

## **FYS-4096 Computational Physics, extra work (max. 21 XPs)**

In case \* your course points are between 120 and 139 (you are about to fail the course) and \* you've submitted both projects 1 and 2 during the course, you can complete and submit this extra work to try to increase your grade to 1.

Read this entire document before you start working on these extra exercises.

Return your solution to project `extra` under your GitLab group for this course by June 3rd 11:59 pm. **Late submissions will not be accepted.**

Tag the final version with `final` keyword, and make sure to include a file `problems_solved` in the repository. The `problems_solved`-file should be a comma separated list of problems you have solved.

### **Problem 1, Computational physics: hardware (max. 7 XPs)**

Write a 1-2 page report describing different processing units (CPU, GPU, accelerators such as Xeon Phi) and their use in computational physics. Provide examples which tasks are suitable for each of these, how these processing units can/could be used together, and review possible difficulties in utilising them for physics simulations.

### **Problem 2, Computational physics: project timetable (max. 7 XPs)**

Your boss wants you to model how certain multi-wall carbon nanotubes absorb light in order to use them as radiation absorbing material for stealth vehicles. She's asking for a preliminary project schedule, and you're going to deliver!

Write a 1-2 page report describing typical tasks in a numerical experiment and what aspects one should take into account when creating the preliminary schedule.

### **Problem 3, Computational physics: project costs (max. 7 XPs)**

A client wants you to model how their new flying saucer appears on a radar, i.e., to compute its radar cross-section, and they're asking for a price estimate.

Write a 1-2 page report describing what aspects one should take into account when computing a price estimate of numerical experiments, and give some rough

guidelines for computing the estimates. Consider aspects such as man-hours (software development, modeling, ...), software costs, supercomputer costs, unforeseeable expenses, profit margin, ...