
股票撮合

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內容

In this problem we deal with the calculation of stock prices. You need to know the following things about stock prices:

- The ask price is the lowest price at which someone is willing to sell a share of a stock.
- The bid price is the highest price at which someone is willing to buy a share of a stock.
- The stock price is the price at which the last deal was established.

Whenever the bid price is greater than or equal to the ask price, a deal is established. A buy order offering the bid price is matched with a sell order demanding the ask price, and shares are exchanged at the rate of the ask price until either the sell order or the buy order (or both) is fulfilled (i.e., the buyer wants no more stocks, or the seller wants to sell no more stocks). You will be given a list of orders (either buy or sell) and you have to calculate, after each order, the current ask price, bid price and stock price.

輸入說明

On the first line a positive integer: the number of test cases, at most 100. After that per test case:

- One line with an integer n ($1 \leq n \leq 1000$): the number of orders.
- n lines of the form 'order type x [shares at] y ', where order type is either 'buy' or 'sell', x ($1 \leq x \leq 1000$) is the number of shares of a stock someone wishes to buy or to sell, and y ($1 \leq y \leq 1000$) is the desired price.

輸出說明

Per test case:

- n lines, each of the form ' a_i b_i s_i ', where a_i , b_i and s_i are the current ask, bid and stock prices, respectively, after the i -th order has been processed and all possible deals have taken place. Whenever a price is not defined, output '-' instead of the price.

測資資訊：

記憶體限制：512 MB

公開 測資點#0 (100%): 3.0s, <1M

範例輸入 #1

```
2
6
buy 10 shares at 100
sell 1 shares at 120
sell 20 shares at 110
buy 30 shares at 110
sell 10 shares at 99
buy 1 shares at 120
6
sell 10 shares at 100
buy 1 shares at 80
buy 20 shares at 90
sell 30 shares at 90
buy 10 shares at 101
sell 1 shares at 80
```

範例輸出 #1

```
- 100 -
120 100 -
110 100 -
120 110 110
120 100 99
- 100 120
100 - -
100 80 -
100 90 -
90 80 90
100 80 90
100 - 80
```

股票交易

- 委託：

- 限價委託：投資人自行決定買賣價格
- 市價委託：依當時市場交易的價格撮合交易
 - 一定要買到或賣到某股票時，採用市價委託

撮合

- 價格優先
 - 買方(bid)：出價高的優先
 - 賣方(ask)：出價低的優先
- 時間優先
 - 先下單的先成交
- 價格優先 > 時間優先

股價決定

- 如果成交在買價賣價相同處，則該價格為成交價
- 如果成交在買價比賣價高的地方，則賣價為成交價

例子1

順序	動作
1	buy 10 shares at 100
2	sell 1 shares at 120
3	sell 20 shares at 110
4	buy 30 shares at 110
5	sell 10 shares at 99
6	buy 1 shares at 120

例子1

順序	動作
1	buy 10 shares at 100
2	sell 1 shares at 120
3	sell 20 shares at 110
4	buy 30 shares at 110
5	sell 10 shares at 99
6	buy 1 shares at 120

委買		委賣	
價格	張數	價格	張數
100	10		

T	Ask	Bid	Price
1	-	100	-

例子1

順序	動作
1	buy 10 shares at 100
2	sell 1 shares at 120
3	sell 20 shares at 110
4	buy 30 shares at 110
5	sell 10 shares at 99
6	buy 1 shares at 120

委買		委賣	
價格	張數	價格	張數
100	10	120	1

T	Ask	Bid	Price
1	-	100	-
2	120	100	-

例子1

順序	動作
1	buy 10 shares at 100
2	sell 1 shares at 120
3	sell 20 shares at 110
4	buy 30 shares at 110
5	sell 10 shares at 99
6	buy 1 shares at 120

委買		委賣	
價格	張數	價格	張數
100	10	120	1
		110	20



委買		委賣	
價格	張數	價格	張數
100	10	110	20
		120	1

賣方：出價低的優先

T	Ask	Bid	Price
1	-	100	-
2	120	100	-
3	110	100	-

例子1

順序	動作
1	buy 10 shares at 100
2	sell 1 shares at 120
3	sell 20 shares at 110
4	buy 30 shares at 110
5	sell 10 shares at 99
6	buy 1 shares at 120

