TKT-2431 SoC-suunnittelu and TKT-2437 SoC design exam Mon 31.1.2011

D. You may use any calculator

You may do whatever you wish to the exam paper

- Please answer in Finnish if possible.
- In addition to text, use equations, figures, and tables. Moreover, give examples in your answers.
- Remember to highlight the differences between compared methods/things, and tell when one should use each of them.
- Don't expect that the reader is psychic, please explain things carefully.

1. What is the "cache bypass" (as used in exercise work)? (1p)
2. Explain the following (á 2p)
   a) Design Y-chart
   b) Bursty traffic
   c) Hardware-dependent software
   d) Bisection bandwidth of a communication network
   e) Wormhole switching
3. Explain the following (á 3p)
   a) The main idea of an ASIP. Tell also when they are beneficial and give a rough estimate how much they improve things.
   b) The concept of power state machine.
4. SoC is verified at various phases and levels. List them and describe which verification methods should be used on each. (4p)
5. The logic in a complex SoC is practically always divided into separate domains (aka. islands or regions)
   a) What are the 3 different types of such domains? Describe the purpose and main idea of each. (Hint: Two of them are quite often combined in student answers even if they are different, as discussed in guest lecture…) (3p)
   b) What is required for the data that cross the domain boundaries ?(1p)
   c) Power saving is the main motivation for domains. What other benefits do they bring? (1p)
6. Rate yourself. In addition to schedule estimation, it is also important to recognize one's own capabilities. Therefore, the last task is to estimate how many points you'll get in questions 1-5. Textual analysis is also appreciated.(4p)