Digital Video Processing, SGN 3106, Winter 2011-12

**Exam: May 21st, 2012**

NO CALCULATORS

*NOTES:*

- *Correctness in English is NOT taken into account in the evaluation of the exam.*
- *Hint 1: "brief" and "short" indicate that 3~5 lines of answer are sufficient. The capability of understanding well the question and summarizing efficiently the important technical aspects is a "plus".*
- *Hint 2: Please be focused in your answer. If I ask "what is a motion vector" do not write a three-page description of a video codec.*

1. What is spatial redundancy in an image or a video sequence? Why is it important in image and video coding? What is the technique that is used in image/video coding to exploit the spatial redundancy?

2. Why are scenes with camera zoom and rotating objects "difficult to encode" (i.e. require more bits in order to achieve the same quality) with video codecs such as H.261/3 or MPEG 1/2/4?

3. Provide a short explanation of the following terms:

(a) Ringing effect
(b) Interlacing
(c) QCIF format
(d) Picture Start Code (in e.g. H.261)
(e) Payload format

4. Draw a block diagram of a basic video **encoder** (such as the H.261 encoder) which is based on motion compensated prediction and DCT coding of the prediction error. The input to the encoder is a sequence of video frames, the output is the compressed video bit stream. Make visible (different color, or thicker line) one part of the encoder where a coding error is introduced. Explain briefly what happens there.

5. Synchronization in multimedia. What are the levels of synchronization that exist in a multimedia presentation? Describe briefly or give an example of at least one of them.