Försättsblad till skriftlig tentamen vid Linköpings universitet

(fylls i av ansvarig)

Datum för tentamen	2011-03-19
Sal	KARA
Tid	14-18
Kurskod	TDDI08
Provkod	
Kursnamn/benämning	Konstruktion av inbyggda system
Institution	IDA
Antal uppgifter som ingår i tentamen	12
Antal sidor på tentamen (inkl. försättsbladet)	4
Jour/Kursansvarig	Petru Eles
Telefon under skrivtid	0703681396
Besöker salen ca kl.	16
Kursadministratör (namn + tfnnr + mailadress)	Gunilla Mellheden 282297, gunilla.mellheden@liu.se
Tillåtna hjälpmedel	Engelsk ordbok
Övrigt (exempel när resultat kan ses på webben, betygsgränser, visning, övriga salar tentan går i m.m.)	
Vilken typ av papper ska användas, rutigt eller linjerat	
Antal exemplar i påsen	

Tentamen i kursen

Embedded Systems Design - TDDI08

2011-03-19, kl. 14-18

Hjälpmedel:	**Supporting material:**
Engelsk ordbok.	English dictionary.

Poänggränser:	**Points:**
Maximal poäng är 30.	Maximum points: 30.
För godkänt krävs sammanlagt	In order to pass the exam you need a
16 poäng.	total of minimum 16 points.

Jourhavande lärare:

Petru Eles, tel. 281396, 0703681396

Good luck !!!

1. a) Describe, using a flow graph, the design flow of an embedded systems, from an informal specification to fabrication.
   b) Give short comments on the design steps which belong to the system-level.
   c) Why is the proposed design flow better than the traditional one?

   (3p)

2. Compare reasoning about time with synchronous FSMs and Timed Automata.

   (2p)

3. Give an example and show how determinism is lost with a GALS model as opposed to a synchronous FSM.

   (2p)

4. a) Are Petri Net models deterministic?
   b) Consider the model in Fig 1a). Can the place S eventually be marked? Is it guaranteed to be marked?
   c) Consider the model in Fig. 1b). Starting with the marking in the figure, which is (are) the possible next state(s) of the system? Can the place S eventually be marked? Is it guaranteed to be marked?
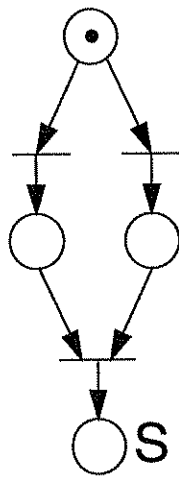
   (3p)

Fig. 1a   Fig. 1b
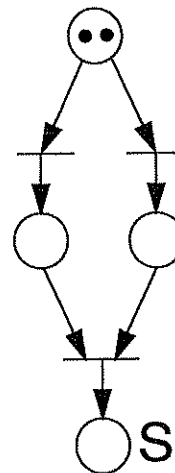
5. Define Kahn process networks and synchronous dataflow models.
   Give an example of a Kahn process network. Show that it cannot be statically scheduled.
   Adjust the example such that it becomes a synchronous dataflow model. Show a static schedule for this new model.

   (3p)

6. We have introduced Systems on Chip with a dynamically reconfigurable datapath; this datapth can be reconfigured to act as an accelerator for the actual program running on the processor. What are the main steps for compiling the source code for such a system? What will result as the outcome of this compilation?

(3p)

7. Describe a simple design flow for processor specialization. Illustrate also by a figure. Comment on the design tools you need.
How does this differ from the design flow for a platform definition?

(2p)

8. What does it mean by an Application Specific Instruction Set Processor (ASIP)?
We have discussed five dimensions of specialization for ASIPs. Which are those five? Comment on each of them.

(3p)

9. What does it mean by IP (core) based design? What types of cores can you choose from? Comment on each of them.

(2p)

10. We have introduced three particular policies for shut-down with Dynamic Power Management: time-out, predictive, and stochastic. Describe the main characteristics of each. Compare.

(3p)

11. What is good with static cyclic scheduling? What is bad?

(2p)

12. Show that, if leakage is ignored, it is possible that, by over-reduction of the supply voltage, the total energy consumption is increased. Use diagrams to explain.

(2p)