Exams

Structure:

1. Traditional exam: classic written test with 6 problems from exercises to theory questions. Solution valid for everyone for the second call
2. Preliminary Exam + Research Project: exam in first part of May, shorter exam than the Complete. Research project to be completed by the end of June. If one is failed you have to attend the traditional exam. The project could be in pairs and also with another professor of the same course. Project evaluation will be done by the professor of the project, the exam is evaluated by your professor.

Deliverables

Somethings you developed, create a repository with the code, write a report and a presentation. The project is an activity which idea is developed together with the professor so there are weekly/biweekly meetings.
The report is few pages long(5 pages expected) it is used to put result and the description of something that helps understanding the project. The presentation is used to present the projects and the results.
The projects is a Research-Oriented effort, they are High-Risk High-Return, most are project with high value and the implementation is not given at the start. Each project is structured to become a scientific paper if done well(Difficult but with high rewards). Could be collaborations with other universities/companies. This can lead to thesis(not automatic or required), extension of the thesis.

Main Topics(Research areas)

- Edge Generative AI(We are talking about architectures, moving Generative AI on the edge(Smartphone, Desktop)). Attention to new models developed to be executed on the edges. Practical implementation of these situations.
- AI based Predictive Systems(Analyse text, understand the context and predict what happens next). Idea is to understand how to integrate these application in the architecture.
- FPGA-based acceleration design: Develop an accelerator with FPGA, goal is to have a significant speedup of the process, rewrite the application and architecture to optimise it
- HW/SW System Co-design
- System Design for High-Performance Memory Subsystems(Block more oriented on acceleration)
- Superscalar RISC-V Architectures on FPGA prototype
- High-Performance Regex Matching with Vector or Spatial Architecture(Implements acceleration using a processor-based architectures)

- Static-Parallelization Techniques on VLW,AIE
- System Design for future Datacenter Networks
- System Level HW/HW-Assisted Security

Projects Ideas(Examples)

- Porting an existing LLM into a mobile application, with all the requirements and integrations with the frameworks
- Prompt engineering and fine tuning of a domain specific LLM
- Creation of domain specific predictive systems for text and/or images
- Extend the functionality of cloudSim to work with accelerators(GPUs and FPGAs)
- Simulator with Gen5 of a NOC-based architecture with dynamic security regions
- Implementation of HW sandboxes for secure FPGA-based architectures

What should be done now

Think about the work to do(Traditional or Project)
Decision is by March 8 2024
See list of the projects on WeBeep
Select potential projects ideas by March 5 2024(Problem is that there could be an over-application on the same topics, so there could be negosiation).
Then decide if starting the project and work on it. There will be a moment where decide if commit to the project or drop it by May 1 2024(This implies you can take also the first call of the traditional exam).
Preliminary test in the first part of May, cannot drop the project after doing the preliminary exam.