Compression

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1 Class Index	1
1.1 Class List	1
2 File Index	3
2.1 File List	3
3 Class Documentation	5
3.1 ClearClosingTagsComp Class Reference	5
3.2 Map Class Reference	5
3.2.1 Constructor & Destructor Documentation	5
3.2.1.1 Map()	5
3.2.1.2 ∼Map()	6
3.2.2 Member Function Documentation	6
3.2.2.1 add()	6
3.2.2.2 containKey()	6
3.2.2.3 getKey()	7
3.2.2.4 getSize()	7
3.2.2.5 getValue()	7
3.2.2.6 toString()	8
3.3 MinifyingXML Class Reference	8
3.3.1 Constructor & Destructor Documentation	8
3.3.1.1 MinifyingXML()	8
3.3.2 Member Function Documentation	9
3.3.2.1 isSkipChar()	9
3.3.2.2 minifyString()	9
3.3.3 Friends And Related Symbol Documentation	10
	10
3.3.3.2 skipFromEnd()	10
3.4 TagsMapComp Class Reference	11
3.4.1 Constructor & Destructor Documentation	11
3.4.1.1 TagsMapComp()	11
3.4.2 Member Function Documentation	11
3.4.2.1 compress()	11
3.4.2.2 mapTags()	12
3.5 TagsMapDec Class Reference	12
4 File Documentation	13
4.1 Sample2/ClearClosingTagsComp.h File Reference	13
4.1.1 Detailed Description	13
4.2 ClearClosingTagsComp.h	13
4.3 Sample2/Map.cpp File Reference	14
4.3.1 Detailed Description	14
	14

4.4.1	Detailed Description	14
4.5 Map.h		15
4.6 Sample	e2/Map_unittest.cpp File Reference	15
4.6.1	Detailed Description	15
4.7 Sample	e2/MinifyingXML.cpp File Reference	16
4.7.1	Detailed Description	16
4.8 Sample	e2/MinifyingXML.h File Reference	16
4.8.1	Detailed Description	17
4.9 Minifyir	ngXML.h	17
4.10 Samp	le2/MinifyingXML_unittest.cpp File Reference	18
4.10.	1 Detailed Description	18
4.11 pch.h		18
4.12 Samp	le2/TagMapComp_unittest.cpp File Reference	19
4.12.	1 Detailed Description	19
4.13 Samp	le2/TagsMapComp.cpp File Reference	19
4.13.	1 Detailed Description	19
4.14 Samp	le2/TagsMapComp.h File Reference	20
4.14.	1 Detailed Description	20
4.15 TagsN	MapComp.h	20
4.16 Samp	le2/TagsMapDec.h File Reference	21
4.16.	1 Detailed Description	21
4.17 TagsN	MapDec.h	21
Index		23

Chapter 1

Class Index

1.1 Class List

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

ClearClosingTagsComp
Map
MinifyingXML
TagsMapComp
TagsMapDec

2 Class Index

Chapter 2

File Index

2.1 File List

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

5ample2/GlearGlosingTagsGomp.n	13
Sample2/Map.cpp	
The source file of the simple Map	14
Sample2/Map.h	
The header file of the simple Map	14
Sample2/Map_unittest.cpp	
Unit test code for Map class	15
Sample2/MinifyingXML.cpp	
The source file of class MinifyingXML	16
Sample2/MinifyingXML.h	
Header file of the MinifyingXML class	16
Sample2/MinifyingXML_unittest.cpp	
Unit test code for MinifyingXML class	18
Sample2/ <mark>pch.h</mark>	18
Sample2/TagMapComp_unittest.cpp	
Unit test code for TagsMapComp class	19
Sample2/TagsMapComp.cpp	
The source file of TagsMapComp class	19
Sample2/TagsMapComp.h	
The header file of TagsMapComp class	20
Sample2/TagsMapDec.h	
The header file of TagsMapDec class	21

File Index

Chapter 3

Class Documentation

3.1 ClearClosingTagsComp Class Reference

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

• Sample2/ClearClosingTagsComp.h

3.2 Map Class Reference

Public Member Functions

• Map ()

C'tor. Initializes empty map with an empty dynamic array.

