Digital Design & Computer Arch.
Preparing for the Final Exam

Prof. Onur Mutlu

ETH Zürich
Spring 2020
22 July 2020

Final Exam
August 21, 2020, 3pm
HIL F15, F41 & F61

Preparing for the Final Exam (I)

- 1. Study to understand the material and concepts. Understanding is the most important thing we will test for

- 2. Do the optional homeworks and understand them

- 3. Some questions on the exam will have similarity to optional homeworks and past exams. However, some questions on the exam will be different from those in the past exams and homeworks. Regardless, the questions will be designed to test your understanding of the material and the ability to think using that understanding

- 4. You can go over the lectures again to reinforce your understanding of the material. We would recommend this. As you know, all lecture videos are available from the course website:
  - https://safari.ethz.ch/digitaltechnik/spring2020/doku.php?id=schedule

Preparing for the Final Exam (II)

- **5.** All material we covered in the lectures and the labs can be part of the exam

- **6.** We have made past exams and their solutions available online on the course webpage

- **7.** You can opt for a German version of the exam. We do not recommend it, given that all contents of the course are taught in English
  - We will make an announcement about this in Moodle

- **8.** We will provide a detailed plan for the exam logistics (e.g., where you should sit)
  - We will keep you posted via Moodle

- **9.** As soon as the exam starts, read carefully the instructions in the first page of the exam paper

Final Exam Spring 2019

Family Name: First Name: Student ID:

Final Exam

Design of Digital Circuits (252-0028-00L)

ETH Zürich, Spring 2019

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Problem 1 (12 Points):	Boolean Algebra	
Problem 2 (20 Points):	Verilog	
Problem 3 (30 Points):	Finite State Machines (FSM)	
Problem 4 (20 Points):	ISA vs. Microarchitecture	
Problem 5 (20 Points):	Performance Evaluation	
Problem 6 (40 Points):	Pipeline (Reverse Engineering)	
Problem 7 (36 Points):	Tomasulo's Algorithm	
Problem 8 (30 Points):	Systolic Arrays	
Problem 9 (35 Points):	GPUs and SIMD	
Problem 10 (40 Points):	Reverse Engineering Caches	
Problem 11 (30 Points):	Dataflow	
Problem 12 (BONUS: 30 Points):	Branch Prediction	
Total (343 (313 + 30 bonus) Points):		

Examination Rules:

1. Written exam, 180 minutes in total.
2. **No books, no calculators, no computers or communication devices**. 3 double-sided A4 sheets of handwritten notes are allowed.
3. Write all your answers on this document; space is reserved for your answers after each question.
4. You are provided with scratchpad sheets. Do not answer questions on them. **We will not collect them**.
5. Clearly indicate your final answer for each problem. Answers will only be evaluated if they are readable.
6. Put your Student ID card visible on the desk during the exam.
7. If you feel disturbed, immediately call an assistant.
8. Write with a black or blue pen (no pencil, no green or red color).
9. Show all your work. For some questions, you may get partial credit even if the end result is wrong due to a calculation mistake. If you make assumptions, state your assumptions clearly and precisely.
10. Please write your initials at the top of every page.

Tips:

- **Be cognizant of time.** Do not spend too much time on one question.
- **Be concise.** You may be penalized for verbosity.
- **Show work when needed.** You will receive partial credit at the instructors' discretion.
- **Write legibly.** Show your final answer.

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