Digital Design & Computer Arch.

Preparing for the Final Exam

Prof. Onur Mutlu

ETH Zürich

Spring 2021

27 July 2021

Final Exam
August 27, 2021, 9am
HIL G15, G41 & G61

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
  - Solutions and discussion sessions are available in the course website
- 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/spring2021/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
  - Except those parts of the lectures that are explicitly mentioned as optional by professor Mutlu during the lectures
- 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 2020

Family Name: First Name: Student ID:

Final Exam

Digital Design and Computer Architecture (252-0028-00L)

ETH Zürich, Spring 2020

Prof. Onur Mutlu

Problem 1 (20 Points):	Boolean Circuit Minimization	
Problem 2 (40 Points):	Verilog	
Problem 3 (40 Points):	Finite State Machines	
Problem 4 (30 Points):	ISA vs. Microarchitecture	
Problem 5 (35 Points):	Performance Evaluation	
Problem 6 (45 Points):	Pipelining (Reverse Engineering)	
Problem 7 (50 Points):	Tomasulo's Algorithm	
Problem 8 (40 Points):	GPUs and SIMD	
Problem 9 (40 Points):	Caches (Reverse Engineering)	
Problem 10 (60 Points):	Branch Prediction	
Problem 11 (BONUS: 50 Points):	VLIW	
Total (450 (400 + 50 bonus) Points):		

Examination Rules:

1. Written exam, 180 minutes in total.
2. **No books, no calculators, no computers or communication devices**. 3 double-sided (or 6 one-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, red or any other 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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