TIE-51256 Computer Architecture
exam 20.8.2015
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Answers in English or in Finnish. Calculators can be used.

1. Explain shortly:
   a) strip mining (1p)
   b) EPIC (1p)
   c) HSA (1p)
   d) interleaved memory (1p)
   e) antidependency (1p)
   f) OpenMP (1p)

2. What is the difference between VLIW and static multiple-issue processor? What is the principal difference between static and dynamic multiple-issue processors? (2p)

3. Explain shortly Tumasulo algorithm. Why it is used, i.e., what is the problem it solves? Are there any alternative methods to solve the same problem? (5p)

4. Why loop unrolling is used? What could be an alternative? (4p)

5. OpenCL. Why OpenCL has been developed? Describe the programming model and platform model of OpenCL. What kind of processor architectures are supported? What kind of parallelism is supported? What are the comparable alternatives for OpenCL? (6p)

6. Assume a 64-byte cache memory, which uses 8-byte blocks. The cache is 2-way set associative and uses LRU mechanism to replace blocks in the cache. Processor uses 16-bit virtual addresses to access 16kbyte main memory. How many bits are needed for the tag fields in the cache? Draw principal cache organization and explain your solution. (4p)