

LINKÖPINGS TEKNISKA HÖGSKOLA
Institutionen för datavetenskap
Petru Eles

Tentamen i kursen
Datorarkitektur - TDDI03
2011-04-27, kl. 8-12

Hjälpmedel:

Engelsk ordbok.

Supporting material:

English 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.

Jourhavande lärare:

Petru Eles, tel. 0703681396

Good luck !!!

Tentamen i kursen Datorarkitektur - TDDI03, 2011-04-27, kl. 8-12

Du kan skriva på svenska eller engelska!

1.

- a) Why do we need special *write strategies* for cache memories?
 - b) We have discussed three write strategies: *write-through*, *write through with buffered write*, and *copy back*. How do they work? Which are their advantages and disadvantages?
- (3p)

2. The Pentium 4 has an L1 instruction cache which is particular in several regards. In what consists the particularity and what is the reason behind it?

(3p)

3. Define the three types of pipeline hazards. Give an example for each.

(3p)

4. Branch history table: what does it contain and how is it used?

(2p)

5. Delayed load. Why do we need it with RISC architectures? How does it work? Give an example.

(3p)

6.

- a) What is the role of the page table in a virtual memory system?
- b) The page table is very large, usually too large to be stored in main memory. Such a large size, at the same time, makes access to the page table very slow. How is this solved in current microprocessor architectures.

(3p)

7.

- a) What is a superscalar architecture?
- b) Draw a block-diagram of a superscalar unit.

(3p)

Tentamen i kursen Datorarkitektur - TDDI03, 2011-04-27, kl. 8-12

Du kan skriva på svenska eller engelska!

8. Give an example with *output dependency* and another one with *antidependency*. Show how they can be solved by *register renaming*. (3p)
9. The design of RISC architectures is based on certain characteristics of typical programs which are frequently used. Enumerate at least five such characteristics of programs. (2p)
10. Compare VLIW architectures with superscalar architectures:
a) Show similarities and differences.
b) Show the advantages and disadvantages of the two approaches.
c) Why is a superscalar consuming more power, compared to a VLIW computer? (3p)
11.
a) What is branch predication (like in the Itanium architecture)?
b) Compare with ordinary branch prediction. (3p)
12. What is trace scheduling? How does it work (remember the three steps)? Why is it important with VLIW architectures? (3p)
13. Formulate Amdahl's law and comment. (3p)
14. What is hardware multithreading?
Why do multithreaded processors provide higher performance? (3p)