//ArchivationThread.h

#ifndef ARCHIVATIONTHREAD\_H

#define ARCHIVATIONTHREAD\_H

#include <QThread>

#include <QFileInfo>

#include "filetranslator.h"

#include "filecollector.h"

#include "fileentry.h"

class **ArchivationThread** : public QThread

{

Q\_OBJECT

private:

QString fileName;

QFileInfo \*activeFile{nullptr};

QList<FileEntry> fcList;

signals:

void **exception\_executed**(QString e);

public:

**ArchivationThread**() = default;

void **setFileName**(QString fileName\_){

fileName=fileName\_;

}

void **setActiveFile**(QFileInfo\* activeFile\_){

activeFile = activeFile\_;

}

void **clear**(){

fcList.clear();

fileName.clear();

activeFile = nullptr;

}

QString **getFileName**(){

return fileName;

}

QList<FileEntry> **getFcList**(){

return fcList;

}

QString **getArchiveName**(){

return fileName;

}

void ***run***();

};

#endif // ARCHIVATIONTHREAD\_H

//ArchivationThread.cpp

#include "archivationthread.h"

void ArchivationThread::***run***(){

if(fileName.isNull() || !activeFile)

emit exception\_executed("ArchvationThread: fileName or activeFile is empty");

try{

FileTranslator ft;

ft.openFile(fileName);

QList<FileEntry> fcList;

if(activeFile->isDir()){

FileCollector fc(activeFile->absoluteFilePath());

fcList = fc.collectFiles();

}

else{

FileEntry temp(activeFile->absoluteFilePath(), "", activeFile->fileName());

fcList.push\_front(temp);

FileEntry temp2("<", "", "");

fcList.push\_front(temp2);

}

if(QThread::currentThread()->isInterruptionRequested()){

clear();

return;

}

ft.setAllFiles(fcList);

ft.translateFiles();

}

catch(runtime\_error e){

emit exception\_executed(e.*what*());

}

}

//bTree.h

#ifndef BTREE\_H

#define BTREE\_H

#include "node.h"

class **bTree**

{

private:

Node<int, char>\* root;

QString endCode;

QMap<char, QString> dictionary;

public:

**bTree**() = delete;

**bTree**(Node<int, char>\* nd): root(nd) {}

~**bTree**(){ destroyTree(*root*); }

void **destroyTree**(Node<int, char>\*& node);

void **formCodes**();

void **formCodesRec**(Node<int, char>\* node, QString tempCode);

QString **getEndCode**();

QMap<char, QString>& **getDictionary**();

};

#endif // BTREE\_H

//bTree.cpp

#include "btree.h"

void bTree::destroyTree(Node<int, char>\*& node){

if(node){

destroyTree(node->left);

destroyTree(node->right);

delete node;

node = nullptr;

}

}

void bTree::formCodes(){

formCodesRec(root, "");

}

void bTree::formCodesRec(Node<int, char>\* node, QString tempCode){

if(node){

if(node->isEndNode())

endCode = tempCode;

if(node->hasValue()){

node->code = tempCode;

dictionary[node->value] = tempCode;

}

formCodesRec(node->left, tempCode+'1');

formCodesRec(node->right, tempCode+'0');

}

}

QMap<char, QString>& bTree::getDictionary(){

return dictionary;

}

QString bTree::getEndCode(){

return endCode;

}

//Catalog.h

#ifndef CATALOG\_H

#define CATALOG\_H

#include "pch.h"

class **Catalog**

{

private:

QMap<char, int> catalog;

public:

**Catalog**() = default;

**Catalog**(QByteArray info);

QMap<char, int>& **add**(QByteArray info);

QMap<char, int>& **getCatalog**();

};

#endif // CATALOG\_H

//Catalog.cpp

#include "catalog.h"

Catalog::Catalog(QByteArray info){

add(info);

}

QMap<char, int>& Catalog::add(QByteArray info){

for(char a : info){

if(catalog.value(a, 0))

++catalog[a];

else

catalog[a]=1;

}

return catalog;

}

QMap<char, int>& Catalog::getCatalog(){

return catalog;

}

//Coder.h

#ifndef CODER\_H

#define CODER\_H

#include "pch.h"

class Coder

{

private:

QString endCode;

char prev;

bool leftPrev;

short prevSize;

int len{};

QMap<char, QString> dictionary;

public:

Coder():leftPrev(false), prevSize(0) {}

bool hasPrev();

char getPrev();

void setDictionary(QMap<char, QString>& dict);

QMap<char, QString> getDictionary();

void setEndCode(QString code);

QString getEndCode();

QByteArray getEof();

QByteArray encode(char sb);

QByteArray getNextCodeBuffer(QByteArray source);

void clear();

static char formByte(QString code);

static QByteArray formBytes(QString code);

};

#endif // CODER\_H

//Coder.cpp

#include "coder.h"

bool Coder::hasPrev(){

return leftPrev;

}

char Coder::getPrev(){

return prev;

}

void Coder::setDictionary(QMap<char, QString>& dict){

dictionary = dict;

}

QMap<char, QString> Coder::getDictionary(){

return dictionary;

}

void Coder::setEndCode(QString code){

endCode = code;

}

QString Coder::getEndCode(){

return endCode;

}

QByteArray Coder::getEof(){

char byte{0};

int counter{8};

QByteArray bf;

if(hasPrev()){

byte = prev;

counter = 8-prevSize;

