Programming Techniques for Scientific Simulations
Exercise 5

HS 10
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Problem 5.1   Cache effects

Write a program to determine the cache sizes of your computer. To that end, write a program that

1. creates an array of numbers,

2. repeatedly loops over the array, incrementing every n'th element,

3. and calculates the time per operation. You can measure the execution time using the `gettimeofday(...)` function. You should probably repeat the measurement several times in order to get a stable result.

Repeat this for different array sizes and step sizes n. Plot the calculated throughput versus array size for each value of n. Identify the size(s) of your computer's cache(s). Can you see an effect of the cache line size and/or cache associativity?

Problem 5.2   Penna model I

The aim of this exercise is to introduce the Penna model. Read the paper by Penna (T.J.P. Penna, J. Stat. Phys. 78, 1629 (1995)) and formulate the stated concepts in your own words. What are the features which all the individuals have in common? Which features are different? How would you represent an individual in your code? **DO NOT WRITE ANY CODE YET!**