4. (25%) This problem is an example of *universal hashing*, a strategy for picking hash functions for a hash table randomly so that no input always exhibits bad hashing behavior.

   Let p be a prime number. I want to hash pairs of numbers (x, y), where x and y are always between 0 and $p - 1$ inclusive. I decide to use a chained hash table with hash function

   $$h_{a,b}(x, y) = (ax + by) \bmod p$$

   where a and b also lie between 0 and $p - 1$.

   (a) abc