}

for(QChar bit: endCode){

if(!counter){

bf += byte;

byte = 0;

counter = 8;

}

else

byte<<=1;

if(bit=='1'){

byte|=1;

}

--counter;

}

byte<<=counter;

bf+=byte;

prev = 0;

leftPrev = false;

prevSize = 0;

return bf;

}

QByteArray Coder::encode(char sb){

QByteArray bf;

QString code;

char byte{0};

code = dictionary[sb];

int counter = 8;

if(leftPrev){

leftPrev = false;

byte = prev;

counter = 8 - prevSize;

}

for(QChar bit: code){

if(!counter){

bf += byte;

byte = 0;

counter = 8;

}

else

byte<<=1;

if(bit=='1'){

byte|=1;

}

--counter;

}

bf+=byte;

return bf;

}

//Length of code must be less than 8, but greater than 0

char Coder::formByte(QString code){

if(code.length() > 8|| code.length() < 1)

throw std::runtime\_error("Coder::formByte: argument length must less than be 8, but greater than 0");

char byte{0};

for(QChar bit: code){

byte<<=1;

if(bit=='1')

byte|=1;

}

byte<<=8-code.length();

return byte;

}

//Returns string of bytes aligned by left: 111 represented as 1110000, not 00000111

QByteArray Coder::formBytes(QString code){

if(!code.size())

throw std::runtime\_error("Coder::formBytes: code size must be greater than 0");

QByteArray bf;

while(code.size()>8){

bf+=formByte(code.left(8));

code = code.right(code.length()-8);

}

bf+=formByte(code.left(8));

return bf;

}

QByteArray Coder::getNextCodeBuffer(QByteArray source){

QByteArray temp;

QByteArray buf;

for(char sb: source){

temp = encode(sb);

len += dictionary[sb].length();

int i{};

while(len>=8){

buf+=temp[i++];

len-=8;

}

if(len){

prevSize = len;

prev = temp[i];

leftPrev = true;

}

else

leftPrev = false;

}

//qDebug() << buf;

return buf;

}

void Coder::clear(){

dictionary.clear();

endCode.clear();

len = 0;

leftPrev = false;

prevSize = 0;

prev = 0;

}

//DearchivationThread.h

#ifndef DEARCHIVATIONTHREAD\_H

#define DEARCHIVATIONTHREAD\_H

#include <QThread>

#include <QString>

#include "filedecoder.h"

class DearchivationThread: public QThread

{

Q\_OBJECT

private:

QString fileName;

QString filePath;

QWidget \*parent;

signals:

void exception\_executed(QString e);

public:

DearchivationThread() = default;

void setFileName(QString fileName\_){

fileName=fileName\_;

}

void setFilePath(QString filePath\_){

filePath = filePath\_;

}

void run();

};

#endif // DEARCHIVATIONTHREAD\_H

//DearchivationThread.cpp

#include "dearchivationthread.h"

void DearchivationThread::***run***(){

try{

FileDecoder fd;

fd.dearchive(filePath, fileName);

}

catch(std::runtime\_error e){

emit exception\_executed(e.*what*());

}

}

//DialogWindow.h

#include "dearchivationthread.h"

void DearchivationThread::***run***(){

try{

FileDecoder fd;

fd.dearchive(filePath, fileName);

}

catch(std::runtime\_error e){

emit exception\_executed(e.*what*());

}

}

//DialogWindow.cpp

#include "dialogwindow.h"

#include "mainwindow.h"

DialogWindow::**DialogWindow**(QWidget\* parent): QDialog(parent)

{

message = new QLabel("&Enter archive name without extension:");

input = new QLineEdit;

message->setBuddy(input);

ok = new QPushButton("&Ok");

ok->setDisabled(true);

ok->setDefault(true);

cancel = new QPushButton("&Cancel");

QVBoxLayout \*inputLayout = new QVBoxLayout;

inputLayout->addWidget(message);

inputLayout->addWidget(input);

QVBoxLayout \*buttonsLayout = new QVBoxLayout;

buttonsLayout->addWidget(ok);

buttonsLayout->addWidget(cancel);

QHBoxLayout \*windowLayout = new QHBoxLayout;

windowLayout->addLayout(inputLayout);

windowLayout->addLayout(buttonsLayout);

setLayout(windowLayout);

setWindowTitle("Archive name input");

setWindowFlags( Qt::Window | Qt::WindowTitleHint | Qt::WindowCloseButtonHint);

connect(input, SIGNAL(textChanged(QString)), this, SLOT(on\_text\_changed(QString)));

connect(ok, SIGNAL(clicked()), this, SLOT(on\_ok\_button\_clicked()));

connect(cancel, SIGNAL(clicked()), this, SLOT(on\_cancel\_button\_clicked()));

}

void DialogWindow::**on\_text\_changed**(QString str){

ok->setEnabled(!str.isEmpty());

}

void DialogWindow::**on\_ok\_button\_clicked**(){

emit fileNameEntered(input->text());

input->clear();

emit close();

}

void DialogWindow::**on\_cancel\_button\_clicked**(){

input->clear();

emit close();

}

//FileCollector.h

#ifndef FILECOLLECTOR\_H

#define FILECOLLECTOR\_H

#include <QDir>

#include <QFile>

#include <QString>

#include <QList>

#include <QThread>

#include "fileentry.h"

class **FileCollector**

{

private:

QDir startDir;

QList<FileEntry> allFiles;

QStringList allDirs;

public:

