

You work at MyFund&Stocks, a platform that lets investors track their investments in equity mutual funds.

Equity mutual funds are a collection of individual stocks. Fund overlap is the term used to quantify the percentage of common stocks between different mutual funds. Investors prefer to have funds with as low an overlap as possible, since investing in different mutual funds with a high overlap will not give the benefits of diversification.

Available mutual funds and their respective stocks are mentioned [here](#).

Portfolio Overlap

Overlap is defined as a measure of the commonality between portfolios.

Suppose there are 2 funds A & B. The overlap between them is given as the number of stocks in common, counting both portfolio A and B (i.e. double counting the common elements) divided by the total number of elements in portfolio A and portfolio B.

Overlap (A,B) =

$$2 * (\text{No of common stocks in A \& B}) / (\text{No of stocks in A} + \text{No of stocks in B}) * 100$$

Your program should take as input:

1. Name of current funds the user holds in his/her portfolio.

2. New funds to be added.

3. Stock to be added for existing fund.

The output should be

1. Overlapping stocks of the new fund with the current funds.

2. If a given fund name is not present while calculating overlap or adding stocks to existing fund, the output should be FUND_NOT_FOUND.

Input Commands

There are 4 input commands defined to separate out the actions. Your input format will start with either of these commands i.e CURRENT_PORTFOLIO, CALCULATE_OVERLAP, OVERLAP_PERCENTAGE, ADD_STOCK

CURRENT_PORTFOLIO

The CURRENT_PORTFOLIO command receives the current funds that the user holds in his/her portfolio.

Format - CURRENT_PORTFOLIO FUND_NAME_1
FUND_NAME_2

Example- CURRENT_PORTFOLIO AXIS_BLUECHIP

ICICI_PRU_BLUECHIP means that the current fund that the user holds in his/her portfolio are AXIS_BLUECHIP and ICICI_PRU_BLUECHIP

CALCULATE_OVERLAP

The **CALCULATE_OVERLAP** command receives the fund name and calculates the overlap between that fund with each fund in the current portfolio.

Format - **CALCULATE_OVERLAP FUND_NAME**

Example - **CALCULATE_OVERLAP AXIS_BLUECHIP** means calculate the percentage of overlapping stocks of **AXIS_BLUECHIP** with each fund that the user holds in his/her current portfolio.

ADD_STOCK

The **ADD_STOCK** command receives the fund name to which the new stock will be added and the name of the new stock.

Format - **ADD_STOCK FUND_NAME STOCK_NAME**

Example - **ADD_STOCK AXIS_BLUECHIP HDFC BANK LIMITED** means we have to add the stock **HDFC BANK LIMITED** to **AXIS_BLUECHIP** fund.

Assumptions

1. All the input funds will be those that are present in the available funds json provided.
2. The overlap percentages will be rounded to 2 decimal points
3. The stocks names can have spaces in between, for eg: **HDFC BANK LIMITED**