4 ISA vs. Microarchitecture [30 points]

A new CPU has two comprehensive user manuals available for purchase as shown in Table 1.

Manual Title	Cost	Description
the_isa.pdf	CHF 1 million	describes the ISA in detail
the_microarchitecture.pdf	CHF 10 million	describes the microarchitecture in detail

Table 1: Manual Costs

Unfortunately, the manuals are extremely expensive, and you can only afford one of the two. If both manuals might be useful, you would prefer the cheaper one.
For each of the following questions that you would like to answer, decide which manual is more likely to help. *Note: we will subtract 1 point for each* ***incorrect*** *answer, and award 0 points for unanswered questions.*

1. [2 points] The integer multiplication algorithm used by the ALU.

   1. the_isa.pdf [2. the_microarchitecture.pdf]

2. [2 points] The program counter width.

   [1. the_isa.pdf] 2. the_microarchitecture.pdf

3. [2 points] Branch misprediction penalty.

   1. the_isa.pdf [2. the_microarchitecture.pdf]

4. [2 points] The ability to flush the TLB from the OS.

   [1. the_isa.pdf] 2. the_microarchitecture.pdf

5. [2 points] The size of the Reorder Buffer in an Out-of-Order CPU.

   1. the_isa.pdf [2. the_microarchitecture.pdf]

6. [2 points] The fetch width of a superscalar CPU.

   1. the_isa.pdf [2. the_microarchitecture.pdf]

7. [2 points] SIMD instruction support.

   [1. the_isa.pdf] 2. the_microarchitecture.pdf

8. [2 points] The memory addresses of the memory-mapped devices of the CPU (e.g., keyboard).

   [1. the_isa.pdf] 2. the_microarchitecture.pdf

9. [2 points] The number of non-programmable registers in the CPU.

   1. the_isa.pdf [2. the_microarchitecture.pdf]

10. [2 points] The replacement policy of the L1 data cache.

    1. the_isa.pdf [2. the_microarchitecture.pdf]

11. [2 points] The memory controller's scheduling algorithm.

    1. the_isa.pdf [2. the_microarchitecture.pdf]

12. [2 points] The number of bits required for the destination register of a load instruction.

    [1. the_isa.pdf] 2. the_microarchitecture.pdf

13. [2 points] Description of the support for division and multiplication between integers.

    [1. the_isa.pdf] 2. the_microarchitecture.pdf

14. [2 points] The mechanism to enter in a system call in the OS.

    [1. the_isa.pdf] 2. the_microarchitecture.pdf

15. [2 points] The size of the addressable memory.

1. `the_isa.pdf`
2. `the_microarchitecture.pdf`