COMP3121-Ass1-Q1

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Q1.

a)

Firstly, go through all of $\binom{n}{2}$ pairs $((A[k], A[m]), k < m)$ of distinct integers in A; compute the sums $A[k^2 + m]$ for all $1 \leq k < m \leq n$ and put the set of integers (k, m, $k^2 + m$) in an array of size $n(n-1)/2$. Similarly, compute the sums $A[k + m^2]$ for the same condition and put the set of integers in a different array of size $n(n-1)/2$. Then, concatenate and sort the two arrays based on the third values ($k^2 + m$ and $k + m^2$) in time $O(n^2 \log_2 n^2) = O(n^2 \log n)$. Finally, go through the sorted array and determine if a number appears in it at least twice and then the four integers are all different values(m, s, p, k).