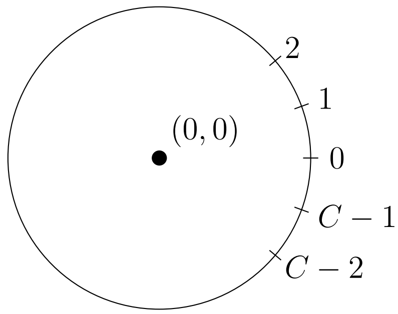
Problem S4: Good Triplets

Problem Description

Andrew is a very curious student who drew a circle with the center at $(0, 0)$ and an integer circumference of $C \geq 3$. The location of a point on the circle is the counter-clockwise arc length from the right-most point of the circle.



Andrew drew $N \geq 3$ points at integer locations. In particular, the i^{th} point is drawn at location P_i $(0 \leq P_i \leq C - 1)$. It is possible for Andrew to draw multiple points at the same location.

A good triplet is defined as a triplet (a, b, c) that satisfies the following conditions:

- $1 \leq a < b < c \leq N$.
- The origin $(0, 0)$ lies strictly inside the triangle with vertices at P_a, P_b, and P_c. In particular, the origin is **not** on the triangle's perimeter.

Lastly, two triplets (a, b, c) and (a', b', c') are distinct if $a \neq a'$, $b \neq b'$, or $c \neq c'$.

Andrew, being a curious student, wants to know the number of distinct good triplets. Please help him determine this number.

Input Specification

The first line contains the integers N and C, separated by one space.

The second line contains N space-separated integers. The i^{th} integer is P_i $(0 \leq P_i \leq C - 1)$.

The following table shows how the available 15 marks are distributed.

La version française figure à la suite de la version anglaise.

Marks Awarded	Number of Points	Circumference	Additional Constraints
3 marks	$3 \leq N \leq 200$	$3 \leq C \leq 10^6$	None
3 marks	$3 \leq N \leq 10^6$	$3 \leq C \leq 6\ 000$	None
6 marks	$3 \leq N \leq 10^6$	$3 \leq C \leq 10^6$	$P_1, P_2, \ldots, P_N$ are all distinct (i.e., every location contains at most one point)
3 marks	$3 \leq N \leq 10^6$	$3 \leq C \leq 10^6$	None

Output Specification

Output the number of distinct good triplets.

Sample Input

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8 10
0 2 5 5 6 9 0 0
```

Output for Sample Input

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6
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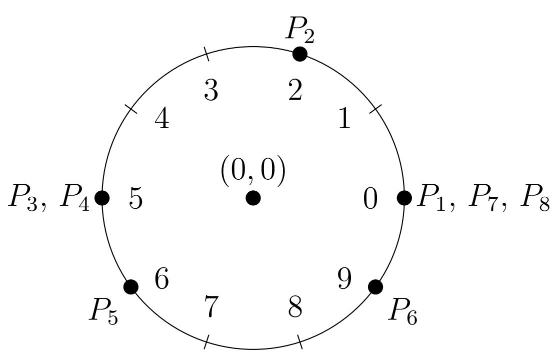
Explanation of Output for Sample Input

Andrew drew the following diagram.



The origin lies strictly inside the triangle with vertices P_1, P_2, and P_5, so $(1, 2, 5)$ is a good triplet. The other five good triplets are $(2, 3, 6)$, $(2, 4, 6)$, $(2, 5, 6)$, $(2, 5, 7)$, and $(2, 5, 8)$.

La version française figure à la suite de la version anglaise.