Individual Analysis Report — Partner’s Algorithm (MinHeap)

Student (B): Shakalova Diana
Partner (A): Nurzhaina Kuralbay
Course: Assignment 2 (Pair 4 — Heaps)

1. Algorithm Overview

MinHeap: array-based binary heap; operations insert, peekMin, extractMin, decreaseKey, buildFrom, merge.

2. Complexity

peek O(1); insert/extract/decreaseKey O(log n); buildFrom Θ(n); merge via heapify Θ(n+m).

3. Correctness

Heap property a[parent(i)] ≤ a[i]; maintained by siftUp/siftDown; decreaseKey only upward.

4. Code Review

Generics, centralized comparisons/swaps, heapify; suggest index map for decreaseKey(key,new), docs on non-stability.

5. Empirics

Use docs/performance-plots/heaps.csv; plot n vs nanos; expect ~ n log n.

6. Conclusion

Correct, matches theory; ergonomic improvements possible.