

Assignment 7

Lempel-Ziv Compression

Program Pseudocode

1. Encoder

verbose = FALSE

infile = STDIN_FILENO

outfile = STDOUT_FILENO

infilename = NULL

outfilename = NULL

Parse command line.

If the “-i” option is specified then set **infilename** to option argument

If the “-o” option is specified then set **outfilename** to option argument

If the “-v” option is specified then set **verbose** to TRUE

Open input file

Open output file

Set permissions for output file the same as input file has

Create and initialize file header (set MAGIC and protection bits)

Write file header to output file

root = TRIE_CREATE()

curr_node = root

prev_node = NULL

curr_sym = 0

prev_sym = 0

next_code = START_CODE

while READ_SYM(infile, &curr_sym) is TRUE

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next_node = TRIE_STEP(curr_node, curr_sym)
if next_node is not NULL
    prev_node = curr_node
    curr_node = next_node
else
    WRITE_PAIR(outfile, curr_node.code, curr_sym, BIT-LENGTH(next_code))
    curr_node.children[curr_sym] = TRIE_NODE_CREATE(next_code)
    curr_node = root
    next_code = next_code + 1
if next_code is MAX_CODE
    TRIE_RESET(root)
    curr_node = root
    next_code = START_CODE
prev_sym = curr_sym
if curr_node is not root
    WRITE_PAIR(outfile, prev_node.code, prev_sym, BIT-LENGTH(next_code))
    next_code = (next_code + 1) % MAX_CODE
WRITE_PAIR(outfile, STOP_CODE, 0, BIT-LENGTH(next_code))
FLUSH_PAIRS(outfile)
If verbose is TRUE
    Output statistics
Close files
Delete trie

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2. Decoder

verbose = FALSE

infile = STDIN_FILENO

outfile = STDOUT_FILENO

infilename = NULL

outfilename = NULL

Parse command line.

If the “-i” option is specified then set **infilename** to option argument

If the “-o” option is specified then set **outfilename** to option argument

If the “-v” option is specified then set **verbose** to TRUE

Open input file

Open output file

Set permissions for output file the same as input file has

table = WT_CREATE()

curr_sym = 0

curr_code = 0

next_code = START_CODE

while READ_PAIR(infile, &curr_code, &curr_sym, BIT-LENGTH(next_code)) is TRUE

 table[next_code] = WORD_APPEND_SYM(table[curr_code], curr_sym)

 WRITE_WORD(outfile, table[next_code])

 next_code = next_code + 1

 if next_code is MAX_CODE

 WT_RESET(table)

 next_code = START_CODE

FLUSH_WORDS(outfile)

If verbose is TRUE

 Output statistics

Close files

Delete **table**