StockMarket

C++ Console Application

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Contents

Chapter 1

Hierarchical Index

1.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 2

Class Index

2.1 Class List

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

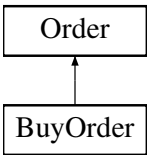
Chapter 3

Class Documentation

3.1 BuyOrder Class Reference

`#include <Order.h>`

Inheritance diagram for BuyOrder:



Public Member Functions

- BuyOrder (ifstream &in)
  ///
- BuyOrder (string stock, double val, unsigned quantity, nif_t buyerNIF)
- nif_t getClientNIF () const
- Transaction * operator() (Order *o)
- void saveChanges (ofstream &out) const

Private Attributes

- friend **SellOrder**
- nif_t buyerNIF

Additional Inherited Members

3.1.1 Detailed Description

Class used to represent a buy order. Derives from Order.

3.1.2 Constructor & Destructor Documentation

3.1.2.1 BuyOrder() [1/2]

```
BuyOrder::BuyOrder (
            ifstream & in )
```

///

A constructor. The construtor creates a BuyOrder object, reading the data from the input stream passed as argument.

Parameters

in	The input stream to read from in order to build the BuyOrder object.

3.1.2.2 BuyOrder() [2/2]

```
BuyOrder::BuyOrder (
            string stock,
            double val,
            unsigned quantity,
            nif_t buyerNIF )
```

A constructor. The construtor creates a BuyOrder object using the data passed as arguments.

Parameters

stock	A string with the stock name.
val	A double with the value per stock.
quantity	An unsigned with the stock quantity.
buyer↩ NIF	The buyer's NIF.

3.1.3 Member Function Documentation

3.1.3.1 getClientNIF()

```
nif_t BuyOrder::getClientNIF ( ) const  [virtual]
```

A const member function that returns the NIF of the client associated with this BuyOrder.

Returns

The NIF of the Buyer associated with this Order.

Implements Order.

3.1.3.2 operator()()

```
Transaction * BuyOrder::operator() (
            Order * o )  [virtual]
```

Overload of operator() for class Order.

Parameters

o	Pointer of an object Order.

Returns

A transaction type object.

Implements Order.

3.1.3.3 saveChanges()

```
void BuyOrder::saveChanges (
            ofstream & out ) const  [virtual]
```

A const memeber function to save changes in an output stream.

Parameters

out	The outstream file to write to.

Reimplemented from Order.

3.1.4 Member Data Documentation

3.1.4.1 buyerNIF

```
nif_t BuyOrder::buyerNIF  [private]
```

nif_t buyerNIF. The NIF of the buyer associated with this Order.

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

- D:/ProjetosC++/AEDAv2/StockMarket/Order.h
- D:/ProjetosC++/AEDAv2/StockMarket/Order.cpp

3.2 Client Class Reference

`#include <Client.h>`

Classes

- class InvalidNIF

Public Member Functions

- Client ()=default
- Client (ifstream &in)
- Client (string name, nif_t nif)
- string getName () const
- nif_t getNIF () const
- void saveChanges (ofstream &out) const

Private Attributes

- string name
- nif_t nif

3.2.1 Detailed Description

A class used to represent a client. Each client object has a name and a nif (from the portuguese "Numero de Identificação Fiscal").

3.2.2 Constructor & Destructor Documentation

3.2.2.1 Client() [1/3]

```
Client::Client ( )  [default]
```

A default constructor.

3.2.2.2 Client() [2/3]

```
Client::Client (
            ifstream & in )
```

A constructor. The construtor creates a Client object, reading the data from the input stream passed as argument.

Parameters

in	The input stream to read from in order to build the client object.

3.2.2.3 Client() [3/3]

```
Client::Client (
            string name,
            nif_t nif )
```

A constructor. The construtor creates a client object with the data passed as arguments.

Parameters

name	The client's name.
nif	The client's NIF.

3.2.3 Member Function Documentation

3.2.3.1 getName()

```
string Client::getName ( ) const
```

A const member function with no arguments to get the client's name.

Returns

A string, the client's name.

3.2.3.2 getNIF()

```
nif_t Client::getNIF ( ) const
```

A const member function with no arguments to get the client's NIF.

Returns

A nif_t, the client's NIF.

3.2.3.3 saveChanges()

```
void Client::saveChanges (
            ofstream & out ) const
```

A const member function that writes the client's info to the output stream. Generally used to save the client's attributes to a file.

Parameters

out	The output stream to write the client's information.

3.2.4 Member Data Documentation

3.2.4.1 name

```
string Client::name  [private]
```

string name. The client's name.

