Concurrency — Exercise 1
Amdahl's Law and Speed-up

Prof. Dr. Oliver Haase

Problem 1

Assume 1% of the runtime of a program is not parallelizable. How much speed-up can be achieved by execution on 64 cores, assuming there is no additional overhead for the parallel execution?

Problem 2

This time, assume the program above uses a broadcast operation that incurs an overhead that depends on the number of used cores, P. This overhead is $0.0001 \cdot P$. For which number of cores do you get the highest speedup?

Problem 3

Write a simulation program that can be configured with (1) the fraction F of the serial part and (2) the number of processors P, and that simulates the execution time by spending a fixed time in the serial part and a time depending on P in the parallelizable part. Use the program to simulate a number of representative points on the graphs for speed-up according to Amdahl, as seen in the lecture.

Have fun and good luck!