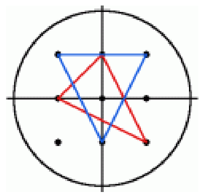
Project Euler #184: Triangles containing the origin.

HackerRank

This problem is a programming version of Problem 184 from projecteuler.net

Consider the set I_r of points (x, y) with integer co-ordinates in the interior of the circle with radius r, centered at the origin, i.e. $x^2 + y^2 < r^2$.

For a radius of 2, I_2 contains the nine points $(0,0)$, $(1,0)$, $(1,1)$, $(0,1)$, $(-1,1)$, $(-1,0)$, $(-1,-1)$, $(0,-1)$ and $(1,-1)$. There are eight triangles having all three vertices in I_2 which contain the origin in the interior. Two of them are shown below, the others are obtained from these by rotation.



For a radius of 3, there are 360 triangles containing the origin in the interior and having all vertices in I_3 and for I_5 the number is 10600.

How many triangles are there containing the origin in the interior and having all three vertices in I_r?

Input Format

The only line of every test file contains a single integer - r.

Constraints

$2 \le r \le 10^6$

Output Format

Output a single integer - an answer to the problem modulo $10^9 + 7$

Sample Input 0

```
2
```

Sample Output 0

```
8
```

Sample Input 1

```
3
```

Sample Output 1

```
360
```

Sample Input 2

```
5
```

Sample Output 2

```
10600
```