Problem 1510: Stone Game IV

Problem Information

Difficulty: Hard
Acceptance Rate: 59.53%
Paid Only: No
Tags: Math, Dynamic Programming, Game Theory

Problem Description

Alice and Bob take turns playing a game, with Alice starting first.

Initially, there are `n` stones in a pile. On each player's turn, that player makes a _move_ consisting of removing **any** non-zero **square number** of stones in the pile.

Also, if a player cannot make a move, he/she loses the game.

Given a positive integer `n`, return `true` if and only if Alice wins the game otherwise return `false`, assuming both players play optimally.

Example 1:

Input: n = 1 **Output:** true **Explanation:** Alice can remove 1 stone winning the game because Bob doesn't have any moves.

Example 2:

Input: n = 2 **Output:** false **Explanation:** Alice can only remove 1 stone, after that Bob removes the last one winning the game (2 -> 1 -> 0).

Example 3:

Input: n = 4 **Output:** true **Explanation:** n is already a perfect square, Alice can win with one move, removing 4 stones (4 -> 0).

Constraints:

* `1 <= n <= 105`

Code Snippets

C++:

```cpp
class Solution {
public:
bool winnerSquareGame(int n) {


}
};
```

Java:

```java
class Solution {
public boolean winnerSquareGame(int n) {


}
}
```

Python3:

```python
class Solution:
    def winnerSquareGame(self, n: int) -> bool:
```