Effectively, we are given 3 modular congruence equations with 2 unknowns (g and password (say X)), of the form for i=1,2,3.

Also, since p gives rise to a multiplicative group, the existence of a multiplicative inverse for every element is always guaranteed. We make use of this fact to perform indirect divisions or substitutions in the above equations (i.e. division equivalent to multiplication by multiplicative inverse).

So, we eliminated X and formed 2 equations by substituting it from one into the other as:

--> putting into equation 2 gives

Similarly, obtain .

Now we noticed that the hcf of the 2 powers of g in these equations is 1.

So we can find x,y such that (Using the extended Euclidean algorithm). Finally, using the exponentiation property of modular congruences, we can get the equation .

Hence, we found the exact value of g by comparing the digits already given. From equation 1 we obtained X = password.

Answer Password: **3608528850368400786036725**