**FileCollector**(QDir dir){

startDir = dir;

}

QList<FileEntry> **collectFiles**();

void **collect\_files**(QDir current, QString relativePath);

static int **dirSize**(QString dirPath, int size, const int max);

static bool **isCorrectFileName**(QString path);

};

#endif // FILECOLLECTOR\_H

//FileCollector.cpp

#include "filecollector.h"

#include <QDebug>

QList<FileEntry> FileCollector::**collectFiles**(){

collect\_files(startDir, startDir.dirName());

QString allDirsLine;

for(QString dir: allDirs){

if(QThread::currentThread()->isInterruptionRequested())

return allFiles;

allDirsLine.append(dir);

allDirsLine.append('|');

}

allDirsLine.append('<');

FileEntry temp(allDirsLine, "", "");

allFiles.push\_front(temp);

return allFiles;

}

void FileCollector::**collect\_files**(QDir current, QString relativePath){

if(QThread::currentThread()->isInterruptionRequested())

return;

QStringList files = current.entryList(QDir::Files | QDir::NoDotAndDotDot);

QStringList dirs = current.entryList(QDir::AllDirs | QDir::NoDotAndDotDot);

if(!relativePath.isEmpty() && !allDirs.contains(relativePath))

allDirs.push\_back(relativePath);

for(QString file: files){

if(QThread::currentThread()->isInterruptionRequested())

return;

qDebug() << file << " " << relativePath;

FileEntry temp(current.absolutePath()+QDir::separator()+file, relativePath, file);

allFiles.append(temp);

}

for(QString dir: dirs){

if(QThread::currentThread()->isInterruptionRequested())

return;

QDir temp(current.absolutePath()+QDir::separator()+dir);

collect\_files(temp, relativePath+"/"+dir);

}

}

int FileCollector::**dirSize**(QString dirPath, int size, const int max){

QDir dir{dirPath};

for(QString filePath: dir.entryList(QDir::Files | QDir::System | QDir::Hidden)){

++size;

}

for(QString childDirPath: dir.entryList(QDir::Dirs | QDir::NoDotAndDotDot | QDir::System | QDir::Hidden)){

++size;

size=dirSize(dirPath+QDir::separator()+childDirPath, size, max);

if(size>50)

return size;

}

return size;

}

bool FileCollector::**isCorrectFileName**(QString path){

// Anything following the raw filename prefix should be legal.

if (path.left(4)=="\\\\?\\")

return true;

// Windows filenames are not case sensitive.

path = path.toUpper();

// Trim the drive letter off

if (path[1]==':' && (path[0]>='A' && path[0]<='Z'))

path = path.right(path.length()-2);

QString illegal="\\/<>:\"|?\*";

foreach (const QChar& c, path)

{

// Check for control characters

if (c.toLatin1() > 0 && c.toLatin1() < 32)

return false;

// Check for illegal characters

if (illegal.contains(c))

return false;

}

// Check for device names in filenames

static QStringList devices;

if (!devices.count())

devices << "CON" << "PRN" << "AUX" << "NUL" << "COM0" << "COM1" << "COM2"

<< "COM3" << "COM4" << "COM5" << "COM6" << "COM7" << "COM8" << "COM9" << "LPT0"

<< "LPT1" << "LPT2" << "LPT3" << "LPT4" << "LPT5" << "LPT6" << "LPT7" << "LPT8"

<< "LPT9";

const QFileInfo fi(path);

const QString basename = fi.baseName();

foreach (const QString& s, devices)

if (basename == s)

return false;

// Check for trailing periods or spaces

if (path.right(1)=="." || path.right(1)==" ")

return false;

// Check for pathnames that are too long (disregarding raw pathnames)

if (path.length()>260)

return false;

// Exclude raw device names

if (path.left(4)=="\\\\.\\")

return false;

// Since we are checking for a filename, it mustn't be a directory

if (path.right(1)=="\\")

return false;

return true;

}

#ifndef FILEDECODER\_H

#define FILEDECODER\_H

#include "pch.h"

#include "readbuffer.h"

#include <QThread>

#include <QDir>

#include <QMessageBox>

class **FileDecoder**

{

private:

ReadBuffer input;

QMap<QString, char> dictionary{};

QString dirName{};

QString endCode{};

QString outpPath{};

QString mainDir{};

int longestCodeSize{};

public:

**FileDecoder**():input(5120) {}

void **dearchive**(QString path, QString fileName);

bool **decodeDictionary**();

void **decodeFile**(QFile& outf);

void **readDireactoryTree**();

int **getNum**();

QByteArray **getPath**();

QString **toCode**(char c, int length);

};

#endif // FILEDECODER\_H

#ifndef FILEDECODER\_H

#define FILEDECODER\_H

#include "pch.h"

#include "readbuffer.h"

#include <QThread>

#include <QDir>

#include <QMessageBox>

class **FileDecoder**

{

private:

ReadBuffer input;

QMap<QString, char> dictionary{};

QString dirName{};

QString endCode{};

QString outpPath{};

QString mainDir{};

int longestCodeSize{};

public:

**FileDecoder**():input(5120) {}

void **dearchive**(QString path, QString fileName);

bool **decodeDictionary**();

void **decodeFile**(QFile& outf);

void **readDireactoryTree**();

int **getNum**();

QByteArray **getPath**();

QString **toCode**(char c, int length);

};

