**Hash Tables & Hash Functions (Course 2 Week 4 Quiz) (100% on first attempt)**

1. 1012. When using direct addressing, we need to cater enough space in the array for all digits (0-9) for every digit.
2. h(x) = x mod 1000. Universe has about 1012 digits. For every 1000 digits, there will be a collision in one of those chains. Hence, the maximum length of each chain would be 1012/ 103 = 109
3. Hash integers from 0 <= x <= 106 . 1 000 003 is a good choice for p, since it is presumably prime, and it is greater than the largest element in our universe, which limits the possibility of a collision to be solely dependent on m, the cardinality of our hash space.
4. First, add (1 000 000) to each integer and get the range of integers between 0 and

2 000 000. Then use the universal family for integers with p = 2 000 003.

**Practice Quiz (Course 2 Week 4)**

1. 107 when using direct addressing.
2. O(|Text| + |Pattern|



