Increasing Increment

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	256 megabytes

`duckmoon99` is stuck at home due to MCO (not this one), so he recently got into a game called Crash Royale (because the game keeps crashing). There are N castles, numbered $0, 1, 2, \ldots, N-1$ from left to right in a line he has to defend. His opponent, `zscoder`, will now launch Q Super Fiery Fearsome Dragon Ultimate Fire Breathe Strikes on the castles! A strike is done by first targeting a continuous segment of castles and having the dragons breathe fire on them. More specifically, `zscoder` will first select an interval L, R and attack the castles numbered $L \leq i \leq R$.

The damage done to the castles is determined by a base damage value X, a combo damage value Y, and the position of the castle. Suppose castle i is within the range $[L, R]$, then the damage it receives is $X + (i - L + 1)Y$. Therefore, castle L will receive damage $X + Y$, castle $L + 1$ will receive $X + 2Y$, castle $L + 2$ will receive $X + 3Y$ ... until castle R receives $X + (R - L + 1)Y$ damage. Help `duckmoon99` calculate the accumulated damage that each castle took after the Q Super Fiery Fearsome Dragon Ultimate Fire Breathe Strikes.

Constraints:

$1 \leq N, Q \leq 2 \times 10^5$

$0 \leq L_i \leq R_i \leq N - 1$

$0 \leq X_i, Y_i \leq 10^5$

Subtask 1 (12 points): $N, Q \leq 10^3$

Subtask 2 (37 points): $Y_i = 0$

Subtask 3 (51 points): No additional constraints

Input

The first line has two integers N and Q, representing the number of castles and the number of strikes respectively. It is then followed by Q lines of four integers L, R, X, and Y representing the range, base damage, and combo damage of that attack as described in the problem statement.

Output

Output N spaced integers in a single line representing the damage sustained by each castle after the Q strikes.

Examples

standard input	standard output
5 3 2 4 7 0 0 4 1 9 3 4 0 2	10 19 35 46 57
4 4 2 2 9 3 3 3 4 4 0 1 2 1 0 0 3 1	7 4 12 8

Note

In the first example, there are 5 castles. Initially, the damage sustained by them are

```
0 0 0 0 0
```

After the first attack, where L = 2, R = 4, X = 7, and Y = 0, the damage sustained by the castles are

```
0 0 7 7 7
```

And after the second attack, where L = 0, R = 4, X = 1, and Y = 9, the damage sustained by the castles are

```
10 19 35 44 53
```

And lastly, after the final attack, where L = 3, R = 4, X = 0, and Y = 2, the damage sustained by the castles are

```
10 19 35 46 57
```

In case you are still confused about how the damage is calculated, consider only castle 3 (second castle from right) for the first sample. After the first attack, it receives $7 + (3 - 2 + 1) \times 0 = 7$ damage. After the second attack, it receives another $1 + (3 - 0 + 1) \times 9 = 37$ damage, making its accumulated damage $37 + 7 = 44$. From the 3rd attack, it will receive $0 + (3 - 3 + 1) \times 2 = 2$ damage, so its final accumulated damage is $44 + 2 = 46$. Note that it is possible for a castle to not be attacked, it just so happens that castle 3 is attacked in all 3 attacks because it lies in the ranges.