

# Individual Analysis Report — Partner's Algorithm (MaxHeap)

**Student (A):** Nurzhaina Kuralbay

**Partner (B):** Shakalova Diana

**Course:** Assignment 2 (Pair 4 — Heaps)

## 1. Algorithm Overview

MaxHeap: array-based binary heap; insert, peekMax, extractMax, increaseKey, buildFrom.

## 2. Complexity

peek  $O(1)$ ; insert/extract/increaseKey  $O(\log n)$ ; buildFrom  $\Theta(n)$ .

## 3. Correctness

Heap property  $a[\text{parent}(i)] \geq a[i]$ ; maintained by siftUp/siftDown; increaseKey only upward.

## 4. Code Review

Clear generics, metrics; suggest locator map for key updates; optional primitive versions.

## 5. Empirics

Use CSV; expect  $\sim n \log n$ .

## 6. Conclusion

Correct and efficient; improvements for ergonomics possible.