REVERSIBLE VARIABLE LENGTH CODE

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Quick Overview

- RVLC can be decoded both forward and backward
- Used to check if bit errors occur during transmission
- Resource used: B. Girod's IEEE paper



Fig. 1. Blockdiagram of the reversible variable length coder.



Fig. 2. Blockdiagram of the reversible variable length decoder.

Encoding

- Each ASCII received is converted into Huffman code.
- Huffman code the encoder receives is reversed and consolidated with a long array of reversed bits called B'
 - Huffman used from class example

Character	Huffman	Length
A	1100	4
В	11010	5
С	00	2
D	100	3
E	110110	6
F	110111	6
G	01	2
Н	101	3

Encoding

The Huffman code is also placed in an array B

- An offset of O's is added before B' and after B. Size of longest Huffman
- The code send out of the encoder is B XOR B'
 - Example

5	> Huffman	B 100110	(<u>100110</u>) X <u>1000000</u> X <u>10000001</u> X 111111 X <u>0000000</u>
5	> length	U 6	6 X 3 X 2 X 6 X 0
*	> RevHuff	B 011001	011001 X 000001 X 111111 X 000000
₩	>в	B 00000000	
₩	> Brev	B 00000000	
*	> c	B 00000000	
≝	> totallen	B 000000	οοχ <u>οού110</u> χ <u>οο1001</u> χ <u>οο1011</u> χ

Decoding

- The code C is received and its first bits are XORed with O's. Again the size of longest Huffman.
- The obtained string of bits is check to get the first Huffman.
- That Huffman is again reversed and XORed to the next bits of C.
 - Happens until all original Huffman are obtained.



Reference

 Bidirectionally Decodable Streams of Prefix Code-Words by Bernd Girod, IEEE Communications Letters, Vol 3, No8, August 1999