Försättsblad till skriftlig tentamen vid Linköpings Universitet

Datum för tentamen	2013-03-22
Sal (2) Om tentan går i flera salar ska du bifoga ett försättsblad till varje sal och ringa in vilken sal som avses	T1 T2
Tid	14-18
Kurskod	TDDI03
Provkod	TEN1
Kursnamn/benämning **Provnamn/benämning**	Datorarkitektur En skriftlig tentamen
Institution	IDA
Antal uppgifter som ingår i tentamen	14
Jour/Kursansvarig Ange vem som besöker salen	Unmesh Bordoloi
Telefon under skrivtiden	0766348968
Besöker salen ca kl.	15:30
Kursadministratör/kontaktperson (namn + tfnr + mailaddress)	Carita Lilja, 1463, carita.lilja@.liu.se
Tillåtna hjälpmedel	Ordbok
Övrigt	
Vilken typ av papper ska användas, rutigt eller linjerat	
Antal exemplar i påsen	

LINKÖPINGS TEKNISKA HÖGSKOLA
Institutionen för datavetenskap
Petru Eles

Tentamen i kursen

Datorarkitektur - TDDI03

2013-03-22, kl. 14-18

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:

Unmesh Bordoloi, tel. 0766348968

Good luck !!!

Tentamen i kursen Datorarkitektur - TDDI03, 2013-03-22, kl. 14-18
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. 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)

6.

a) What is a superscalar architecture?

b) Draw a block-diagram of a superscalar unit.

(3p)

7.

a) What is the role of the page table in a virtual memory system? What information does it contain?

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)

8.

a) Which are the types of data dependencies that have to be considered with an out-of-order superscalar? Give an example for each.

b) Why do we call them "true" and "artificial", respectively?

c) What can be solved by *register renamimg*? Give an example.

(3p)

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9. What is speculative loading with the Itanium architecture? How does it work?

(3p)

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?

(4p)

11. What is trace scheduling? How does it work (remember the three steps)? Why is it important with VLIW architectures?

(3p)

12. What is a vector processor? Draw a block diagram.
What is the basic difference between array processors and vector processors?

(2p)

13. Formulate Amdahl's law and comment.

(3p)

14.
a) What is hardware multithreading?
b) Why do multithreaded processors provide higher performance?
c) We have described three approaches to multithreading: interleaved, blocked, and simultaneous; what is the main characteristic of each of them?

(3p)