1. Need to find the inverse of 122 mod 343 use x euclidean algo
343=2*122+99
122=1*99+23
99=4*23+9
23=3*7+2
7=3*2+1

Then reverse this process backward
1=7-3*2
=7-3*(23-3*7)
=-3*23+10*7
=-3*23+10*(99-4*23)
=-43*23+10*99
=-43*(122-1*99)+10*99
=-43*122+53*99
=-43*122+53*(343-2*122)
=-149*122+53*343

The we find the inverse is -149 we multiply -149 on both side then we get x=3*-149+2*343=239.

2. My id number is 112889478, so it is not invertible since gcd(id,2^64))!=1
The next number that is invertible under 2^64 will be 1128894779

a=112889479 , and we want to find a*x=2018 mod 2^64
The same idea we need to find the inverse of a with mod 2^64.
The answer from sage is 10282407867830009742

Adn u need the following code d,u,v=xgcd(112889479,2*64)
Then x=mod(u*2018,2^64)
Then x=10282407867830009742

3. The unit group of Z/16Z should be all the numbers that is relative to 16.
{1,3,5,7,9,11,13,15}
And zero divisors will be
{2,4,6,8,10,12,14}

4. The unit group of Z/15Z is {1,2,4,7,8,11,13,14}
And the zero divisor for this ring will be {3,5,6,9,10,12}