

Exercise 3

Task 1

Sort the array $[2, 8, 13, 5, 7, 16, 3, 12]$ using Quicksort.

Task 2 (Slides 53 and 58)

Show that for the n -th harmonic number H_n the following inequalities hold:

$$\ln(n+1) \leq H_n \leq \ln(n) + 1.$$

Hint: $\ln(n) = \int_1^n \frac{1}{x} dx$.

Task 3

Sort the array

$$[7, 3, 8, 1, 5, 2, 4, 6]$$

using Standard Heapsort and then sort it using Bottom-up Heapsort. How many comparisons do you need in each case?

Task 4

Show Jensen's inequality (slide 8).