Map (const std::string *tagMapBlock)

C'tor. Initialize the map from a < TagMap> block.

- ~Map ()
- int add (std::string *key)

Adds the key to the map.

• int getValue (const std::string *key) const

The value that the key is mapped to.

• const std::string * getKey (int value) const

Get the key from the value that the key was mapped to.

bool containKey (const std::string *key) const

Checks if the map contains that key.

- int getSize ()
- std::string * toString ()

Returns the < TagMap> block so it can be added to the compressed XML file.

3.2.1 Constructor & Destructor Documentation

3.2.1.1 Map()

C'tor. Initialize the map from a <TagMap> block.

The file must start with <TagMap> and ends with </TagMap> otherwise the file is considered defected.

6 Class Documentation

Parameters

```
tagMapBlock.
```

Exceptions

```
runtime_error if the file is defected.
```

3.2.1.2 \sim Map()

```
Map::\sim Map ( ) [inline]
```

D'tor.

Warning

It will delete all the keys string assigned to it.

3.2.2 Member Function Documentation

3.2.2.1 add()

```
int Map::add (
          std::string * key )
```

Adds the key to the map.

Parameters

```
key To add.
```

Returns

The value that the key is mapped to.

3.2.2.2 containKey()

```
bool Map::containKey ( {\tt const\ std::string\ *\ key\ )\ const}
```

Checks if the map contains that key.

Parameters

key.

Returns

true if the key is available in the map, false otherwise.

3.2.2.3 getKey()

Get the key from the value that the key was mapped to.

Parameters

value

Returns

The key.

Exceptions

runtime error if the value is not in the map.

3.2.2.4 getSize()

```
int Map::getSize ( ) [inline]
```

Returns

the size of the map.

3.2.2.5 getValue()

```
int Map::getValue ( {\tt const \ std::string * \it key} \ ) \ {\tt const}
```

The value that the key is mapped to.

Parameters

key.

Returns

The value if the key is found, -1 otherwise.

8 Class Documentation

3.2.2.6 toString()

```
std::string * Map::toString ( )
```

Returns the <TagMap> block so it can be added to the compressed XML file.

Exceptions

```
runtime error if the map is empty.
```

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

- Sample2/Map.h
- Sample2/Map.cpp

3.3 MinifyingXML Class Reference

Public Member Functions

MinifyingXML (const std::string *xmlFile)

C'tor.

std::string * minifyString ()

This function deletes any spaces and new lines from the XML File.

- const std::string * getXMLFile () const
- void setXMLFile (const std::string *xmlFileNew)

Static Public Member Functions

• static bool isSkipChar (const char c)

function checks if the char is one the located characters.

Related Symbols

(Note that these are not member symbols.)

void skipFromBeginning (std::string *result) const

This function clears all the skip Chars except some spaces.

void skipFromEnd (std::string *result) const

This function clears the extra spaces left from the prev step.

3.3.1 Constructor & Destructor Documentation

3.3.1.1 MinifyingXML()

See also

D'tor, this class will not deallocate the XML file string.

Parameters

xmlFile

3.3.2 Member Function Documentation

3.3.2.1 isSkipChar()

```
bool MinifyingXML::isSkipChar (  {\tt const\ char\ } c \ ) \quad [{\tt static}]
```

function checks if the char is one the located characters.

Parameters

c -The character to check.

Returns

- True if it's a skip char.
 - · False otherwise.

See also

MinifyingXML::charToSkip array.

3.3.2.2 minifyString()

```
std::string * MinifyingXML::minifyString ( )
```

This function deletes any spaces and new lines from the XML File.

It removes any charToSkip from the file string, except spaces in the tags values (leading and trailing spaces are removed from the value too).

See also

MinifyingXML::charToSkip array.

Returns

The result string from minifying function.

