Computational Number Theory
Programming HW 4

Due Date: 06/11/2022

Implement the Tonelli-Shanks algorithm for the following:

Input: The input is a csv file with each line having a pair a, p (separated by commas) with p prime and $0 < a < p$, see the sample input file. The number of test cases will be at most 100; each prime will be at most 10 digits long. A sample input file is attached.

Output: For each pair (a, p), print the smallest positive integer x such that $x^2 \equiv a \pmod{p}$, if it exists, and print 0 otherwise. Print each output on a new line to the standard output (screen).

Output for the given sample input file (inputSquareRoots.csv):

```
16
78
0
502
456
0
212022
2352359
84561442
134304
```