'MyMoney', a platform that lets investors track their consolidated portfolio value across equity, debt, and gold.

Portfolio rebalancing is an activity done to reduce the gains from one asset class and investing them in another, to ensure that the desired weight for each asset class doesn't deviate because of market gains/losses.

If we consider an investor who has invested in an equity fund, a debt/gilt fund, and gold, over the course of 5 years, with a desired weight of 60%, 30% and 10%, without rebalancing, the portfolio would look like this:

	Equity	Debt	Gold	Total
Dec-05	6,00,000	3,00,000	1,00,000	10,00,000
Allocation	60%	30%	10%	100%
Dec-06	8,51,584	3,13,305	1,19,384	12,84,836
Allocation	66%	25%	9%	100%
Dec-07	13,35,324	3,35,124	1,38,730	18,09,178
Allocation	74%	18%	8%	100%
Dec-08	6,50,684	3,97,317	1,76,097	12,24,098
Allocation	53%	32%	14%	100%
Dec-09	11,55,555	3,43,246	2,18,795	17,17,595

It's clear that due to changing markets, the desired allocation has deviated.

You need to design a system that will suggest actions to ensure that the desired allocation percentages are equal to the actual percentages invested. The desired allocation percentage should be derived from the initial allocation made. If 5000, 2000, 3000 is initial allocation, then desired percentage is 50%, 20% and 30%. The rebalanced portfolio would look like this:

	Equity	Debt	Gold	Total
Dec-05	6,00,000	3,00,000	1,00,000	10,00,000
Allocation	60%	30%	10%	100%
Dec-06	8,51,584	3,13,305	1,19,384	12,84,836
Allocation	66%	25%	9%	100%
Dec-06 (Post Rebalancing)	7,70,901	3,85,451	1,28,484	12,84,836
Allocation	60%	30%	10%	100%
Dec-07	12,08,811	4,12,295	1,48,602	17,69,708
Allocation	68%	23%	9%	100%
Dec-07 (Post Rebalancing)	10,61,825	5,30,912	1,76,971	17,69,708
Allocation	60%	30%	10%	100%
Dec-08	5,17,412	6,29,439	2,24,639	13,71,490
Allocation	38%	46%	16%	100%
Dec-08 (Post Rebalancing)	8,22,894	4,11,447	1,37,149	13,71,490
Allocation	60%	30%	10%	100%
Dec-09	14,51,396	3,56,116	1,70,011	19,77,523

The output should be
1. Balanced amount of each fund for a certain month.
2. Rebalanced amount of each month if applicable.

Input Commands

There are 5 input commands defined to separate out the actions. Your input format will start with either of these commands i.e ALLOCATE, SIP, CHANGE, BALANCE, REBALANCE

ALLOCATE

The ALLOCATE command receives the initial investment amounts for each fund.

Format - ALLOCATE AMOUNT_EQUITY AMOUNT_DEBT AMOUNT_GOLD
Example- ALLOCATE 6000 3000 1000 means that an amount of 6000, 3000 and 1000 is initially invested in equity, debt and gold fund respectively.

SIP

The SIP command receives the investment amount on a monthly basis for each fund.

Format - SIP AMOUNT_EQUITY AMOUNT_DEBT AMOUNT_GOLD
Example - SIP 2000 1000 500 means a monthly payment of 2000, 1000 and 500 is done against each of equity, debt and gold funds respectivelty.

CHANGE

The CHANGE command receives the monthly rate of change (growth or loss) for each fund type. A negative value represents a loss.

Format - CHANGE AMOUNT_EQUITY AMOUNT_DEBT AMOUNT_GOLD MONTH
Example - CHANGE 8.00% -3.00% 7.00% APRIL means in the month of April equity received a growth of 8%, debt has taken a loss by 3% and gold received a growth of 7%.

BALANCE

The BALANCE command receives a month name.

Format - BALANCE MONTH
Example - BALANCE APRIL means - print the balance for each fund as on April month.