10 Class Documentation

3.3.3 Friends And Related Symbol Documentation

3.3.3.1 skipFromBeginning()

This function clears all the skip Chars except some spaces.

Operation:

- · For all the string, skip (don't add it into the result) all charToskip elements except spaces.
- For space cases: -> Starting from the beginning, skip any spaces until reaching the first closing tag '>'. -> After the closing tab, skip any spaces until reaching the first non skip value (any chars not in charToSkip array). -> Add all spaces until reaching the next opening tag '<'.

Example: " <name> Ahmed Ali \n </name>" --> "<name> Ahmed Ali </name>"

helper function for: std::string* MinifyingXML::minifyString(). be called before void MinifyingXML::skipFrom← End(const std::string* result).

Parameters

result an empty string to store the result of this function.

3.3.3.2 skipFromEnd()

This function clears the extra spaces left from the prev step.

Operation: Starting from the last element.

• Clear all the spaces before any opening tag '<' till the prev last non skip char. -> If the current element was the opening tag, skip spaces. -> If the current element is any non skip char, stop skipping spaces.

Example: "<name>Ahmed Ali </name>" --> "<name>Ahmed Ali</name>"

· Other skip chars are eliminated from the prev step.

See also

void MinifyingXML::skipFromBeginning(std::string* result).

helper function for: std::string* MinifyingXML::minifyString(). be called after void MinifyingXML::skipFrom← Beginning(std::string* result).

Parameters

result The result string from the prev step to modify it.

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

- Sample2/MinifyingXML.h
- Sample2/MinifyingXML.cpp

3.4 TagsMapComp Class Reference

Public Member Functions

• TagsMapComp (const std::string *xmlFile)

C'tor

∼TagsMapComp ()

D'tor.

• void mapTags ()

Reads the XML file and create the map with all the tags.

• std::string * compress (bool addMapTable=false)

This function compresses the XML file.

3.4.1 Constructor & Destructor Documentation

3.4.1.1 TagsMapComp()

C'tor.

Initializes the XML file, reads it and create a map with all the tags.

Parameters

xmlFile

3.4.2 Member Function Documentation

3.4.2.1 compress()

This function compresses the XML file.

Operation:

12 Class Documentation

• If addMapTable is true, it adds the <TagMap> block in the first line in the string. Will not added otherwise (is false by default).

• It replaces all the tags (closing and opening) with there mapped value in the map, it also adds 't' before the number just for the rules of XML files. Example: <TagEg> --> <t0>, </TagEg> --> </t0>

Parameters

```
addMapTable if true, then a <TagMap> block will be added in the 1st line in the result string.
```

Returns

A string contains the XML file after the compression.

Note

The result string doesn't contain XML version and encoding line.

3.4.2.2 mapTags()

```
void TagsMapComp::mapTags ( )
```

Reads the XML file and create the map with all the tags.

Explanation:

- · Find the next tag.
- · If the tag is in the map, do nothing.
- · If the tag is not in the map add it.

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

- Sample2/TagsMapComp.h
- Sample2/TagsMapComp.cpp

3.5 TagsMapDec Class Reference

Public Member Functions

• std::string * decompress ()

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

- Sample2/TagsMapDec.h
- · Sample2/TagsMapDec.cpp

Chapter 4

File Documentation

4.1 Sample2/ClearClosingTagsComp.h File Reference

```
#include <string>
```

Classes

• class ClearClosingTagsComp

4.1.1 Detailed Description

Author

eslam

Date

December 2023

4.2 ClearClosingTagsComp.h

Go to the documentation of this file.

4.3 Sample2/Map.cpp File Reference

The source file of the simple Map.

```
#include "pch.h"
#include "Map.h"
```

4.3.1 Detailed Description

The source file of the simple Map.

This a simple implementation of Map DS that will help Mapping tags into numbers.

Author

eslam

Date

December 2023

4.4 Sample2/Map.h File Reference

The header file of the simple Map.

```
#include <vector>
#include "MinifyingXML.h"
#include <sstream>
```

Classes

class Map

4.4.1 Detailed Description

The header file of the simple Map.