3.2.4.2 nif

```
nif_t Client::nif  [private]
```

nif_t nif. The client's NIF.

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

- D:/ProjetosC++/AEDAv2/StockMarket/Client.h
- D:/ProjetosC++/AEDAv2/StockMarket/Client.cpp

3.3 Company Class Reference

Public Member Functions

- Company ()=default
- Company (ifstream &in)
- Company (string name, string activity, nif_t NIF, double max_transaction)
- string getName () const
- string getArea () const
- double getValue () const
- void setValue (double value)
- void saveChanges (ofstream &out) const

Private Attributes

- string name
- string business_area
- nif_t NIF
- double max_transaction_value

Friends

- ostream & operator<< (ostream &, const Company &)
- bool operator< (const Company &c1, const Company &c2)

3.3.1 Constructor & Destructor Documentation

3.3.1.1 Company() [1/3]

```
Company::Company ( )  [default]
```

A default constructor.

3.3.1.2 Company() [2/3]

```
Company::Company (
            ifstream & in )
```

A constructor. The construtor creates a company object, reading the data from the input stream passed as argument.

Parameters

in	The input stream to read from in order to build the company object.

3.3.1.3 Company() [3/3]

```
Company::Company (
            string name,
            string activity,
            nif_t NIF,
            double max_transaction )
```

A constructor. The construtor creates a company object using the data passed as arguments.

Parameters

name	The company name.
activity	The company business area.
NIF	The company NIF.
max_transaction	The highest value transaction ever made by that company.

3.3.2 Member Function Documentation

3.3.2.1 getArea()

```
string Company::getArea ( ) const
```

A const member function that returns the business area of a certain company.

3.3.2.2 getName()

```
string Company::getName ( ) const
```

A const member function that returns the name of the company.

3.3.2.3 getValue()

```
double Company::getValue ( ) const
```

A const member function that returns the maximum transaction value.

3.3.2.4 saveChanges()

```
void Company::saveChanges (
            ofstream & out ) const
```

A const member function to write the company to a save file.

Parameters

out	The outputstream file to write to.

3.3.2.5 setValue()

```
void Company::setValue (
            double value )
```

A member function that changes the maximum transaction value.

3.3.3 Friends And Related Function Documentation

3.3.3.1 operator<

```
bool operator< (
            const Company & c1,
            const Company & c2 )  [friend]
```

Overload of Operator < for class Company. Compares 2 company's.

Parameters

c1	Left side Company.
c2	Right side Company.

Returns

Returns true if c1 has an alphabetically smaller business area than c2. If equal returns true if c1 has an alphabetically smaller name than c2.

3.3.3.2 operator<<

```
ostream& operator<< (
            ostream & out,
            const Company & c )  [friend]
```

Overload of Operator << for class Company. Prints the company in a human friendly way.

Parameters

out	The outstream to write to.
c	The company to be written.

Returns

Returns the output stream to allow chainning

3.3.4 Member Data Documentation

3.3.4.1 business_area

```
string Company::business_area  [private]
```

string business_area. The company's business area.

3.3.4.2 max_transaction_value

```
double Company::max_transaction_value  [private]
```

double max_transaction_value. The company's maximum transaction value up to this date.

3.3.4.3 name

```
string Company::name  [private]
```

string name. The company's name.

3.3.4.4 NIF

```
nif_t Company::NIF  [private]
```

nif_t. The company's NIF.

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

- D:/ProjetosC++/AEDAv2/StockMarket/Company.h
- D:/ProjetosC++/AEDAv2/StockMarket/Company.cpp

3.4 Date Class Reference

```
#include <Date.h>
```

Public Member Functions

- Date ()
- Date (string data)
- Date (int day, int month, int year)
- int get_day () const
- int get_month () const
- int get_year () const

Private Attributes

- unsigned day
- unsigned month
- unsigned year

Friends

- ostream & operator<< (ostream &out, const Date &date)
- istream & operator>> (istream &in, Date &date)
- bool operator<= (const Date &d1, const Date &d2)
- bool operator< (const Date &d1, const Date &d2)
- bool operator== (const Date &d1, const Date &d2)

3.4.1 Detailed Description

A class used to represent a date. Each date object contains 3 integers, representing day, month and year.

3.4.2 Constructor & Destructor Documentation

3.4.2.1 Date() [1/3]

```
Date::Date ( )
```

A default constructor. The default construtor creates a date object with the current system date.

3.4.2.2 Date() [2/3]

```
Date::Date (
            string data )
```

A constructor. The construtor creates a date object with the specified date string specified as argument.

