

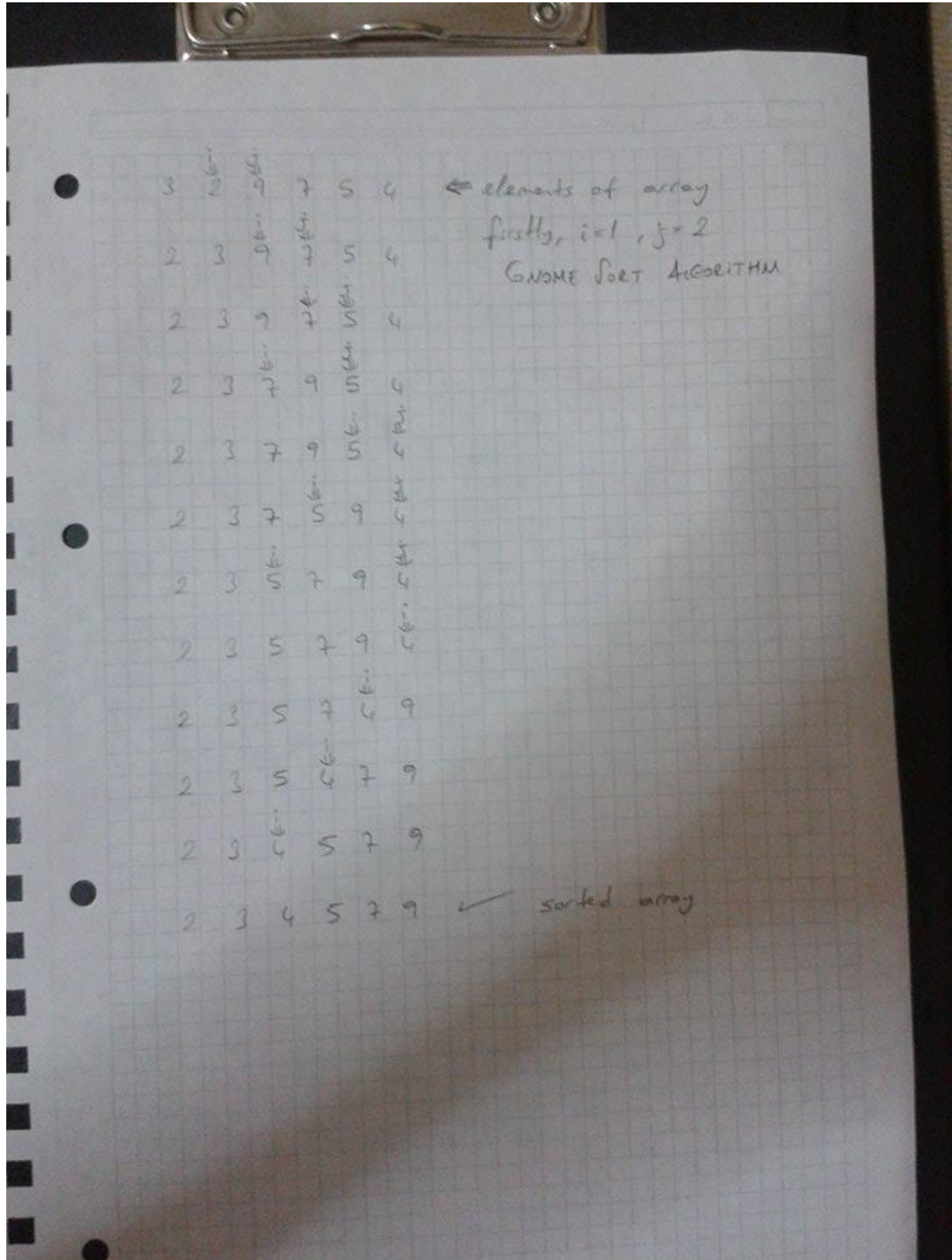
PART A

1. Running time of radix sort algorithm with different N values:

```
root@conquerrrr:~/Masaüstü/algo_3/partA# g++ Source.cpp
root@conquerrrr:~/Masaüstü/algo_3/partA# ./a.out 100
Running Time: 0.000317 seconds
root@conquerrrr:~/Masaüstü/algo_3/partA# ./a.out 1000
Running Time: 0.002993 seconds
root@conquerrrr:~/Masaüstü/algo_3/partA# ./a.out 10000
Running Time: 0.018617 seconds
root@conquerrrr:~/Masaüstü/algo_3/partA# ./a.out 100000
Running Time: 0.1502 seconds
root@conquerrrr:~/Masaüstü/algo_3/partA# ./a.out 1000000
Running Time: 1.49906 seconds
root@conquerrrr:~/Masaüstü/algo_3/partA#
```

We expected to obtain that complexity of radix sort algorithm is $O(n*k)$, it happened according to result of our program.

2. Gnome Sort Algorithm: We have learned how to gnome sort algorithm works basically by using sample array.



- [illegible]

The most important feature of counting sort using as intermediate step of radix sort is being stable sorting algorithm. Reason of using as intermediate step of radix sort algorithm is that. Therefore, sorting algorithm that will use as intermediate step of radix sort algorithm should be stable algorithm.(A sorting algorithm is said to be stable if two elements with equal value should appear in the same order in sorted output as they appear in the input unsorted array). Also gnome sort and freezing sort algorithms are stable. As a result, both of them can be used as intermediate step of radix sort algorithm.

PART B.

1. Complexity of heap sort algorithm is $O(n \cdot \log n)$

```
root@conquerorrr:~/Masaüstü/algo_3/partB# g++ Source.cpp
root@conquerorrr:~/Masaüstü/algo_3/partB# ./a.out 1 10
in PART B-1
Running Time: 5e-06 seconds
root@conquerorrr:~/Masaüstü/algo_3/partB# ./a.out 1 100
in PART B-1
Running Time: 5.4e-05 seconds
root@conquerorrr:~/Masaüstü/algo_3/partB# ./a.out 1 1000
in PART B-1
Running Time: 0.000722 seconds
root@conquerorrr:~/Masaüstü/algo_3/partB# ./a.out 1 10000
in PART B-1
Running Time: 0.006735 seconds
root@conquerorrr:~/Masaüstü/algo_3/partB# ./a.out 1 100000
in PART B-1
Running Time: 0.066618 seconds
root@conquerorrr:~/Masaüstü/algo_3/partB# ./a.out 1 1000000
in PART B-1
Running Time: 0.95101 seconds
root@conquerorrr:~/Masaüstü/algo_3/partB#
```

2. Result of tournament:

```
root@conquerorrr:~/Masaüstü/algo_3/partB# ./a.out 2
in PART B-2
Total Cp of A: 50477419
Total Cp of B: 50532277
Winner of Tournament is Clan B
root@conquerorrr:~/Masaüstü/algo_3/partB#
```