Problem 1
Baubles

Input File: `baublesin.txt`
Output File: `baublesout.txt`

Time and Memory Limits: 1 second, 1 GB

Olaf the artificer makes and sells intricate decorations. Recently, he has been making baubles to hang on Christmas trees.

Baubles come in two colours: red and blue. In his workshop, Olaf has $\mathbf{R_O}$ red baubles and $\mathbf{B_O}$ blue baubles. Additionally, Olaf has $\mathbf{S}$ spare unpainted baubles, which he can turn into baubles of either colour. Olaf *cannot* turn a red bauble into a blue bauble, or vice versa.

The royal palace just placed an order for $\mathbf{R_P}$ red baubles and $\mathbf{B_P}$ blue baubles.

Unfortunately for Olaf, the Goblin King has hired you to stop Olaf from being able to fulfil this order! In the night, you will sneak into Olaf's workshop and destroy some of his baubles, so that Olaf cannot make up the order, no matter how he chooses to paint his spare baubles.

Olaf may wake up at any moment, so you will need to work quickly and efficiently. What is the fewest baubles you can destroy to stop Olaf from fulfilling this order?

Input

The first and only line of input will contain the five integers $\mathbf{R_O}$, $\mathbf{B_O}$, $\mathbf{S}$, $\mathbf{R_P}$ and $\mathbf{B_P}$.

Output

Your program should output a single integer, the fewest baubles you must destroy to stop Olaf from fulfilling the royal palace's order.

Sample Input 1

```
4 2 1 2 2
```

Sample Output 1

```
2
```

Sample Input 2

```
5 5 10 6 6
```

Sample Output 2

```
9
```

Sample Input 3

```
5 6 2 100 0
```

Sample Output 3

```
0
```

Sample Input 4

```
10 8 0 5 6
```

Sample Output 4

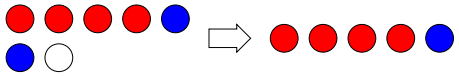
```
3
```

Explanation

In the first sample input, Olaf has $\mathbf{R_O = 4}$ red baubles, $\mathbf{B_O = 2}$ blue baubles and $\mathbf{S = 1}$ spare bauble. The royal palace would like Olaf to make $\mathbf{R_P = 2}$ red baubles and $\mathbf{B_P = 2}$ blue baubles.

If you destroy Olaf's one spare bauble and one of his blue baubles, then Olaf will be left with 4 red baubles and 1 blue bauble. Clearly, this is not enough for Olaf to make the $\mathbf{B_P = 2}$ blue baubles requested by the palace.

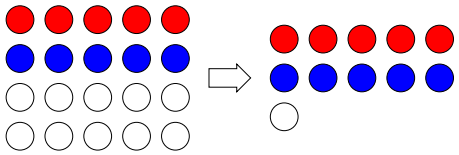
This involves destroying 2 baubles, which is the minimum possible.



In the second sample input, Olaf has $\mathbf{R_O = 5}$ red baubles, $\mathbf{B_O = 5}$ blue baubles and $\mathbf{S = 10}$ spare baubles. The royal palace would like Olaf to make $\mathbf{R_P = 6}$ red baubles and $\mathbf{B_P = 6}$ blue baubles.

If you destroy nine of Olaf's spare baubles, then Olaf will be left with 5 red baubles, 5 blue baubles and 1 spare bauble. It doesn't matter what colour Olaf paints his spare bauble, Olaf will not be able to fulfil the royal palace's order.

This involves destroying 9 baubles, which is the minimum possible.



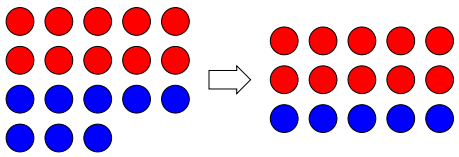
In the third sample input, Olaf has $\mathbf{R_O = 5}$ red baubles, $\mathbf{B_O = 6}$ blue baubles and $\mathbf{S = 2}$ spare baubles. The royal palace would like Olaf to make $\mathbf{R_P = 100}$ red baubles and $\mathbf{B_P = 0}$ blue baubles.

Olaf is already unable to fulfil the royal palace's order, so you do not have to destroy any baubles. So the answer is 0.

In the fourth sample input, Olaf has $\mathbf{R_O = 10}$ red baubles, $\mathbf{B_O = 8}$ blue baubles and $\mathbf{S = 0}$ spare baubles. The royal palace would like Olaf to make $\mathbf{R_P = 5}$ red baubles and $\mathbf{B_P = 6}$ blue baubles.

If you destroy three of Olaf's blue baubles, then Olaf will be left with 10 red baubles and 5 blue baubles. Clearly, this is not enough for Olaf to make the $\mathbf{B_P = 6}$ blue baubles requested by the palace.

This involves destroying 3 baubles, which is the minimum possible.



Subtasks & Constraints

For all test cases:

- $\mathbf{0} \leq \mathbf{R_O}, \mathbf{B_O}, \mathbf{S}, \mathbf{R_P}, \mathbf{B_P} \leq \mathbf{500\,000\,000}$.
- $\mathbf{R_P} + \mathbf{B_P} > \mathbf{0}$. That is, the palace will place an order for at least one bauble.

Additionally:

- For Subtask 1 (15 marks), $\mathbf{R_O} = \mathbf{8}$, $\mathbf{B_O} = \mathbf{4}$, $\mathbf{S} = \mathbf{3}$, $\mathbf{R_P} = \mathbf{7}$, $\mathbf{B_P} = \mathbf{1}$. That is, there is only one test case in this subtask. In this test case, Olaf has $\mathbf{R_O} = \mathbf{8}$ red baubles, $\mathbf{B_O} = \mathbf{4}$ blue baubles and $\mathbf{S} = \mathbf{3}$ spare baubles. The royal palace placed an order for $\mathbf{R_P} = \mathbf{7}$ red baubles and $\mathbf{B_P} = \mathbf{1}$ blue bauble.

  Hint: There is only one test case in this subtask, so try working out the answer by hand.

- For Subtask 2 (20 marks), $\mathbf{S} = \mathbf{0}$. That is, Olaf has no spare unpainted baubles.

  Hint: You have two options: destroy enough red baubles so that Olaf can't fulfil his order, or destroy enough blue baubles until Olaf can't fulfil his order. How might you decide which option is better?

- For Subtask 3 (20 marks), $\mathbf{B_O} = \mathbf{0}$ and $\mathbf{B_P} = \mathbf{0}$. That is, Olaf has no blue baubles, and the royal palace does not need any blue baubles.

  Hint: Since the palace does not need any blue baubles, Olaf might as well paint all his spare baubles red.

- For Subtask 4 (35 marks), $\mathbf{R_O}, \mathbf{B_O}, \mathbf{S}, \mathbf{R_P}, \mathbf{B_P} \leq \mathbf{1000}$. That is, all the numbers in the input will be at most 1000.

  Hint: If you have the choice of destroying a red, blue or spare bauble, which one should you destroy? Can you use this idea to come up with a strategy for destroying baubles?

- For Subtask 5 (10 marks), there are no special constraints.

  Hint: The input values in this subtask can be large enough to timeout your program! Try to come up with a solution that avoids for-loops.