Försättsblad till skriftlig tentamen vid Linköpings Universitet

Datum för tentamen	2013-08-28
Sal (1) Om tentan går i flera salar ska du bifoga ett försättsblad till varje sal och ringa in vilken sal som avses	TER1
Tid	14-18
Kurskod	TDTS07
Provkod	TEN2
Kursnamn/benämning **Provnamn/benämning**	Systemkonstruktion och metodik 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

System Design and Methodology- TDTS07

2013-08-28, 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 System Design and Methodology- TDTS07, 2013-08-28, 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. Give an example and show how determinism is lost with a GALS model as opposed to a synchronous FSM.

   (2p)

3. 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)

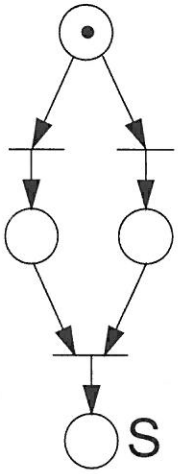

Fig. 1a

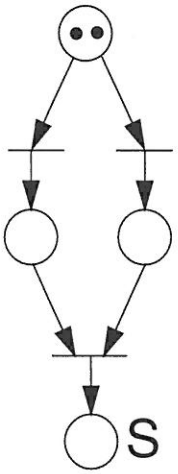

Fig. 1b

4. Define Kahn process networks.
   Show by an example how determinism is guaranteed with Kahn process networks.
   Transform the example and show that a more general dataflow network, which is not a Kahn process network, does not guarantee determinism.

   (3p)

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5. 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)

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

(2p)

7. 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)

8. 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)

9. Illustrate by a diagram the trade-off energy consumption vs. flexibility for ASIC, FPGA, ASIP, and general-purpose processor.

(2p)

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

(3p)

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)