

**Tentamen i kursen**  
**System Design and Methodology- TDTS 30**  
**2006-03-11, kl. 8-12**

**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:**

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**Good luck !!!**

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**Du kan skriva på svenska eller engelska!**

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. (3p)
  
2. a) What does it mean by data-driven and control-driven concurrency?  
b) Give an example for each of them. (2p)
  
3. a) Formulate the synchrony hypothesis for FSMs. What does it imply?  
b) Under which assumptions can we correctly implement a synchronous FSM model? (2p)
  
4. Give an example and show how determinism is lost with a GALS model as opposed to a synchronous FSM. (2p)
  
5. Define synchronous dataflow networks.  
Show, by an example, how static scheduling of a synchronous dataflow network is possible.  
Transform the example such that it becomes an “ordinary” Kahn process network and show that static scheduling is not possible. (3p)
  
6. We have identified three properties which can be analyzed on systems modeled as Petri Nets:
  - Boundedness.
  - Liveness.
  - Reachability.How is each of these properties defined?  
What is the practical significance of each of these properties (what does it say about the system)? (3p)

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7. How does a discrete event simulator work?  
Illustrate by a flow-graph. (2p)
8. What is an Application Specific Platform?  
Design space exploration for platform instantiation: illustrate by a figure.  
Comment on the design tools you need. (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. What is good with static cyclic scheduling? What is bad? (2p)
11. 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)
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)