#endif // FILEDECODER\_H

//FileDecoder.cpp

#include "filedecoder.h"

void FileDecoder::**dearchive**(QString path, QString fileName){

input.openFile(path+"/"+fileName);

outpPath = path;

readDireactoryTree();

while (!input.isEnd()){

if(QThread::currentThread()->isInterruptionRequested())

return;

dictionary.clear();

longestCodeSize = 0;

QString currentPath = getPath();

QString currentName = getPath();

if(!outpPath.isEmpty()){

currentPath.prepend('/');

currentPath.prepend(outpPath);

}

if(!currentPath.isEmpty()){

currentName.prepend('/');

currentName.prepend(currentPath);

}

QFile outf(currentName);

if(!outf.*open*(QFile::WriteOnly)){

throw std::runtime\_error("Can't dearchive");

}

if(decodeDictionary())

decodeFile(*outf*);

outf.*close*();

}

}

bool FileDecoder::**decodeDictionary**(){

int size{};

QString code;

size = getNum();

if(!size){

return false;

}

do{

char bt = input.get();

code+=toCode(bt, size);

size-=8;

}while(size>0);

endCode = code;

char byte;

while(true){

if(QThread::currentThread()->isInterruptionRequested())

return false;

code.clear();

input.get();

byte = input.get();

if(dictionary.values().contains(byte))

break;

input.get();

size = getNum();

do{

code+=toCode(input.get(), size);

size-=8;

}while(size>0);

dictionary[code]=byte;

}

for(QString str: dictionary.keys()){

if(QThread::currentThread()->isInterruptionRequested())

return false;

if (str.length()>longestCodeSize)

longestCodeSize = str.length();

}

return true;

}

int FileDecoder::**getNum**(){

QString num{};

while(input.peek()!='|'){

num.append(input.get());

}

if(num.isNull())

throw std::runtime\_error("Archive was corrupted");

input.get();

return num.toInt();

}

QByteArray FileDecoder::**getPath**(){

QByteArray path{};

while(input.peek()!='|'){

path.append(input.get());

}

input.get();

return path;

}

QString FileDecoder::**toCode**(char c, int length){

QString code;

int bit8 = 128;

if (length>8)

length = 8;

while(length){

if(c&bit8){

code.append("1");

}

else

code.append("0");

--length;

c<<=1;

}

return code;

}

void FileDecoder::**decodeFile**(QFile& outf){

char byte{};

int size{};

int bit8 = 128;

bool notEnd{true};

QString code;

QByteArray buffer;

while(notEnd){

if(QThread::currentThread()->isInterruptionRequested())

return;

if(!size){

byte = input.get();

size = 8;

}

while(size){

if (byte&bit8)

code.append("1");

else

code.append("0");

if(code.length()>longestCodeSize)

throw std::runtime\_error("Archive was corrupted");

byte<<=1;

--size;

if(code==endCode){

notEnd=false;

break;

}

if(dictionary.contains(code)){

buffer.append(dictionary[code]);

code.clear();

if(buffer.size()>128){

outf.write(buffer);

buffer.clear();

}

break;

}

}

}

if(buffer.size())

outf.write(buffer);

}

void FileDecoder::**readDireactoryTree**(){

QString dir;

QDir a(outpPath);

while(input.peek()!='<'){

if(QThread::currentThread()->isInterruptionRequested())

return;

while(input.peek()!='|'){

dir.append(input.get());

}

if(input.peek()=='|'){

if(!dir.isEmpty()){

a.mkdir(dir);

}

}

input.get();

dir.clear();

}

input.get();

}

//FileEntry.h

#ifndef FILEENTRY\_H

#define FILEENTRY\_H

#include <QString>

class **FileEntry**

{

private:

QString path;

QString relativePath;

QString fileName;

public:

**FileEntry**(QString path\_, QString relativePath\_, QString file\_name){

path = path\_;

relativePath = relativePath\_;

fileName = file\_name;

}

void **setPath**(QString path\_);

QString **getPath**();

void **setRelativePath**(QString relativePath\_);

QString **getRelativePath**();

void **setFileName**(QString file\_name);

QString **getFileName**();

};

#endif // FILEENTRY\_H

//FileEntry.cpp

#include "fileentry.h"

void FileEntry::**setPath**(QString path\_){

path = path\_;

}

QString FileEntry::**getPath**(){

return path;

}

void FileEntry::**setRelativePath**(QString relativePath\_){

relativePath = relativePath\_;

}

QString FileEntry::**getRelativePath**(){

return relativePath;

}

void FileEntry::**setFileName**(QString file\_name){

fileName = file\_name;

}

QString FileEntry::**getFileName**(){

return fileName;

}

//FileTranslator.h

#ifndef FILETRANSLATOR\_H

#define FILETRANSLATOR\_H

#include "coder.h"

#include "fileentry.h"

#include <QThread>

using namespace std;

class **FileTranslator**

{

private:

QFile fout;

QFile fin;

QList<FileEntry> allFiles;

Coder coder{};

public:

**FileTranslator**() = default;

**FileTranslator**(QString path): fout(path){

fout.*open*(QFile::WriteOnly);

}

~**FileTranslator**(){

fout.*close*();

fin.*close*();

}

void **openFile**(QString path\_);

void **setAllFiles**(QList<FileEntry> allFiles\_);

QList<FileEntry> **getAllFiles**();

void **translateFiles**();

void **translateDictionary**();

void **clear**();

};

