Finding Outliers

Given N samples of data in an array $x = (x_1, x_2, \ldots, x_N)$, find the following.

1. Create an interval that ranges from the 25th percentile of x to the 75th percentile of x, denoted as $[l, u]$ (lower bound and upper bound of the interval)
2. Given a constant $\alpha > 1$, find the entries in x that lie outside $[\alpha l, \alpha u]$, and sort them ascendingly.

Input Format

- An array x of N floating-point numbers
- A floating-point constant $\alpha > 1$

Output Format

Output the outliers that lie outside the interval $[\alpha l, \alpha u]$, sorted in ascending order.

Constraints

- $1 \leq N \leq 100,000$
- $1 < \alpha \leq 5$
- $-1000 \leq x_i \leq 1000$

Sample Input

```
x = [1, 2, 3, 4, 5, 10, 15, 20, 25, 100]
alpha = 2.0
```

Sample Output

```
[1, 2, 3, 4, 5, 100]
```

Implementation

Goal: Fill in the following function:

```
def find_outliers(x: Array, alpha: float) -> Array:
    ...
    return ... # Return the sorted outliers
exec("\n".join(iter(input, "#Exit"))) # Don't remove this line
```