This a simple implementation of Map DS that will help Mapping tags into numbers.

Author

eslam

Date

December 2023

4.5 Map.h 15

4.5 Map.h

```
Go to the documentation of this file.
```

```
00001 /********
00012 #pragma once
00013 #ifndef MAP_H
00014 #define MAP_H
00016 #include <vector>
00017 #include "MinifyingXML.h"
00018 #include <sstream>
00019
00020 class Map
00021 {
00022 private:
00023
          std::vector<std::string*>* arr;
00024
00025
          //helper method
          static void trimString(std::string& str);
00031
00032
00033 public:
00038
        explicit Map() :arr(new std::vector<std::string*>()) {}
00048
           explicit Map(const std::string* tagMapBlock);
00053
          ~Map() {
    for (std::string* s : *arr) {
00054
00055
                   delete s;
00056
00057
               delete arr;
00058
          }
00059
00060
          //methods
00061
00068
          int add(std::string* key);
00075
          int getValue(const std::string* key) const;
          const std::string* getKey(int value) const;
bool containKey(const std::string* key) const;
00083
00091
00092
00096
           int getSize() { return arr->size(); }
00097
00104
           std::string* toString();
00105 };
00106
00107 #endif // !MAP_H
```

4.6 Sample2/Map_unittest.cpp File Reference

Unit test code for Map class.

```
#include "gtest/gtest.h"
#include "pch.h"
#include "Map.h"
```

4.6.1 Detailed Description

Unit test code for Map class.

Author

eslam

Date

December 2023

4.7 Sample2/MinifyingXML.cpp File Reference

The source file of class MinifyingXML.

```
#include "pch.h"
#include "MinifyingXML.h"
```

4.7.1 Detailed Description

The source file of class MinifyingXML.

Minifying is one of the required functions in the data structure and algorithms course's project. Minifying is a way of decreasing the size of the file by deleting all spaces, tabs, new lines.

This class will minify any flawless XML file.

Operation summary:

- · Using the array charToSkip.
- All charToSkip (except the space : ' ') will not be added into the result array.
- Spaces will be added to the result string only if it occurred inside the tag's value, not before or after the value. i.e., "<tagg> value with spaces </tagg>" -apply minifying--> "<tagg> value with spaces </tagg>", on other words, the value will be trimmed from spaces before or after it.

Author

eslam

Date

December 2023

4.8 Sample2/MinifyingXML.h File Reference

Header file of the MinifyingXML class.

```
#include <string>
#include <stdexcept>
```

Classes

· class MinifyingXML

4.9 MinifyingXML.h

4.8.1 Detailed Description

Header file of the MinifyingXML class.

Minifying is one of the required functions in the data structure and algorithms course's project. Minifying is a way of decreasing the size of the file by deleting all spaces, tabs, new lines.

This class will minify any flawless XML file.

Operation summary:

- · Using the array charToSkip.
- All charToSkip (except the space : ' ') will not be added into the result array.
- Spaces will be added to the result string only if it occurred inside the tag's value, not before or after the value.
 i.e., "<tagg> value with spaces </tagg>" -apply minifying--> "<tagg> value with spaces </tagg>", on other words, the value will be trimmed from spaces before or after it.