#endif // FILETRANSLATOR\_H

//FileTranslator.cpp

#include "filetranslator.h"

#include "catalog.h"

#include "treeformer.h"

#include "btree.h"

void FileTranslator::**openFile**(QString path\_){

if(fout.isOpen())

fout.*close*();

fout.setFileName(path\_);

if(!fout.*open*(QFile::WriteOnly))

throw std::runtime\_error("Cant open output file");

}

void FileTranslator::**translateFiles**(){

const int BUFFER\_SIZE = 512;

QByteArray buf{};

if(allFiles.isEmpty())

throw std::runtime\_error("Internal error");

buf.clear();

buf.append(allFiles.front().getPath());

fout.write(buf);

allFiles.pop\_front();

while(allFiles.size()){

if(QThread::currentThread()->isInterruptionRequested()){

clear();

return;

}

coder.clear();

QString path = allFiles.front().getRelativePath();

buf.clear();

buf.append(path);

buf.append("|");

buf.append(allFiles.front().getFileName());

buf.append("|");

fout.write(buf);

path = allFiles.front().getPath();

QFile inf(path);

if(!inf.*open*(QFile::ReadOnly)){

throw runtime\_error("Can't open input file");

}

Catalog cat;

buf.clear();

allFiles.pop\_front();

if(inf.*size*())

do{

if(QThread::currentThread()->isInterruptionRequested()){

clear();

return;

}

buf = inf.read(BUFFER\_SIZE);

if(buf.isNull() || !buf.size())

break;

cat.add(buf);

}while(!buf.isNull());

else{

buf.clear();

buf.append("0|");

fout.write(buf);

buf.clear();

continue;

}

TreeFormer trf(cat.getCatalog());

bTree tree = trf.formBTree();

tree.formCodes();

coder.setDictionary(*tree.getDictionary()*);

coder.setEndCode(tree.getEndCode());

translateDictionary();

inf.*seek*(0);

do{

if(QThread::currentThread()->isInterruptionRequested()){

clear();

return;

}

buf = inf.read(BUFFER\_SIZE);

if(buf.isNull() || !buf.size())

break;

fout.write(coder.getNextCodeBuffer(buf));

fout.flush();

}while(!buf.isNull());

fout.write(coder.getEof());

fout.flush();

inf.*close*();

}

fout.*close*();

}

void FileTranslator::**translateDictionary**(){

QString temp;

fout.write(std::to\_string(coder.getEndCode().size()).c\_str());

fout.write("|");

temp = coder.getEndCode();

fout.write(Coder::formBytes(temp));

for(char key: coder.getDictionary().keys()){

if(QThread::currentThread()->isInterruptionRequested()){

clear();

return;

}

QByteArray arr;

arr.clear();

arr.append("|");

arr.append(key);

arr.append("|");

arr.append(to\_string(coder.getDictionary()[key].length()).c\_str());

arr.append("|");

arr.append(Coder::formBytes(coder.getDictionary()[key]));

fout.write(arr);

}

fout.write("|");

fout.putChar(coder.getDictionary().keys()[0]);

}

void FileTranslator::**setAllFiles**(QList<FileEntry> allFiles\_){

allFiles = allFiles\_;

}

QList<FileEntry> FileTranslator::**getAllFiles**(){

return allFiles;

}

void FileTranslator::**clear**(){

if(fout.isOpen())

fout.*close*();

if(fin.isOpen())

fin.*close*();

allFiles.clear();

coder.clear();

}

//Main.cpp

#include "pch.h"

#include "mainwindow.h"

#include <QApplication>

int main(int argc, char \*argv[])

{

QApplication a(argc, argv);

QFile styles(":style.css");

if(!styles.open(QFile::ReadOnly))

throw std::runtime\_error("Can't open css file");

a.setStyleSheet(styles.readAll());

MainWindow w;

w.show();

return a.exec();

}

//MainWindow.h

#ifndef MAINWINDOW\_H

#define MAINWINDOW\_H

#include "filetranslator.h"

#include "filedecoder.h"

#include "filecollector.h"

#include "dialogwindow.h"

#include "waitbox.h"

#include "archivationthread.h"

#include "dearchivationthread.h"

#include <QFileSystemModel>

#include <QTreeView>

#include <QLabel>

#include <QMessageBox>

#include <QMainWindow>

#include <QFileInfo>

QT\_BEGIN\_NAMESPACE

namespace Ui { class MainWindow; }

QT\_END\_NAMESPACE

class MainWindow : public QMainWindow

{

Q\_OBJECT

public:

MainWindow(QWidget \*parent = nullptr);

~MainWindow();

private:

void disableButtons();

signals:

void close\_waitBox();

private slots:

void on\_treeView\_clicked(const QModelIndex &index);

void on\_archiveButton\_clicked();

void on\_dearchiveButton\_clicked();

void on\_fileNameEntered(QString input);

void when\_archivation\_complete();

void when\_archivation\_canceled();

void when\_dearchivation\_complete();

void when\_dearchivation\_canceled();

void on\_deleteButton\_clicked();

void when\_thread\_exception\_handled(QString e);

private:

Ui::MainWindow \*ui;

QFileInfo \*activeFile;

QFileSystemModel \*model;

DialogWindow \*dw;

WaitBox \*archiveWait;

WaitBox \*dearchiveWait;

ArchivationThread \*at;

DearchivationThread \*dt;

QString fileName;

const int MAX\_DEPTH = 50;

bool processing;

};