Parameters

data	A string with the date in the DD/MM/YY format

3.4.2.3 Date() [3/3]

```
Date::Date (
            int day,
            int month,
            int year )
```

A constructor. The construtor creates a date object with the specified day, month and year passed as arguments.

Parameters

day	A unsigned short representing the day
month	A unsigned short representing the month
year	A unsigned short representing the year

3.4.3 Member Function Documentation

3.4.3.1 get_day()

```
int Date::get_day ( ) const
```

A member function with no arguments to get the date's day.

Returns

An integer, the date's day

3.4.3.2 get_month()

```
int Date::get_month ( ) const
```

A member function with no arguments to get the date's month.

Returns

An integer, the date's month

3.4.3.3 get_year()

```
int Date::get_year ( ) const
```

A member function with no arguments to get the date's year.

Returns

An integer, the date's year

3.4.4 Friends And Related Function Documentation

3.4.4.1 operator<

```
bool operator< (
            const Date & d1,
            const Date & d2 )  [friend]
```

Overload of Operator < for class Date.

Parameters

d1	First date
d2	Second date

Returns

Returns a boolean value, true if d1 < d2

3.4.4.2 operator<<

```
ostream& operator<< (
            ostream & out,
            const Date & date )  [friend]
```

Operator << for class Date. Prints the specified Date as 2nd argument in the outstream passed as 1st argument.

Parameters

out	The outstream to write to.
date	The date to be written.

Returns

Returns the output stream to allow chainning

3.4.4.3 operator<=

```
bool operator<= (
            const Date & d1,
            const Date & d2 )  [friend]
```

Overload of Operator <= for class Date.

Parameters

d1	First date
d2	Second date

Returns

Returns a boolean value, true if d1 <= d2

3.4.4.4 operator==

```
bool operator== (
            const Date & d1,
            const Date & d2 )  [friend]
```

Overload of Operator == for class Date.

Parameters

d1	First date
d2	Second date

Returns

Returns a boolean value, true if d1 equals d2

3.4.4.5 operator>>

```
istream& operator>> (
            istream & in,
            Date & date )  [friend]
```

Operator >> for Date class. Reads the dare from the input stream to change de date object.

Parameters

in	Input stream where to read the date from
date	Date object to be changed

Returns

Returns the input stream to allow chainning

3.4.5 Member Data Documentation

3.4.5.1 day

```
unsigned Date::day  [private]
```

unsigned day. Unsigned Integer representing the date day.

3.4.5.2 month

```
unsigned Date::month  [private]
```

unsigned month. Unsigned Integer representing the date month.

3.4.5.3 year

```
unsigned Date::year  [private]
```

unsigned year. Unsigned Integer representing the date year.

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

- D:/ProjetosC++/AEDAv2/StockMarket/Date.h
- D:/ProjetosC++/AEDAv2/StockMarket/Date.cpp

3.5 Client::InvalidNIF Class Reference

```
#include <Client.h>
```

Public Member Functions

- InvalidNIF (nif_t nif)
- nif_t getNIF () const

Private Attributes

- nif_t **nif**

3.5.1 Detailed Description

A class used to represent an exception. The exception object contains the invalid NIF

3.5.2 Constructor & Destructor Documentation

3.5.2.1 InvalidNIF()

```
Client::InvalidNIF::InvalidNIF (
            nif_t nif )  [inline]
```

A constructor. The construtor creates an InvalidNIF object with the supplied NIF.

Parameters

nif	The nif in question.

3.5.3 Member Function Documentation

3.5.3.1 getNIF()

```
nif_t Client::InvalidNIF::getNIF ( ) const  [inline]
```

A const member function with no arguments to get the object's NIF.

Returns

A nif_t, the NIF that originated the creation of this object.

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

- D:/ProjetosC++/AEDAv2/StockMarket/Client.h

3.6 Order::InvalidValue Class Reference

```
#include <Order.h>
```

Public Member Functions

- InvalidValue (double value)
- double **getValue** () const

Private Attributes

- double value

3.6.1 Detailed Description

A class used to represent an exception, InvalidValue. The object from InvalidValue class contains the invalid value stored.

3.6.2 Constructor & Destructor Documentation

3.6.2.1 InvalidValue()

```
Order::InvalidValue::InvalidValue (
            double value )  [inline]
```

A constructor.

Parameters

value	The invalid value in question.

3.6.3 Member Data Documentation

3.6.3.1 value

`double Order::InvalidValue::value [private]`

double value. The invalid value, for exception handling.

