Huffman coding

Rumen Mihov

КН Курс 2, група 3

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Глава 1

Class Index

1.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

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Глава 2

File Index

2.1 File List

Here is a list of all documented files with brief descriptions:

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Глава 3

Class Documentation

3.1 adaptiveHuffmanTree Class Reference

Public Member Functions

- int compress (const std::string &str, std::ostream &out)
- std::string decompress (const std::string &str, const int &size, std::ostream &out)

3.1.1 Member Function Documentation

3.1.1.1 compress()

```
int adaptiveHuffmanTree::compress (
                    const std::string & str,
                    std::ostream & out )
```

Parameters

str	- низ, който ще се компресира
out	- изходен поток, в който ще се изведе компресираната версия на низа

Returns

- връща броя на символите в компресирания низ

3.1.1.2 decompress()

```
std::string adaptiveHuffmanTree::decompress (
                    const std::string & str,
                    const int & size,
                    std::ostream & out )
```

Parameters

str	- низ, който ще се декомпресира
size	- броя на символите в некомпресирания низ
out	- изходен поток, в който ще се изведе декомпресираната версия на низа

Returns

- връща декомпресирания низ

The documentation for this class was generated from the following files:

- AdaptiveHuffmanTree.h
- AdaptiveHuffmanTree.cpp

3.2 commandLine Class Reference

Public Member Functions

- void readLine ()
- void print ()

The documentation for this class was generated from the following files:

- CommandLine.h
- CommandLine.cpp

3.3 huffmanTree Class Reference

#include <HuffmanTree.h>

Public Member Functions

- huffmanTree (const std::string &)
- huffmanTree (std::istream &in)
- int compress (const std::string &str, std::ostream &out) const
- std::string decompress (const std::string &str, const int size, std::ostream &out) const
- void print (std::ostream &out) const
- void testPrint () const

3.3.1 Detailed Description

Клас, който представлява дърво на Хъфман. Съдържа в себе си структура от върхове, които са върхове на дървото на Хъфман.

3.3.2 Member Function Documentation

3.3.2.1 compress()

```
int huffmanTree::compress (
                    const std::string & str,
                    std::ostream & out ) const
```

Parameters

str	- низ, който ще се компресира
out	- изходен поток, в който ще се изведе компресираната версия на низа

Returns

- връща броя на символите в компресирания низ

3.3.2.2 decompress()

```
std::string huffmanTree::decompress (
                const std::string & str,
                const int size,
                std::ostream & out ) const
```

Parameters

str	- низ, който ще се декомпресира
size	- броя на символите в некомпресирания низ
out	- изходен поток, в който ще се изведе декомпресираната версия на низа

Returns

- връща декомпресирания низ

The documentation for this class was generated from the following files:

- HuffmanTree.h
- HuffmanTree.cpp

Глава 4

File Documentation

4.1 AdaptiveHuffmanTree.h

```
# include <queue>
# include <string>
# include <iostream>
# include <algorithm>
class adaptiveHuffmanTree
{
private:
    struct node
    {
        char data;
        int weight;
        node *par;
        node *left;
        node *right;
    };
    node *root;
    node *NYT;
    node *symbols[256];

    std::string binary_code (char c);
    std::string code (node *temp);
    void deleteTree(node *);
    void recalc(node *temp);
    node* addNode(char c);

public:
    adaptiveHuffmanTree();
    ~adaptiveHuffmanTree();

    int compress(const std::string& str, std::ostream &out);

    std::string decompress(const std::string& str, const int& size, std::ostream &out);
};
```

4.2 CommandLine.h

```
# pragma once
# include <iostream>
# include <string>
# include <istream>
# include <ostream>
# include <sstream>
# include <fstream>
# include "huffmanTree.h"
# include "adaptiveHuffmanTree.h"

class commandLine
{
private:

    void compress(std::istream &in, std::ostream &out, std::ostream &out_tree);

    void decompress(std::istream &in, std::istream &in_tree ,std::ostream &out, bool DEBUG);

    void adaptive_compress(std::istream &in, std::ostream &out, std::ostream &out_tree);

    void adaptive_decompress(std::istream &in, std::istream &in_tree ,std::ostream &out, bool DEBUG);

public:
    void readLine();
    void print();
};
```

4.3 HuffmanTree.h

```
# include <queue>
# include <string>
# include <iostream>

class huffmanTree
{
private:

    struct node
    {
        char data;
        int weight;
        node *left;
        node *right;
    };
    node *root;
    std::priority_queue <std:: pair < int, node*> > pq;
    int numOccur[256];
    std::string code[256];

    void buildFreqTable(const std::string &);
    void buildTree();
    void buildCode(node*, std::string num);
    void printTree(node*, std::ostream &out) const;
    void deleteTree(node *);
    node* buildTree(std::istream &in);

public:
    huffmanTree(const std::string &);
    huffmanTree(std::istream &in);
    ~huffmanTree();

    int compress(const std::string &str, std::ostream &out)  const;

    std::string decompress(const std::string &str, const int size, std::ostream &out) const;
    void print(std::ostream &out) const;
    void testPrint() const;
};

std::ostream& operator«(std::ostream& out, const huffmanTree& tree);
```

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