

Name.....Pnr.....

Programme (circle the appropriate):  
DV F MN Fristående Distance

## **Exam, Computer Architecture**

Courses 1DT157, 1DT631, 1DT720, 1TT441  
Saturday 21/08/2004 at 9:00 am – 11:00 am

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### **Important information about this exam:**

Don't forget to circle the educational programme you are following. That will make it easier for us to report the results.

Answer every question with at most two sentences of normal length. Most questions can have even shorter answers, and some can be answered in a single word. Too long answers will mean a reduced score since what is being tested here is also the ability to discern relevant information.

**Write your answer in the space immediately below each question. Do not** use a separate sheet for answers.

Answers to open questions (of type "what is..." or "explain how...") must demonstrate an understanding beyond spelling out acronyms. For example, if the question is "What is DMA" the answer "Direct Memory Access" gets 0 points.

You may answer in English or in Swedish.

Note that there are questions on both sides of the sheets and that the exam begins on the other side of this sheet.

Each question can give at most 1 point. There are 30 questions in all. A pass requires 20 points, and an extra credit towards a higher grade requires 25 points.

Good luck!

1. What does it mean that an I/O unit is **memory mapped**?
2. A **RAID** disk has possibilities for a better data transfer rate than a single disk. Why?
3. How is the operand found if **indexed addressing** is used?
4. What is the **Hamming distance** between 101010100 and 001001010 ?
5. What information is contained in a **truth table** of a Boolean function?
6. What is gained by making a CPU **pipelined**? (Note: I do **not** ask you to explain what pipelining is. I just ask what the effect of it is and why it is worth the extra necessary hardware).
7. A computer stores the number 113 in a 16-bit word located at byte addresses 0 and 1 using a **big endian** system. What will be the content of byte address 1?
8. What is a **basic block** in an assembler program?
9. Explain how **amplitude modulation** works.
10. What is the function of the laser in a **laser printer**?

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11. Name one example of a code used for storing **texts**.
12. What does it mean that an ALU experiences an **underflow**?
13. What is meant by a **pipeline stall**?
14. In the MIC architecture the **MBR** register is only 8 bits wide. Why?
15. What is meant by **spatial locality** in connection with cache memories?
16. What is an **EEPROM**?
17. How many different results can be given by a **Boolean function**?
18. What is **MOS**? Spell out the acronym and explain briefly what kind of thing it is.
19. What is the advantage of a **set associative cache** over a direct mapped cache?
20. What is the difference between **negative logic** and positive logic?

21. The Mic-2 design improves over Mic-1 in (among other things) that it uses **prefetching**. What kind of thing is it that is being prefetched in Mic-2?
22. What do you call the program **language** that can be directly executed by a CPU?
23. What is the **path length** of an instruction?
24. What is **EPIC**?
25. What is the purpose of a **parity bit**?
26. What does a **D latch** do?
27. What is decided during **bus arbitration**?
28. Is **branch prediction** useful at all in a non pipelined CPU? Motivate briefly.
29. A **rewritable CD** cannot replace an ordinary hard disk. Why?
30. Why is **sign extension** used when a 32-bit signed integer is loaded into a 64-bit register?