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

- D:/ProjetosC++/AEDAv2/StockMarket/Order.h

3.7 Investor Class Reference

Public Member Functions

- Investor ()=default
- Investor (ifstream &in)
- Investor (string name, tlmv_t phone, double maxInvest=0, double budget=0)
- double getBudget () const
- double getMaxInv () const
- tlmv_t getPhoneNumber () const
- void debitInvest (double value)
- void addBudget (double loan)
- void updatePhoneN (tlmv_t phone)

Private Attributes

- string name
- tlmv_t phone
- double maxInvestment
- double availableBudget

Friends

- ostream & operator<< (ostream &out, const Investor &i)
- bool operator== (const Investor &i1, const Investor &i2)
- bool operator< (const Investor &i1, const Investor &i2)

3.7.1 Constructor & Destructor Documentation

3.7.1.1 Investor() [1/3]

```
Investor::Investor ( )  [default]
```

A default constructor.

3.7.1.2 Investor() [2/3]

```
Investor::Investor (
            ifstream & in )
```

A constructor. The construtor creates a Investor object, reading the data from the input stream passed as argument.

Parameters

in	The input stream to read from in order to build the Investor object.

3.7.1.3 Investor() [3/3]

```
Investor::Investor (
            string name,
            tlmv_t phone,
            double maxInvest = 0,
            double budget = 0 )
```

A constructor. The construtor creates a Investor object using the data passed as arguments.

Parameters

name	The Investor name.

3.7.2 Member Function Documentation

3.7.2.1 addBudget()

```
void Investor::addBudget (
            double loan )
```

Adds capital to the investor.

Parameters

loan	The value of the loan to the investor.

3.7.2.2 debitInvest()

```
void Investor::debitInvest (
            double value )
```

Debits the investor budget with an amount invested.

Parameters

value	The value of the investment.

3.7.2.3 getBudget()

```
double Investor::getBudget ( ) const
```

A getter method returning investor's budget.

Returns

Returns the investor's budget.

3.7.2.4 getMaxInv()

```
double Investor::getMaxInv ( ) const
```

A getter method returning investor's maximum investment.

Returns

Returns the investor's maximum investment.

3.7.2.5 getPhoneNumber()

```
tlmv_t Investor::getPhoneNumber ( ) const
```

A getter method returning investor's phone number.

Returns

Returns the investor's phone number.

3.7.2.6 updatePhoneN()

```
void Investor::updatePhoneN (
            tlmv_t phone )
```

Updates the investor phone number with a new one.

Parameters

phone	The new investor's phone number.

3.7.3 Friends And Related Function Documentation

3.7.3.1 operator<

```
bool operator< (
            const Investor & i1,
            const Investor & i2 )  [friend]
```

Overload of Operator < for class Investor. Compares 2 investor's.

Parameters

i1	Left side Investor.
i2	Right side Investor.

Returns

Returns true if i1 has a greater or equal budget than i2. False otherwise.

3.7.3.2 operator<<

```
ostream& operator<< (
            ostream & out,
            const Investor & i )  [friend]
```

Overload of Operator << for class Investor. Prints the investor in a human friendly way.

Parameters

out	The outstream to write to.
i	The investor to be written.

Returns

Returns the output stream to allow chainning

3.7.3.3 operator==

```
bool operator== (
            const Investor & i1,
            const Investor & i2 )  [friend]
```

Overload of Operator == for class Investor. Compares 2 investor's.

Parameters

i1	Left side Investor.
i2	Right side Investor.

Returns

Returns true if i1 equals i2 meaning same name and phone number (unique qualifiers). False otherwise.

3.7.4 Member Data Documentation

3.7.4.1 availableBudget

```
double Investor::availableBudget  [private]
```

double availableBudget. The investor's budget used to finance.

3.7.4.2 maxInvestment

```
double Investor::maxInvestment  [private]
```

double maxInvestment. The maximum value the investors is willing to spend.

3.7.4.3 name

```
string Investor::name  [private]
```

string name. The investors's name.

3.7.4.4 phone

```
tlmv_t Investor::phone  [private]
```

tlmv_t phone. The investor's phone number.

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

- D:/ProjetosC++/AEDAv2/StockMarket/Investor.h
- D:/ProjetosC++/AEDAv2/StockMarket/Investor.cpp

3.8 investorPtrHash Struct Reference

```
#include <Investor.h>
```

Public Member Functions

- int operator() (const Investor *i) const
- bool operator() (const Investor *i1, const Investor *i2) const

3.8.1 Detailed Description

A structure to encapsulate the Hash and Comparison functions of Investor Pointers.

3.8.2 Member Function Documentation

3.8.2.1 operator()() [1/2]

```
int investorPtrHash::operator() (
            const Investor * i ) const  [inline]
```

Hash Function for Investor*

Parameters

i	Pointer to an Investor object.

