

Foundations of Multimedia technologies Exam. 2022.05.31.

Please give the answers in the blank space below the questions and on further additional blank papers *with indicating the name, Neptun ID and the no. of the given question!*

Total: 100 points 0-40 points: failure (1), 41-55 points: poor (2), 56-70 points: satisfactory (3), 71-85 points: good (4), 86-100 points: excellent (5)

Név: _____
Neptun kód: _____

1. 15 point Calculate the active bitrate of a 4k UHD TV video stream (number of active pixels: 3840x2160 at frame rate of 60 Hz, with progressive scanning) if the chroma components are subsampled with a sampling scheme 4:2:0 and components are represented in 10 bits/sample!
2. 15 point What is the goal of motion estimation? What is the goal of block matching (the explanation should include illustration)? Name several frequently used block matching algorithms.
3. 15 point What is the general goal of transform coding? What is the optimal transform and name several sub-optimal, fixed base transforms.
4. 20 point Draw the block diagram of an MPEG encoder! Explain the steps of the encoding process if the applied GOP structure is IBBP!
5. 20 point Audio encoding
 - Why do we apply psychoacoustic encoding (mp3, dolby digital, etc.) at all?
 - What kind of error do we introduce to the uncompressed audio by applying a psychoacoustic encoding?
 - Why (or when) isn't it a problem that we introduced this error to our audio signal?
6. 3 point What are the basic axioms of image processing?
7. 7 point List the types of edge detection algorithms and explain their mathematical background!
8. 5 point List the steps of SIFT detector!