#endif // MAINWINDOW\_H

//MainWindow.cpp

#include "mainwindow.h"

#include "ui\_mainwindow.h"

MainWindow::**MainWindow**(QWidget \*parent)

: QMainWindow(parent)

, ui(new Ui::MainWindow)

{

ui->setupUi(this);

model = new QFileSystemModel(this);

model->setRootPath(QDir::homePath());

ui->treeView->*setModel*(model);

ui->treeView->setColumnWidth(0, 350);

this->setWindowTitle("Jacket");

resize(size().width(), size().height()\*1.2);

setWindowIcon(QIcon("./images/jacket.ico"));

activeFile = new QFileInfo();

dw = new DialogWindow(this);

archiveWait = new WaitBox(this);

dearchiveWait = new WaitBox(this);

at = new ArchivationThread();

dt = new DearchivationThread();

disableButtons();

connect(dw, &DialogWindow::fileNameEntered, this, &MainWindow::on\_fileNameEntered);

connect(at, &QThread::finished, this, &MainWindow::when\_archivation\_complete);

connect(archiveWait, &WaitBox::operation\_canceled, this, &MainWindow::when\_archivation\_canceled);

connect(this, &MainWindow::close\_waitBox, archiveWait, &WaitBox::on\_signal\_to\_close);

connect(dt, &QThread::finished, this, &MainWindow::when\_dearchivation\_complete);

connect(dearchiveWait, &WaitBox::operation\_canceled, this, &MainWindow::when\_dearchivation\_canceled);

connect(this, &MainWindow::close\_waitBox, dearchiveWait, &WaitBox::on\_signal\_to\_close);

connect(dt, &DearchivationThread::exception\_executed, this, &MainWindow::when\_thread\_exception\_handled);

connect(at, &ArchivationThread::exception\_executed, this, &MainWindow::when\_thread\_exception\_handled);

}

MainWindow::~***MainWindow***(){

delete ui;

}

void MainWindow::**on\_treeView\_clicked**(const QModelIndex &index)

{

disableButtons();

if(!processing){

\*activeFile = model->fileInfo(index);

ui->infoLabel->setText(activeFile->fileName());

if(activeFile->suffix() == "jacket")

ui->dearchiveButton->setEnabled(true);

ui->archiveButton->setEnabled(true);

ui->deleteButton->setEnabled(true);

}

}

void MainWindow::**on\_archiveButton\_clicked**()

{

if(!activeFile->fileName().isEmpty()){

dw->show();

}

else

QMessageBox::warning(this, "Wrong input", "Please, choose file or directory first");

}

void MainWindow::**on\_dearchiveButton\_clicked**()

{

if(activeFile->suffix() == "jacket"){

processing = true;

ui->infoLabel->setText("");

dt->setFileName(activeFile->fileName());

dt->setFilePath(activeFile->absolutePath());

dt->start();

dearchiveWait->show();

}

else{

QMessageBox::warning(this, "Wrong file", "Please, choose file with '.jacket' extension");

}

}

void MainWindow::**on\_fileNameEntered**(QString input){

if(!input.isEmpty() && FileCollector::isCorrectFileName(input)){

processing = true;

ui->infoLabel->setText("");

fileName = input;

dw->close();

fileName+=".jacket";

fileName.prepend('/');

fileName.prepend(activeFile->absolutePath());

at->setFileName(fileName);

at->setActiveFile(activeFile);

at->start();

archiveWait->show();

}

else {

fileName = "";

QMessageBox::warning(this, "Wrong input", "Please, input filename without special symbols");

}

}

void MainWindow::**when\_archivation\_complete**(){

emit close\_waitBox();

QString prev = model->rootPath();

model->setRootPath(activeFile->absolutePath());

model->setRootPath(prev);

processing = false;

disableButtons();

}

void MainWindow::**when\_archivation\_canceled**(){

at->requestInterruption();

at->wait();

emit close\_waitBox();

QFile::remove(fileName);

processing = false;

}

void MainWindow::**when\_dearchivation\_complete**(){

emit close\_waitBox();

QString prev = model->rootPath();

model->setRootPath(activeFile->absolutePath());

model->setRootPath(prev);

processing = false;

disableButtons();

}

void MainWindow::**when\_dearchivation\_canceled**(){

dt->requestInterruption();

dt->wait();

processing = false;

emit close\_waitBox();

}

void MainWindow::**on\_deleteButton\_clicked**()

{

if(!activeFile->fileName().isEmpty()){

QString what("file");

if(activeFile->isDir()){

if(FileCollector::dirSize(activeFile->absoluteFilePath(), 0, MAX\_DEPTH)>MAX\_DEPTH){

QMessageBox::warning(this, "Bad directory", "Choosen directory depth is to big");

return;

}

what = "directory";

}

if(QMessageBox::Yes == QMessageBox::question(this, "", "Are you sure you want to delete this " + what+ "?")){

if(activeFile->isDir()){

QDir temp(activeFile->absoluteFilePath());

temp.removeRecursively();

}

else{

QFile temp(activeFile->absoluteFilePath());

temp.remove();

}

}

}

else

QMessageBox::warning(this, "Wrong input", "Please, choose file or directory first");

processing = false;

disableButtons();

}

void MainWindow::**disableButtons**(){

ui->archiveButton->setEnabled(false);

ui->dearchiveButton->setEnabled(false);

ui->deleteButton->setEnabled(false);