Author

eslam

Date

December 2023

4.9 MinifyingXML.h

```
Go to the documentation of this file.
```

```
00001 /******
00022 #pragma once
00023 #ifndef MINIFYING_XML_H
00024 #define MINIFYING_XML_H
00025 #include <string>
00026
00027 #include <stdexcept>
00028
00029 class MinifyingXML
00030 {
00031 private:
00032
          // the file that neads to be minified.
00033
          const std::string* xmlFile;
00034
00035
          // char To skip in minifying.
00036
          static const char charToSkip[5];
00037
00038 public:
00045
          explicit MinifyingXML(const std::string* xmlFile) : xmlFile(xmlFile) {
00046
              \ensuremath{//} check adding a null ptr.
00047
              if (xmlFile == nullptr) {
00048
                  throw std::logic_error("Null pointer exception: Accessing null pointer!");
00049
00050
          }
00051
00052
          //methods
00053
00064
          std::string* minifyString();
00065
00075
          static bool isSkipChar(const char c);
00076
00077
          //helper methods
00078
00097
          void skipFromBeginning(std::string* result)const;
00098
00119
          void skipFromEnd(std::string* result) const;
```

```
00121
          //getters and setters, used for debugging
00122
          //getters.
00123
         //XML file getter.
00124
         const std::string* getXMLFile() const { return this->xmlFile; }
00125
00126
00127
00128
          //XML file setter.
00129
          void setXMLFile(const std::string* xmlFileNew) {
             // check adding a null ptr.
if (xmlFileNew == nullptr) {
00130
00131
                   throw std::logic_error("Null pointer exception: Accessing null pointer!");
00132
00133
              this->xmlFile = xmlFileNew;
00134
00135
00136 }; //class MinifyingXML
00137
00138 #endif // !MINIFYING_XML_H
```

4.10 Sample2/MinifyingXML_unittest.cpp File Reference

Unit test code for MinifyingXML class.

```
#include "gtest/gtest.h"
#include "pch.h"
#include "MinifyingXML.h"
```

4.10.1 Detailed Description

Unit test code for MinifyingXML class.

It includes a test for each member method in the class using gtest framework.

Author

eslam

Date

December 2023

4.11 pch.h

```
00001 //
00001 //
00002 // pch.h
00003 //
00004
00005 #pragma once
00006
00007 #include "gtest/gtest.h"
80000
00009 int main(int argc, char** argv) {
          testing::InitGoogleTest(&argc, argv);
00010
00011
00012
          // Run all tests
00013
          return RUN_ALL_TESTS();
00014 }
```

4.12 Sample2/TagMapComp_unittest.cpp File Reference

Unit test code for TagsMapComp class.

```
#include "gtest/gtest.h"
#include "pch.h"
#include "TagsMapComp.h"
```

4.12.1 Detailed Description

Unit test code for TagsMapComp class.

Author

eslam

Date

December 2023

4.13 Sample2/TagsMapComp.cpp File Reference

The source file of TagsMapComp class.

```
#include "pch.h"
#include "TagsMapComp.h"
```

4.13.1 Detailed Description

The source file of TagsMapComp class.

A compression algorithm that maps tags into numbers. By applying this algorithm, the size file decrease, as many characters in tags will be getting red off, so theses char will not repeated over and over again.

To now the mapping values, a <TagsMap> block will be added to the start of the XML file.

```
Example: -> File before: <tag0><tag1><tag2></tag2></tag2></tag2></tag1></tag0>
-> File after: <TagMap>tag0,tag1,tag2<Tag/Map> <t0><t1><t2></t2></t2></t2></t1></t0>
```

Note

- : <TagMap> block is optional, Will not be added to the social network file, is tags are constant there.
- : if <TagMap> is added, this algorithm will be efficient only if it contains lots of long tags.

all methods in this class assumes that the input file is flawless.

Author

eslam

Date

December 2023

4.14 Sample2/TagsMapComp.h File Reference

The header file of TagsMapComp class.

```
#include <string>
#include "Map.h"
```

Classes

class TagsMapComp

4.14.1 Detailed Description

The header file of TagsMapComp class.

A compression algorithm that maps tags into numbers. By applying this algorithm, the size file decrease, as many characters in tags will be getting red off, so theses char will not repeated over and over again.

To now the mapping values, a <TagsMap> block will be added to the start of the XML file.

```
-> File after: <TagMap>tag0,tag1,tag2<Tag/Map> <t0><t1><t2></t2></t2></t2></t1></t0>
```

Note

- : <TagMap> block is optional, Will not be added to the social network file, is tags are constant there.
- : if <TagMap> is added, this algorithm will be efficient only if it contains lots of long tags.

all methods in this class assumes that the input file is flawless.

