Försättsblad till skriftlig tentamen vid Linköpings Universitet

Datum för tentamen	2013-03-16
Sal (1) Om tentan går i flera salar ska du bifoga ett försättsblad till varje sal och ringa in vilken sal som avses	TER2
Tid	14-18
Kurskod	TDDI08
Provkod	TEN1
Kursnamn/benämning **Provnamn/benämning**	Konstruktion av inbyggda system En skriftlig tentamen
Institution	IDA
Antal uppgifter som ingår i tentamen	12
Jour/Kursansvarig Ange vem som besöker salen	Petru Eles
Telefon under skrivtiden	0703681396
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

Embedded Systems Design - TDDI08

2013-03-16, kl. 14-18

Hjälpmedel:

Engelsk ordbok.

Supporting material:

English dictionary.

Poänggränser:

Maximal poäng är 30.
För godkänt krävs sammanlagt 16 poäng.

Points:

Maximum points: 30.
In order to pass the exam you need a total of minimum 16 points.

Jourhavande lärare:

Petru Eles, tel. 0703681396

Good luck !!!

Tentamen i kursen Embedded Systems Design - TDDI08, 2013-03-16, kl. 14-18
Du kan skriva på svenska eller engelska!

1. a) Formulate the synchrony hypothesis for FSMs. What does it imply?
   b) Under which assumptions can we correctly implement a synchronous FSM model?
   (2p)

2. 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)

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)

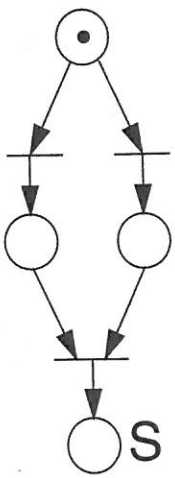

Fig. 1a

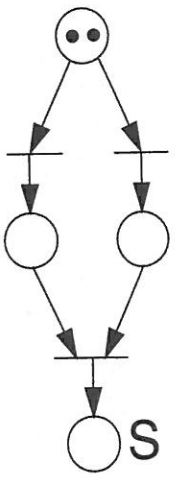

Fig. 1b

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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. Timed automata are a particular (the simplest) form of hybrid automata. Give an example of a timed automata model of your choice. Explain the model. Specify the same model as hybrid automata.

(3p)

7. How does a discrete event simulator work?
Illustrate by a flow-graph.

(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. 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.

(2p)

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

(2p)

11. a) Formulate the scheduling problem for a set of real-time tasks.
b) What does it mean that a task set is schedulable?
c) What does it mean by preemptive and non-preemptive scheduling?

(2p)

12. a) What is the basic principle for task scheduling on DVS processors?
b) What is the problem if we consider particularities, concerning power consumption, of individual tasks?
c) How do we solve the problem that only discrete voltage levels are available?
d) Discuss what the problems are if leakage energy is ignored.

(3p)