REBALANCE

The REBALANCE command receives no additional inputs.

Input format - REBALANCE
Example - REBALANCE - Rebalance happens compulsorily after 6 months in June and December. The REBALANCE command shows the last rebalanced amount for each fund at the time of rebalancing. If 6 months data is not available then print CANNOT_REBALANCE.

Output format - EQUITY DEBT GOLD
Example - 10593 7898 2273

Assumptions

1. Balances are always floored to the nearest integers.

2. The rebalancing happens on 6th (June) and 12th (December) month.

3. The allocation always happens from January, and SIP from February.

SAMPLE INPUT-OUTPUT 1

INPUT:
ALLOCATE 6000 3000 1000
SIP 2000 1000 500
CHANGE 4.00% 10.00% 2.00% JANUARY
CHANGE -10.00% 40.00% 0.00% FEBRUARY
CHANGE 12.50% 12.50% 12.50% MARCH
CHANGE 8.00% -3.00% 7.00% APRIL
CHANGE 13.00% 21.00% 10.50% MAY
CHANGE 10.00% 8.00% -5.00% JUNE
BALANCE MARCH
REBALANCE

Operation	Equity	Debt	Gold	Total
JANUARY - Allocation	6000	3000	1000	10000
JANUARY - After Market Change	6240	3300	1020	10560
FEBRUARY - Existing	6240	3300	1020	10560
FEBRUARY - After SIP	8240	4300	1520	14060
FEBRUARY - After Market Change	7416	6020	1520	14956
MARCH - Existing	7416	6020	1520	14956
MARCH - After SIP	9416	7020	2020	18456
MARCH - After Market Change	10593	7897	2272	20762
APRIL - Existing	10593	7897	2272	20762
APRIL - After SIP	12593	8897	2772	24262
APRIL - After Market Change	13600	8630	2966	25196
MAY - Existing	13600	8630	2966	25196
MAY - After SIP	15600	9630	3466	28696
MAY - After Market Change	17628	11652	3829	33109
JUNE - Existing	17628	11652	3829	33109
JUNE - After SIP	19628	12652	4329	36609
JUNE - After Market Change	21590	13664	4112	39366
JUNE - Rebalance	23619	11809	3936	39366

SAMPLE INPUT-OUTPUT 2

INPUT:
ALLOCATE 8000 6000 3500
SIP 3000 2000 1000
CHANGE 11.00% 9.00% 4.00% JANUARY
CHANGE -6.00% 21.00% -3.00% FEBRUARY
CHANGE 12.50% 18.00% 12.50% MARCH
CHANGE 23.00% -3.00% 7.00% APRIL
BALANCE MARCH
BALANCE APRIL
REBALANCE

OUTPUT:
15937 14552 6187
23292 16055 7690
CANNOT_REBALANCE

Portfolio (for reference):

Operation	Equity	Debt	Gold	Total
JANUARY - Allocation	8000	6000	3500	17500
JANUARY - After Market Change	8880	6540	3640	19060
FEBRUARY - Existing	8880	6540	3640	19060
FEBRUARY - After SIP	11880	8540	4640	25060
FEBRUARY - After Market Change	11167	10333	4500	26000
MARCH - Existing	11167	10333	4500	26000
MARCH - After SIP	14167	12333	5500	32000
MARCH - After Market Change	15937	14552	6187	36676
APRIL - Existing	15937	14552	6187	36676
APRIL - After SIP	18937	16552	7187	42676
APRIL - After Market Change	23292	16055	7690	47037

Before you get started, please check the below:

1. Help docs to help you get a good score.
2. Key badges to earn.
3. Build instructions before submitting your code.

Note: When testing your code, make sure your program reads input from a file, which will be passed to the program as a command line argument. And output should be printed to console.

Attribution - This coding problem was created by Varun Vembar. Three cheers to him! If you wish to create a coding problem for us, do get in touch.