Report

一. Insertion Sort

1. CPU (included clock)：2.3 GHz Intel Core i5
2. RAM：8 GB 2133 MHz LPDDR3
3. 30分鐘最多能排序多少筆資料：How many numbers can be sorted in 30mins:
   A: 在每個數字介於1~513705之間的情況下，三十分鐘內最多大約可以排序513705個數字 （不含I/O的時間）。 一開始我先排序12500個數字，並使用clock（）函數來記錄sorting的起始時間（最後有除以CLCK_PER_SEC），得到耗時約1.06578 秒的結果，再來我用1800（三十分鐘的秒數）除以1.06578並求得此數的平方根（因為time complexity是O(n^2)）得到約41.多的結果，於是我就將一開始的12500*41.多得到513703這個數字，再經過微調測出三十分鐘內約可排序513705個數字的結果。

二. Prime

1. Time Complexity of your algorithm: O($\sqrt{n}$), n is the input number.
2. What is the limit of your input number?: 64bits integer
3. The largest prime that your algorithm can find within 30 minutes:
   A: 18446744073709551557 is the maximum prime in the range of 1~18446744073709551615. My program spent 41.5163 secs to find this number. It starts to test whether a number is a prime from the upper bound of the range, which is 18446744073709551615, and ends when a prime is found which is the largest prime of the range. I modify the algorithm from Q1 so that once a number is found non-prime, the algorithm won't try to find all the other factors of the number like what it does in Q1 and just carries on testing the next number.