}

void MainWindow::**when\_thread\_exception\_handled**(QString e){

QMessageBox::critical(this, "Error", e);

}

//Node.h

#ifndef NODE\_H

#define NODE\_H

#include "pch.h"

template <typename T, typename N>

class **Node** {

private:

bool has\_value{true};

public:

QString code;

T count{};

N value{};

Node<T, N>\* left = nullptr, \*right = nullptr;

bool endNode{false};

**Node**() = default;

**Node**(T cnt): count(cnt), left(nullptr), right(nullptr), has\_value(false), endNode(true) {}

**Node**(T cnt, N val): count(cnt), value(val), left(nullptr), right(nullptr), has\_value(true) {}

**Node**(Node<T, N>\* lef, Node<T, N>\* rgt) : left(lef), right(rgt), has\_value(false) {

count = left->count+right->count;

}

~**Node**() {

if(left)

delete left;

if(right)

delete right;

}

T **getCount**(){

return count;

}

N **getValue**(){

return value;

}

QString **getCode**(){

return code;

}

bool **hasValue**(){

return has\_value;

}

void **setEndNode**(bool t){

endNode = t;

}

bool **isEndNode**(){

return endNode;

}

bool operator>(Node<T, N> other){

return count>other.getCount();

}

bool operator<(Node<T, N> other){

return count<other.getCount();

}

bool operator==(Node<T, N> other){

return count==other.getCount();

}

bool operator!=(Node<T, N> other){

return !count==other.getCount();

}

};

#endif // NODE\_H

//NodeComparator.h

#ifndef NODECOMPARATOR\_H

#define NODECOMPARATOR\_H

#include "node.h"

struct NodeComparator

{

public:

bool operator()(Node<int, char>\* first, Node<int, char>\* second){

return first->getCount()>second->getCount();

}

};

#endif // NODECOMPARATOR\_H

//pch.h

#ifndef PCH\_H

#define PCH\_H

#include <QFile>

#include <QString>

#include <QDebug>

#include <QMap>

#include <queue>

#include <iostream>

#include <string>

#include <vector>

#include <list>

#include <map>

#include <windows.h>

#include <locale>

#include <iomanip>

#include <sstream>

#include <fstream>

using std::cout;

using std::cin;

using std::endl;

using std::setw;

using std::string;

using std::wstring;

using std::list;

using std::vector;

using std::map;

using std::priority\_queue;

using std::cout;

using std::pair;

using std::ifstream;

using std::ofstream;

using std::ios;

#endif // PCH\_H

//ReadBuffer.h

#ifndef READBUFFER\_H

#define READBUFFER\_H

#include <QFile>

class **ReadBuffer**

{

private:

QFile fin;

char\* buffer;

const size\_t inputSize;

size\_t index{};

size\_t readen{};

public:

**ReadBuffer**(size\_t inputSize\_): inputSize(inputSize\_){

buffer = new char[inputSize];

index = inputSize;

}

~**ReadBuffer**(){

delete[] buffer;

fin.*close*();

}

void **openFile**(QString fileName){

if(fin.isOpen())

fin.*close*();

fin.setFileName(fileName);

fin.*open*(QFile::ReadOnly);

}

char **get**(){

nextBuffer();

return buffer[index++];

}

char **peek**(){

nextBuffer();

return buffer[index];

}

void **nextBuffer**(){

if(!(index<inputSize)){

memset(buffer, 0, inputSize);

if(fin.*atEnd*()){

throw std::runtime\_error("ReadBuffer::nextBuffer(): File was corrupted");

}

readen = fin.read(buffer, inputSize);

index=0;

}

}

bool **isEnd**(){

if(index<readen)

return false;

else

return fin.*atEnd*();

}

void **close**(){

fin.*close*();

}

};

#endif // READBUFFER\_H

//TreeFormer.h

#ifndef TREEFORMER\_H

#define TREEFORMER\_H

#include "pch.h"

#include "node.h"

#include "nodecomparator.h"

class **TreeFormer**

{

private:

priority\_queue<Node<int, char>\*, vector<Node<int, char>\*>, NodeComparator> nodes;

public:

**TreeFormer**() = default;

**TreeFormer**(QMap<char, int> cat);

void **add**(Node<int, char>\* nw);

Node<int, char>\* **take**();

Node<int, char>\* **formBTree**();

};

#endif // TREEFORMER\_H

//TreeFormer.cpp

#include "treeformer.h"

TreeFormer::TreeFormer(QMap<char, int> cat){

for(char a: cat.keys()){

Node<int, char> \*temp = new Node<int, char>(cat[a], a);

nodes.push(temp);

}

}

void TreeFormer::add(Node<int, char>\* nw){

nodes.push(nw);

}

Node<int, char>\* TreeFormer::take(){

Node<int, char>\* temp = nodes.top();

nodes.pop();

return temp;

}

Node<int, char>\* TreeFormer::formBTree(){

Node<int, char>\* tree;

if(nodes.empty())

tree = nullptr;

Node<int, char>\* left, \*right;

Node<int, char> \*temp = new Node<int, char>(0);

nodes.push(temp);

while(nodes.size()>1){

left = take();

right = take();

Node<int, char>\* temp = new Node<int, char>(left, right);

nodes.push(temp);

}

tree = take();

return tree;

}

//WaitBox.h

#ifndef WAITBOX\_H

#define WAITBOX\_H

#include <QDialog>

#include <QThread>

#include <QLabel>

#include <QObject>

#include <QVBoxLayout>

#include <QPushButton>

class WaitBox: public QDialog

{

Q\_OBJECT

private:

QLabel\* msgLabel;

QPushButton \*cancel;

public:

WaitBox(QWidget \*parent = nullptr);

void show();

signals:

void operation\_canceled();

public slots:

void on\_cancel\_button\_clicked();

void on\_signal\_to\_close();

};

#endif // WAITBOX\_H

//WaitBox.cpp

#include "waitbox.h"

WaitBox::**WaitBox**(QWidget \*parent)

: QDialog(parent),

msgLabel(new QLabel("Please wait until the end of operation", this)),

cancel(new QPushButton("Cancel")){

QVBoxLayout\* mainLayout = new QVBoxLayout;

mainLayout->setContentsMargins(30, 30, 30, 30);

mainLayout->addWidget(msgLabel);

mainLayout->addWidget(cancel);

setLayout(mainLayout);

setWindowFlags(Qt::Dialog

| Qt::WindowTitleHint

| Qt::MSWindowsFixedSizeDialogHint);

QObject::connect(cancel, &QPushButton::clicked, this, &WaitBox::on\_cancel\_button\_clicked);

}

void WaitBox::**show**(){

QDialog::show();

}

void WaitBox::**on\_cancel\_button\_clicked**(){

emit operation\_canceled();

}

void WaitBox::**on\_signal\_to\_close**(){

emit close();

}

//MainWindow.ui

<?xml version="1.0" encoding="UTF-8"?>

<ui version="4.0">

<class>MainWindow</class>

<widget class="QMainWindow" name="MainWindow">

<property name="windowModality">

<enum>Qt::NonModal</enum>

</property>

<property name="enabled">

<bool>true</bool>

</property>

<property name="geometry">

<rect>

<x>0</x>

<y>0</y>

<width>779</width>

<height>617</height>

</rect>

</property>

<property name="sizePolicy">

<sizepolicy hsizetype="Preferred" vsizetype="Preferred">

<horstretch>0</horstretch>

<verstretch>0</verstretch>

</sizepolicy>

</property>

<property name="windowTitle">

<string>MainWindow</string>

</property>

<property name="styleSheet">

<string notr="true"/>

</property>

<property name="inputMethodHints">

<set>Qt::ImhNone</set>

</property>

<widget class="QWidget" name="centralwidget">

<layout class="QVBoxLayout" name="verticalLayout">

<property name="spacing">

<number>0</number>

</property>

<item>

<widget class="QTreeView" name="treeView">

<property name="sortingEnabled">

<bool>true</bool>

</property>

<property name="animated">

<bool>false</bool>

</property>

</widget>

</item>

<item>

<layout class="QHBoxLayout" name="horizontalLayout">

<property name="spacing">

<number>12</number>

</property>

<property name="topMargin">

<number>20</number>

</property>

<item>

<widget class="QPushButton" name="archiveButton">

<property name="styleSheet">

<string notr="true"/>

</property>

<property name="text">

<string>Archive</string>

</property>

</widget>

</item>

<item>

<widget class="QPushButton" name="dearchiveButton">

<property name="styleSheet">

<string notr="true">.myButton {

box-shadow: 0px 7px 0px 0px #3cb1c9;

background-color:#58c2e8;

border-radius:8px;

display:inline-block;

cursor:pointer;

color:#ffffff;

font-family:Arial;

font-size:22px;

font-weight:bold;

padding:13px 24px;

text-decoration:none;

text-shadow:0px 1px 0px #326e82;

}

.myButton:hover {

background-color:#2daec2;

}

.myButton:active {

position:relative;

top:1px;

}

</string>

</property>

<property name="text">

<string>Dearchive</string>

</property>

</widget>

</item>

<item>

<widget class="QPushButton" name="deleteButton">

<property name="text">

<string>Delete</string>

</property>

</widget>

</item>

<item>

<widget class="QLabel" name="infoLabel">

<property name="text">

<string/>

</property>

</widget>

</item>

<item>

<spacer name="horizontalSpacer">

<property name="orientation">

<enum>Qt::Horizontal</enum>

</property>

<property name="sizeHint" stdset="0">

<size>

<width>40</width>

<height>20</height>

</size>

</property>

</spacer>

</item>

</layout>

</item>

</layout>

</widget>

<widget class="QMenuBar" name="menubar">

<property name="geometry">

<rect>

<x>0</x>

<y>0</y>

<width>779</width>

<height>21</height>

</rect>

</property>

</widget>

<widget class="QStatusBar" name="statusbar"/>

</widget>

<resources/>

<connections/>

</ui>

//Style.css

QPushButton {

border-radius: 3px;

background-color: #2196f3;

color:#ffffff;

font-size:12px;

font-weight:bold;

padding:5px 10px;

min-width: 40px;

}

QPushButton*:pressed* {

background-color: #6ec6ff;

}

QPushButton*:hover* {

background-color: #0c88eb;

}

QPushButton*:flat* {

border: none;

}

QPushButton*:default* {

border-color: navy;

}

QPushButton**#deleteButton** {

background-color: #ff5252;

}

QPushButton**#deleteButton***:hover* {

background-color: #fc3a3a;

}

QPushButton**#deleteButton***:pressed* {

background-color: #ff867f;

}

QPushButton*:!enabled* , QPushButton**#deleteButton***:!enabled* {

background-color: #c7c7c7;

}