COMP3121-Ass1-Q3

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Q3.

Firstly, sort the array in time $O(n \log n)$. Then, for each pair (L_k, U_k) ($1 \leq k \leq n$, we can use binary search to find the index of the:

- First element with value no less than L_k
- First element with value greater than U_k

Then, the difference between these indices is the answer for the pairs. Each binary search takes $O(\log n)$ and there are n pairs of (L_k, U_k). So, searching for n pairs takes $O(n \log n)$ Hence, this whole process takes $O(n \log n)$.