Kiel University
Christian-Albrechts-Universität zu Kiel

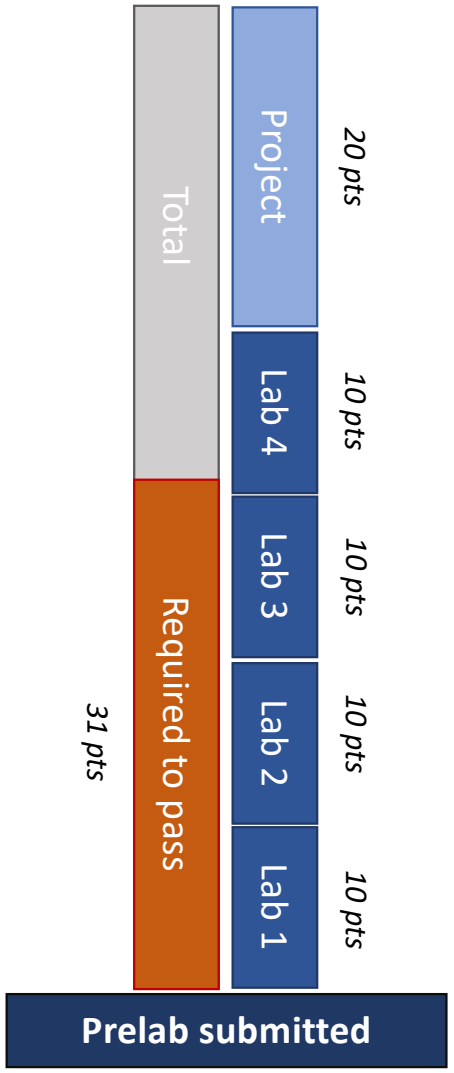
Research Group
Distributed Systems

Project Introduction

YOUR distributed system

If you remember the labs presentation…

- Submitting Prelab is mandatory
- You need 50% of the points
  - One lab is 10 points
    - Sometimes with bonus points
  - The optional project is worth 20 points
  - You get more than 30 points, you pass!



Course week	Date	Day	Lecture	Book	Lab notes
1	22.10.	Tuesday 14-16	Introduction pdf video	Ch. 1	PreLab open
	24.10.	Thursday 10-12	Communication pdf video	Ch. 4	Lab intro & Lab 1 open
2	29.10.	Tuesday 14-16	Processes & Arch. pdf video	Ch. 2.1, 2.3, 3.1	
	31.10.	Thursday 10-12	- (no lecture, no lab, Reformationstag)	-	PreLab due
3	5.11.	Tuesday 14-16	Mutual Exclusion, Election pdf video	Ch. 6.3, 6.4	
	7.11.	Thursday 10-12	- (no lecture)	-	Lab 1 due, Lab 2 open
4	12.11.	Tuesday 14-16	Naming pdf video	Ch. 5	
	14.11.	Thursday 10-12	Clock & Time I pdf video	Ch. 6.1	
5	19.11.	Tuesday 14-16	Clock & Time II pdf video	Ch. 6.2	
	21.11.	Thursday 10-12	Consistency & Rep. I pdf video	Ch. 7.1, 7.2	Lab 2 due, Lab 3 open
6	26.11.	Tuesday 14-16	Consistency & Rep. II pdf video	Ch. 7.3, 7.4	
	28.11.	Thursday 10-12	Consistency & Rep. III pdf video	Ch. 7.5, 7.6	
7	3.12.	Tuesday 14-16	Fault Tolerance I pdf	Ch. 8.1, 8.2	
	5.12.	Thursday 10-12	Fault Tolerance II	Ch. 8.3, 8.4	Lab 3 due, Project Intro & Lab 4 open
8	10.12.	Tuesday 14-16	Fault Tolerance III	Ch. 8.4 - 8.6	
	12.12.	Thursday 10-12	Applications I	-	
9	17.12.	Tuesday 14-16	Blockchain I	-	
	19.12.	Thursday 10-12	Present Project Ideas	-	Project Ideas Due
10	7.1.	Tuesday 14-16	Blockchain II	-	
	9.1.	Thursday 10-12	Blockchain III	-	Lab 4 due
11	14.1.	Tuesday 14-16	Applications II	-	
	16.1.	Thursday 10-12	Applications III	-	
12	21.1.	Tuesday 14-16	Paxos	-	
	23.1.	Thursday 10-12	Recap	-	Project Due
13	28.1.	Tuesday 14-16	Demos & Presentations	-	
	30.1.	Thursday 10-12	AMA	-	

Goal

- Pick a topic in/related to the course
  - And make a small project from it
  - How much? Slightly more than a normal lab
- 20 points
  - Project idea and its presentation: 5 points
  - Project itself and final presentation: 15 points

Why

- Get experience in defining your tasks yourself
  - Estimate complexity, feasibility, and workload

- Key learning experience
  - For bachelor and master thesis
  - For projects
  - For real-life
    - You: Let's do the following
    - Boss: How long will it take?
    - You: One week.
    - *Two weeks later.* You: Boss, there is a problem…

Part 1: Project Idea

- Pick a topic, research it a bit
- Present it in the course (before Christmas)
  - 5 minutes, suggested: 4 slides max
  - Content
    - Motivation
    - Goal
    - Approach
    - Expected Result
      - For 5 points we do this, for 10 points we do this, for 15 points we do this…
        - You need to state these three milestones! They will be used for the final grade
      - Add challenging scenarios to make it worth 15 points!

Part 2: Project work

- Do the work (after Christmas break)

- Present it (10 to 15 min)
  - Motivation
  - Restate goals
  - Results (goals achieved)
  - Demo / Video
  - Approach
  - Lessons Learned
  - …

Timeline

Item	Date	Christmas break
Project Idea	19th of December	Before!
Lab 4	9th of January	After
Project	23rd of January	After

Grading criteria

- Project proposal (5 points)
  - Presentation
  - Level of ambition (not too much, not too little)

- Project (15 points)
  - Quality
  - Presentation
  - Goals reached vs goals claimed
    - 5 points milestone, 10 points milestone, 15 points milestone?

Topic ideas

- Implement an algorithm of the lecture as part of the blackboard
  - Active replication (with Sequencer)
  - Quorum Protocol
  - Byzantine Generals: n > 1 dishonest nodes
  - Implement eventual consistency requirements: read-your writes when you switch replicas et.
  - Dining philosophers
  - 2PC, 3PC, Raft, Paxos…
  - …
- Smart contracts in blockchain
  - Ethereum, Hyperledger etc.
- Play with Hadoop, Apache Spark, …
- Your own topics and ideas are very welcome, too!!

More directions?

- Open Source stuff in Distributed Computing
  - https://opensource.fb.com/#data
  - https://opensource.google.com/projects/list/cloud
  - https://github.com/rShetty/awesome-distributed-systems#opensource
  - …

Proposed topics are…

- …Just hints!
  - Not specific on purpose
  - We want you to make your interpretation of the topic
  - Allows for multiple groups on similar topics
- Again, your own ideas are very welcome!