FEW, Afdeling Informatica
Vrije Universiteit

Computerorganisatie
29 april 2003

(Voor Nederlands, z.o.z.)

Every correctly answered question is good for at most 1 point. The final grade is the sum of the grades for the questions. The midterm exam does not count.

1. According to Moore's law, the number of transistors on a chip doubles every 18 months. A state-of-the-art chip now has 50 million transistors of 0.1 micro diameter. What will the diameter of a transistor be in 3 years?

2. Using a drawing, show the difference between a superscalar architecture and a pipeline architecture.

3. LBA addressing uses 28 bits for a sector number within a partition. What is the largest disk parititon (in GB) that can be addressed with LBA?

4. Draw a circuit that computes the XOR function. Use only NAND gates.

5. What is the difference between a synchronous bus and an asychronous bus?

6. Give the optimal IJVM code for the following Java statement:
   I = 4 * (I – K + 5)

7. Many computers have a PSW (Program Status Word) with NZVC bits. Some instructions (e.g. ADD) change the values of these bits. Under which circumstances is the N bit set to 1? When is it set to 0? Also explain when the Z, V, and C bits are set each way.

8. What is the difference between internal fragmentation and external fragmentation?

9. What is the difference between a machine instruction and a pseudoinstruction?

10. Explain the use of a snooping cache. On what kinds of machines are snooping caches used?