委買		委賣	
價格	張數	價格	張數
100	10	110	20
		120	1



委買		委賣	
價格	張數	價格	張數
100	10	120	1
110	10		

買方：出價高的優先
買價賣價相同
該價格為成交價

T	Ask	Bid	Price
1	-	100	-
2	120	100	-
3	110	100	-
4			110

例子1

順序	動作
1	buy 10 shares at 100
2	sell 1 shares at 120
3	sell 20 shares at 110
4	buy 30 shares at 110
5	sell 10 shares at 99
6	buy 1 shares at 120

委買		委賣	
價格	張數	價格	張數
100	10	120	1
110	10		



委買		委賣	
價格	張數	價格	張數
110	10	120	1
100	10		

買方：出價高的優先

T	Ask	Bid	Price
1	-	100	-
2	120	100	-
3	110	100	-
4	120	110	110

例子1

順序	動作
1	buy 10 shares at 100
2	sell 1 shares at 120
3	sell 20 shares at 110
4	buy 30 shares at 110
5	sell 10 shares at 99
6	buy 1 shares at 120

委買		委賣	
價格	張數	價格	張數
110	10	120	1
100	10		



委買		委賣	
價格	張數	價格	張數
100	10	120	1

買價比賣價高
賣價為成交價

T	Ask	Bid	Price
1	-	100	-
2	120	100	-
3	110	100	-
4	120	110	110
5	120	100	99

例子1

順序	動作
1	buy 10 shares at 100
2	sell 1 shares at 120
3	sell 20 shares at 110
4	buy 30 shares at 110
5	sell 10 shares at 99
6	buy 1 shares at 120

委買		委賣	
價格	張數	價格	張數
100	10	120	1



委買		委賣	
價格	張數	價格	張數
100	10		

買方：出價高的優先

T	Ask	Bid	Price
1	-	100	-
2	120	100	-
3	110	100	-
4	120	110	110
5	120	100	99
6	-	100	120

例子2

順序	動作
1	sell 10 shares at 100
2	buy 1 shares at 80
3	buy 20 shares at 90
4	sell 30 shares at 90
5	buy 10 shares at 101
6	sell 1 shares at 80

例子2

順序	動作
1	sell 10 shares at 100
2	buy 1 shares at 80
3	buy 20 shares at 90
4	sell 30 shares at 90
5	buy 10 shares at 101
6	sell 1 shares at 80

委買		委賣	
價格	張數	價格	張數
		100	10

T	Ask	Bid	Price
1	100	-	-
2			
3			
4			
5			
6			

例子2

順序	動作
1	sell 10 shares at 100
2	buy 1 shares at 80
3	buy 20 shares at 90
4	sell 30 shares at 90
5	buy 10 shares at 101
6	sell 1 shares at 80

委買		委賣	
價格	張數	價格	張數
80	1	100	10

T	Ask	Bid	Price
1	100	-	-
2	100	80	-
3			
4			
5			
6			

例子2

順序	動作
1	sell 10 shares at 100
2	buy 1 shares at 80
3	buy 20 shares at 90
4	sell 30 shares at 90
5	buy 10 shares at 101
6	sell 1 shares at 80

委買		委賣	
價格	張數	價格	張數
90	20	100	10
80	1		

T	Ask	Bid	Price
1	100	-	-
2	100	80	-
3	100	90	-
4			
5			
6			

例子2

順序	動作
1	sell 10 shares at 100
2	buy 1 shares at 80
3	buy 20 shares at 90
4	sell 30 shares at 90
5	buy 10 shares at 101
6	sell 1 shares at 80

委買		委賣	
價格	張數	價格	張數
90	20	900	10
80	1	100	10

T	Ask	Bid	Price
1	100	-	-
2	100	80	-
3	100	90	-
4	90	80	90
5			
6			

例子2

順序	動作
1	sell 10 shares at 100
2	buy 1 shares at 80
3	buy 20 shares at 90
4	sell 30 shares at 90
5	buy 10 shares at 101
6	sell 1 shares at 80

委買		委賣	
價格	張數	價格	張數
80	1	900	10
		100	10

T	Ask	Bid	Price
1	100	-	-
2	100	80	-
3	100	90	-
4	90	80	90
5	100	80	90
6			

例子2

順序	動作
1	sell 10 shares at 100
2	buy 1 shares at 80
3	buy 20 shares at 90
4	sell 30 shares at 90
5	buy 10 shares at 101
6	sell 1 shares at 80

委買		委賣	
價格	張數	價格	張數
80	1	100	10

T	Ask	Bid	Price
1	100	-	-
2	100	80	-
3	100	90	-
4	90	80	90
5	100	80	90
6	100	-	80