Course Analysis: SF2568, Parallel Computations for Large Scale Problems, 2020

Course Data

- Parallel Computations for Large Scale Problems, SF2568, 7.5 ECTS
- Period 3/4, 2019/2020
- Responsibility: Michael Hanke
- Teaching hours:
  - Lectures/exercises: 28 h
  - Computer labs: 2 h
- Registered students: 27 + 7 PhD students
- Literature: Wilkinson/Allen, Parallel programming 2nd ed., lecture slides
- Credits:
  - homework+"mid-term quiz": 4.5 ECTS
  - project: 3 ECTS
- Examination index (according to VIS): 88,9%

Aim The present course is intended to provide an introduction into the basic ideas and methods used for developing parallel applications. We have been concentrated on distributed memory architectures. Applications include simple numerical algorithms, image processing, sorting, algorithms on graphs, as well as more advanced numerical techniques.

A great deal of work was spent in hands-on exercises. For those who are not comfortable with C or Fortran, a short introduction to C has been provided.

The course includes a larger project (almost) freely chosen by the students.

Changes compared to the last year An introduction on related problems of sustainable development, in particular Green Computing, has been provided. This aspect of computing seems surprisingly new to many students.

Conclusions The difficulty of the course was considered to be just right this time. The homeworks came to the point and their level was just right. The examination by homeworks/mid-term quiz has been well-received.

The introduction to C was considered very useful! It was emphasized that more time should be spend on this subject.

There is a wide variety of programming experience. This seems to be the major obstacle for how much time is spent in the homeworks. Another obstacle is the use of a production environment (PDC) in contrast to computer labs in a learning environment. The use of a professional environment is, however, one of the key parts of this course.

The course book is out of print and, thus, only available via libraries. Therefore the Lecture Notes (slides) have been formed in such a way that they can be used as the only reference for basic knowledge. Unfortunately, a good replacement textbook could not be found. This becomes more urgent!

The examination by projects (report + workshop) was very well received. In particular, the project part including the revision by reports and workshop was highly estimated. A problem mentioned was the presentation via electronic distance tools. This was not well perceived because this prevented certain feedback and discussions. Some students found it difficult to write good reports. However, one of the course goals is to "[] present the results both orally and in writing in a scientific manner." This seems often to be overlooked.

Teaching The teaching was done by lectures and computer labs in period 3. Period 4 consists of two introductory lectures, scheduled and unscheduled personal consultations, and project presentations.

Examination The examination based on homework problems and a mid-term quiz. The project was examined by a written report and an oral presentation in a "colloquium".

Prerequisites With the exception of minor programming skills, no problem. However, a great plus would be if the students are comfortable with C from the beginning.

Planned changes I will add a new lecture and/or exercise for the C-introduction.

Find a new course book!

One should think about rescheduling of the C++ course and this course. If they would have been taken in the opposite order (C++ before Parallelization), it would simplify this course a lot.

Grading Essentially no problems. However, some more explanations to the project part might be necessary. The mid-term quiz intended to check the theoretical knowledge was welcomed, however the time frame was often considered too short.