

Course description

Title of the Course	Data Compression
Code of module:	CTU14
Key words:	Data compression, entropy, coding of integers, statistical methods, dictionary methods, context methods
Language:	English
Institution:	Czech Technical University in Prague
Professor Responsible:	Jan Holub
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Participating professors:	Miroslav Balík
Course address:	Department of Theoretical Computer Science, Faculty of Information Technology, Czech Technical University in Prague, Thákurova 2700/9, 160 00 Prague 6, Czech Republic
Number of total places open for the Course :	15, minimum 10
Objectives:	<p>Modern technologies require processing of larger and larger amount of data while on the other hand smaller and smaller devices appear. These two contradictory requirements lead to increasing importance of data compression.</p> <p>The course presents principles of data compression. The basic data compression methods are presented followed by most popular and frequently used compression algorithms. Students will learn properties of various data compression methods which is very important when designing new information and communication systems.</p>
Programme to be followed:	<p>Five 3-hour lectures:</p> <ol style="list-style-type: none"> 1. Introduction, entropy, basic methods, coding of integers, Elias codes, Fibonacci codes 2. Statistical methods, Shannon-Fano, Huffman, and arithmetic coding 3. Dictionary methods, LZ77, LZ78, LZW 4. Context methods, PPM, DCA (Antidictionaries), ACB 5. Burrow-Wheeler transformation, searching in compressed text, word-based compression <p>Four 3-hour seminars with demonstrations:</p> <ol style="list-style-type: none"> 1. Entropy, basic methods, coding integers, Elias codes, Fibonacci codes

	<ol style="list-style-type: none"> 2. Statistical methods, Shannon-Fano, Huffman, and arithmetic coding 3. Dictionary methods, LZ77, LZ78, LZW 4. Context methods, PPM, DCA (Antidictionaries), ACB, Burrow-Wheeler transformation, test
Prerequisites:	Sets, relations, oriented graphs, finite automata.
Course exam:	Written exam with the duration of 1 hour. Evaluation of the results.