

Tentamen i kursen Datorarkitektur - TDTS55, 2005-03-31, kl. 8-12
Du kan skriva på svenska eller engelska!

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Tentamen i kursen
Datorarkitektur - TDTS55
2005-03-31, kl. 8-11

Hjälpmedel:

Engelsk ordbok.

Supporting material:

English language dictionary.

Poänggränser:

Maximal poäng är 40.
För godkänt krävs sammanlagt
21 poäng.

Points:

Maximum points: 40.
In order to pass the exam you need a
total of minimum 21 points.

Resultat anslås:

2005-04-11

Results available:

2005-04-11

Jourhavande lärare:

Paul Pop, tel. 285628

Good luck !!!

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1. We have discussed three write strategies for cache memories: write-through, write through with buffered write, and copy back.
a) How do they work?
b) Which are their advantages and disadvantages?

(4p)

2. Consider the following sequence:

```
MUL R3,R4      R3 <- R3 * R4
SUB #1,R2      R2 <- R2 - 1
ADD R1,R2      R1 <- R1 + R2
BEZ TARGET
MOVE #10,R1    R1 <- 10
- - - - -
TARGET - - - - -
```

Transform this sequence in order to use delayed branching. Show how the original sequence and the transformed one are executed in a pipelined CPU, and illustrate the reduction of the delay (draw a figure which illustrates the corresponding pipelined execution).

(5p)

3. Describe the delayed load problem in the context of RISC architectures. Show by means of a simple example how the delayed loading problem is solved by the compiler.

(4p)

4. A superscalar architecture can have several policies for parallel instruction execution. Explain which data dependencies have to be considered for the following two execution policies:

- a) in-order issue with in-order completion;
b) out-of-order issue with out-of-order completion.

(4p)

5. What is the window of execution in a superscalar architecture? Discuss the importance of a window of execution, and what limits its size.

(4p)

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6. What are the characteristics of an Merced/Itanium architecture? What are the disadvantages of VLIW architectures that are solved by the Merced/Itanium architecture, and how are they solved?
(4p)

7. How are the parallel architectures classified according to Flynn? Describe and draw a diagram for each of the alternative architectures.
(5p)

8. Both array processors and vector computers are used for speeding up computations with vectors. What is the main difference between them?
(3p)

9. The MMX extensions to the Intel architecture try to improve the performance of multimedia applications. What is subword execution in this context? Explain how it works.
(4p)

10. The Crusoe processor provides hardware support for the code morphing software. Why is hardware support needed? Give one example of such a hardware support.
(3p)