Author

eslam

Date

December 2023

4.15 TagsMapComp.h

Go to the documentation of this file.

```
00031 #pragma once
00032 #ifndef TAGS_MAP_Comp_H
00033 #define TAGS_MAP_Comp_H
00034
00035 #include <string>
00036 #include "Map.h
00037
00038 class TagsMapComp
00039 {
00040 private:
00041
          const std::string* xmlFile;
00042
          //Map of tag values.
00043
          Map* map;
00044 public:
         explicit TagsMapComp(const std::string* xmlFile) : xmlFile(xmlFile),
00053
00054
            map(new Map()) {
00055
             mapTags();
00056
00061
          ~TagsMapComp() { delete map; }
00070
00071
00089
          std::string* compress(bool addMapTable = false);
00090 };
00092 #endif // !TAGS_MAP_Comp_H
```

4.16 Sample2/TagsMapDec.h File Reference

The header file of TagsMapDec class.

```
#include "Map.h"
```

Classes

class TagsMapDec

4.16.1 Detailed Description

The header file of TagsMapDec class.

The decompression algorithm of TagsMap compression algorithm. The decompression will re-map the tags to their original value.

The file might contain a TagsMap tag at the beginning, from that tag we can get the mapping numbers.

If the file doesn't contain this tag, then it will be assumed to be: <TagMap>users,user,id,name,posts,post,body,topics,topic,followers,formagMap>. which will be used for social network system only.

```
\label{eq:figure} \begin{split} \text{Example: -> File before: } <& \text{TagMap>} \\ & \text{tag0>} \\ & \text{tag2>} <& \text{tag2>}
```

See also

TagsMapComp

Author

eslam

Date

December 2023

4.17 TagsMapDec.h

Go to the documentation of this file.

```
00028 #pragma once
00029 #ifndef TAGS_MAP_DEC_H
00030 #define TAGS_MAP_DEC_H
00031
00032 #include "Map.h"
00033
00034 class TagsMapDec
00035 {
00036 private:
00037
         const std::string* xmlFile;
00038
00039
         const static std::string* defaultTagMapBlock;
00040
00041
          //Map of tag values.
00042
         Map* map;
00043
00044
          //helper methods
         void getMapTags();
00045
          void getTagsMapBlock();
00046
00047 public:
00048
         explicit TagsMapDec();
00049
          ~TagsMapDec();
00050
00051
         std::string* decompress();
00052 };
00053 #endif // !TAGS_MAP_DEC_H
```

Index

```
\simMap
    Map, 6
add
    Map, 6
ClearClosingTagsComp, 5
compress
    TagsMapComp, 11
containKey
    Map, 6
getKey
    Map, 7
getSize
    Map, 7
getValue
    Map, 7
isSkipChar
    MinifyingXML, 9
Map, 5
    \simMap, 6
    add, 6
    containKey, 6
    getKey, 7
    getSize, 7
    getValue, 7
    Map, 5
    toString, 7
mapTags
    TagsMapComp, 12
MinifyingXML, 8
    isSkipChar, 9
    MinifyingXML, 8
    minifyString, 9
    skipFromBeginning, 10
    skipFromEnd, 10
minifyString
    MinifyingXML, 9
Sample2/ClearClosingTagsComp.h, 13
Sample2/Map.cpp, 14
Sample2/Map.h, 14, 15
Sample2/Map_unittest.cpp, 15
Sample2/MinifyingXML.cpp, 16
Sample2/MinifyingXML.h, 16, 17
Sample2/MinifyingXML_unittest.cpp, 18
Sample2/pch.h, 18
```

Sample2/TagsMapComp.cpp, 19 Sample2/TagsMapComp.h, 20 Sample2/TagsMapDec.h, 21 skipFromBeginning MinifyingXML, 10 skipFromEnd Minifying XML, 10 TagsMapComp, 11 compress, 11 mapTags, 12 TagsMapComp, 11 TagsMapDec, 12 toString Map, 7

Sample2/TagMapComp_unittest.cpp, 19