After removing the step 3 from the old game rule the whole thing became much simple and the game is now much balanced.

Old Game Rules

R = robber, C = cop, N = number of rows, K = number of columns, m = multiplicity

1. Robbers placed randomly
2. Cops placed randomly
3. ~~Venerable cops are removed~~
4. Robbers move
5. Venerable robbers are removed
6. Cops move
7. Venerable cops are removed
8. Repeat from step 4, until either one of them is left on the board.

Multiplicity

The multiplicity required to catch the robbers is such that

$$m \times C \geq R; \ m \leq 9$$

If $m \leq 5$,

$$m \times (C - 1) > R; \ m \leq 9$$

As for such m one more cop is required as compared to its higher values. But there are some exceptional cases for $m = 1 \ and \ 2$, which are shown below.

Exceptional Values of Multiplicity (m) less than 3

```
// for some exceptional condition if multiplicity(m) = 1, 2
int FindMinM(int c, int r, int n, int k)
{
        int empty = n*k - (c+r);

        // 3
        if( r >= 2*n && c%n == 0 )  return 3;
        if( r > 2*n  && empty >= n - r%n ) return 3;

        // 2
        if( r >= 8) return 2; // diagonal

        if( r >= n && c%n == 0 ) return 2;
        if( r > n  && empty >= n - r%n ) return 2;
        if( r < n  && c < 2*r && empty >= n + (n - r) + n - (c/2) ) return 2;

        // 1
        return 1;
}
```