ETH
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Programming Techniques for Scientific Simulations Exercise 3

HS 15
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Problem 3.1 The Simpson Collaboration

Work together in a team on the Simpson integration library. The idea is to learn to collaborate on a project.

1. team up with a partner, preferably one with a machine running a different OS
2. create a joint project on GitLab
3. one of you commits the main file which calls the integration routine and the other the header and source files for the Simpson integration
4. jointly write a make file which builds the library and links it to the main executable
5. confirm that the whole project, building and executions, works on both machines

Problem 3.2 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 N numbers
2. repeatedly loops over the array, incrementing every n'th element
3. calculates the time per operation (you should repeat the measurement several times in order to get a stable result)

Repeat this for different array sizes N 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?