
Multimedia Systems

Exercise No. 6

Encoding and decoding with Lempel-Ziv algorithms

1. Encode the following string with the Lempel-Ziv algorithm (LZ77):

ababababab

Take into consideration that only the first character of a string has to be found in the search buffer for a match.

2. The following algorithm describes a Lempel-Ziv-Welch (LZW) encoding:

1. Initialize the directory with all characters of the used alphabet (e.g. all numbers 0-255).
2. Set $pos = 0$.
3. Encode the string s with a directory index, whereas s is a string from the input and the first character of s is located at position pos .
4. Add sx to the directory, whereas x is the character following s in the input.
5. Set pos to the position of x ; continue at 3 or end.

- a) Define a similar algorithm for decoding with LZW.
- b) Decode a string encoded with the following indices: 1, 2, 3, 5
The initial directory has the entries

<i>Index</i>	<i>String</i>
1	a
2	b

Use a simple table with step number and output string as entries of a row. Write down the complete directory for every step.

Note: The directory creation during decoding is a bit more complicated than it was during encoding.