Institute of Computer Science
Department of Mathematics and Computer Science

Freie Universität Berlin

Algorithms and Programming IV

Course Concept and Organization

Summer Term 2021 | 12.04.2021

Barry Linnert

Target Group of this Course

- You are in the fourth semester of your bachelor's degree in computer science or computer science for a teaching profession.

- You have attended the modules "Functional Programming", "Concepts of imperative and object-oriented programming" and the course "Computer Engineering II: Computer Architecture", "Operating and Communication Systems" in the module "Computer Architecture, Operating and Communication Systems".

- You have no previous knowledge in the area of parallel and distributed programming.

Integration of the Course into the BSc. Programme

Semester	Algorithmen und Programmierung	Technische Informatik	Theoretische Informatik und Praktische Informatik	Mathematik für Informatik	Wissenschaft	Anwendungs-bereich	ABV	SWS
1. FS 28 LP	Funktionale Programmierung (9 LP)	Rechnerarchitektur, Betriebs- und Kommunikations-systeme (10 LP)		Logik und Diskrete Mathematik (9 LP)			ABV (5 LP)	18
2. FS 30 LP	Objekt-Orientierte Programmierung (8 LP)		Grundlagen der Theoretischen Informatik (7 LP)	Lineare Algebra für Informatik (10 LP)				20
3. FS 29 LP	Algorithmen, Datenstrukturen und Datenabstraktion (9 LP)		Auswirkungen der Informatik (5 LP)	Analysis für Informatik (10 LP)			ABV (5 LP)	18
4. FS 31 LP	Nichtsequentielle und verteilte Programmierung (9 LP)		Datenbank-systeme (7 LP) Software-technik (10 LP)		Wissenschaft-liches Arbeiten in der Informatik (5 LP)			18

Learning Objectives of this Course

- Students should be able to differentiate relevant terms in this field.

- Students should be able to know and apply relevant interaction paradigms for concurrent, parallel and distributed programming to a given problem.

- Students should be able to evaluate relevant interaction paradigms for concurrent, parallel and distributed programming, and to understand they advantages and disadvantages.

Mainly Used Text Books

- Rauber, Thomas, and Gudula Rünger: Parallele und verteilte Programmierung, Springer-Verlag, 2013
- Andrews, Gregory R.: Foundations of multithreaded, parallel, and distributed programming, Vol. 11, Reading: Addison-Wesley, 2000.
- Quinn, Michael J.: Parallel Programming in C with MPI and OpenMP, McGrawHill, 2003

- Coulouris, Dollimore, Kindberg, Blair: Distributed Systems: Concepts and Design, Addison-Wesley, May 2011
- Andrew S. Tanenbaum, Maarten van Steen: Distributed Systems: Principles and Paradigm, Pearson Education Limited, 2013

Results from Evaluation last Semester

- We received average results in our course evaluation.
  - Exception: References to other courses and further studies, application-orientation
- Positive:
  - Interaction
- Improvable:
  - Slides
  - C-Programming and practice sheet
  - Lecture is too slow, lecture is too fast
- Miscellaneous:
  - „Wer zu spät kommt, soll Kuchen mitbringen!“

Concepts of Non-Sequential and Distributed Programming

ORGANISATION

Course Structure

Lecture
Mon 2 to 4 PM / Fri 10 to 12 AM

Exercise / tutorial
Tue to Thu as selected in Whiteboard

Examination	Mon 19.07.2021, 2 to 4 PM **???**
Retake	Mon 11.10.2021, 2 to 4 PM **???**

Time Required for Attending this Course

Lecture	Time of attendence 60 h Pre- and postprocessing 30 h
Exercise / tutorial	Time of attendence 30 h Pre- and postprocessing 120 h
Examination	Exam preparation and examination 30 h

Organisational Setting

- You should be registered in Whiteboard (KVV): https://mycampus.imp.fu-berlin.de
  - In the WB/KVV you will find all information regarding the lecture and the exercise. You also use the WB/KVV for communication in case of questions about the lecture or exercise. Please do not ask questions by e-mail, but use the Forum in Whiteboard.

- You should be registered in Campus Management: https://www.ecampus.fu-berlin.de/
  - With your registration in Campus Management, you are bindingly registered for the module and, thus, for the examination.

Concepts of Non-Sequential and Distributed Programming

APL IV TEAM

Lecturer

- Barry Linnert
  - Betriebssysteme / Operating Systems (MSc)
  - Cluster Computing (MSc)
  - Projects and theses in the area of OS and High Performance Computing (HPC)

Exercise Group Leader – Tutorials

- Florian Alex

Tue 12:00 pm, 14:00 pm	Thu 10:00 am, 12:00 pm

- Alexander Korzec

Tue 8:00 am, 10:00 am	Tue 12:00 pm, 2:00 pm
Wed 8:00 am, 10:00 am	Wed 12:00 pm, 2:00 pm

Concepts of Non-Sequential and Distributed Programming

COURSE CONCEPT

Concept of Lecture

- We do not teach one programming language in the lecture, but you should understand the underlying concepts of programming languages.

- You will not learn programming during the lecture, but only when applying the insights within practical software projects. For example, we recommend that you participate in Open Source Software (OSS) projects.

Concept of the Exercise

- You will not learn programming in the exercise, but you will deepen concepts from the lecture using selected programming languages.

- You will work in small groups in the exercise. If you are working with an already experienced student, do not rest on these skills, but work together with the other student.

- Use the competence of the exercise group leaders to improve your understanding.

Mentoring – Learning Room

- The Mentoring program offers students accompanying help during all phases of their studies, among other things, in the form of supporting events, so-called learning rooms.

- They are allowed to ask all questions for understanding.

- Further information: http://www.mi.fu-berlin.de/stud/mentoring/inf/lernraeume/index.html#informatik

Concepts of Non-Sequential and Distributed Programming

ASSIGNMENTS

Criteria for the Confirmation of Regular and Active Participation

- **Regular participation** in the exercises is essential.
- Each student must work through **(n-1)** exercise sheets and receive **60% of the maximum possible scores** in all exercise sheets.
- There are nine exercise sheets and we provide an additional sheet, if needed.
- Each student has to **present** her/his **solutions at least twice**. Students should register with the tutor before the tutorial in order to be able to present. Without registration the tutor decides randomly.

Delivery of the Exercise Sheets

- Exercise sheets must be created in LaTeX! If you do not use the LaTeX template, 5 points will be deducted.
- The publication of the exercise sheets takes place on Mondays at 10 AM.
- The delivery of the exercise results is required on Mondays until 09:55 AM as PDF in the Whiteboard under Assignment.
- Please provide all your results in Whiteboard under Assignment. Practice sheets submitted after this date will not be considered.