LINKÖPINGS TEKNISKA HÖGSKOLA
Institutionen för datavetenskap
Petru Eles

Tentamen i kursen

System Design and Methodology- TDTS 30

2006-08-14, 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:

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Good luck !!!

Tentamen i kursen System Design and Methodology- TDTS 30, 2006-06-07, kl. 8-12
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. Compare reasoning about time with synchronous FSMs and Timed Automata.

   (2p)

5. 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)

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

   (2p)

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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. 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?

   (3p)

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

   (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. a) Formulate the scheduling problem for a set of real-time tasks.
    What does it mean that a task set is schedulable?
    b) How does it change if energy optimisation is taken into consideration?
    c) What does it mean by preemptive and non-preemptive scheduling?

    (3p)

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)