Returns

hash value.

3.8.2.2 operator()() [2/2]

```
bool investorPtrHash::operator() (
            const Investor * i1,
            const Investor * i2 ) const  [inline]
```

Comparison Function for Investor*

Parameters

i1	Pointer to an Investor object.
i2	Pointer to an Investor object.

Returns

true if Investors pointed by i1 and i2 are the same, false otherwise.

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

- D:/ProjetosC++/AEDAv2/StockMarket/Investor.h

3.9 Market Class Reference

```
#include <Market.h>
```

Public Member Functions

- bool signIn (string name, nif_t nif)
- void signOut ()
- bool signUp (string name, nif_t nif)
- nif_t getCurrentNIF () const
- void showClientInfo () const
- void showClientHistory () const
- void showClientOrders () const
- bool eraseClientOrder (unsigned choice)
- void listBuyOrders () const
- void listSellOrders () const

- void listCompanys () const
- void listCompanys (string business) const
- void insertCompany (Company c)
- void deleteCompany (string name)
- void changeCompany (string name, double value)
- void listInvestors ()
- void listInvestorsB (double budget)
- void listInvestorsI (double maxInvest)
- void requestInvestement (double requestValue)
- void listInactiveInvestors ()
- void recreditInvestor (double loan, Investor *investor)
- void changeInvestorContact (tlmv_t newPhone_n, Investor *investor)
- vector< Transaction * > clientHistory (Client *c) const
- void printTransactions () const
- void printTransactions (string stock) const
- void printTransactions (Date day1, Date day2) const
- void printTransactions (Date d) const
- pair< vector< Transaction * >::iterator, vector< Transaction * >::iterator > placeOrder (Order *o)
- void saveChanges () const

Static Public Member Functions

- static Market * instance ()

Private Member Functions

- Market ()
- ~Market ()

Private Attributes

- nif_t currentNIF
- map< nif_t, Client * > clients
- vector< Transaction * > transactions
- vector< Order * > unfulfilled_orders
- set< Company > companys
- priority_queue< Investor > investors
- unordered_set< Investor *, investorPtrHash, investorPtrHash > inactive_investors
- string clientsFile
- string ordersFile
- string transactionsFile
- string companysFile
- string investorsFile
- bool clientsChanged
- bool transactionsChanged
- bool ordersChanged
- bool companysChanged
- bool investorsChanged

Static Private Attributes

- static Market * singleton_instance = NULL

Friends

- ostream & operator<< (ostream &out, const Market &m)

3.9.1 Detailed Description

Singleton Class to implement most of the logic behind the StockMarket

3.9.2 Constructor & Destructor Documentation

3.9.2.1 Market()

```
Market::Market ( )  [private]
```

A default constructor.

3.9.2.2 ~Market()

```
Market::~Market ( )  [private]
```

A destructor. Deletes all dynamically allocated memory.

3.9.3 Member Function Documentation

3.9.3.1 changeCompany()

```
void Market::changeCompany (
            string name,
            double value )
```

A member function that changes the maximum transaction value of a company in the BST.

3.9.3.2 changeInvestorContact()

```
void Market::changeInvestorContact (
            tlmv_t newPhone_n,
            Investor * investor )
```

A member function that changes the phone number of an investor in the inactive_investors hash table.

3.9.3.3 clientHistory()

```
vector< Transaction * > Market::clientHistory (
            Client * c ) const
```

A const member function used to get the client's history of transactions.

Parameters

c	A client pointer.

Returns

A vector of the client's transactions.

3.9.3.4 deleteCompany()

```
void Market::deleteCompany (
            string name )
```

A member function that deletes a company from the BST companys.

3.9.3.5 eraseClientOrder()

```
bool Market::eraseClientOrder (
            unsigned choice )
```

A member function that erases a client's unfulfilled order.

Parameters

The	number corresponding to the order to be erased (sorted by date placed).

Returns

A boolean, true if deletion of the order was done successfully.

3.9.3.6 getCurrentNIF()

```
nif_t Market::getCurrentNIF ( ) const
```

A member function that returns the current user's NIF.

Returns

The current user's nif.

3.9.3.7 insertCompany()

```
void Market::insertCompany (
            Company c )
```

A member function that inserts into company BST a new company.

3.9.3.8 instance()

```
Market * Market::instance ( )  [static]
```

A member function returning the one and only instace of Market (creates it if one doesn't exist).

Returns

A pointer to the singleton instance of Market.

3.9.3.9 listBuyOrders()

```
void Market::listBuyOrders ( ) const
```

A const member function that displays the buy orders.

3.9.3.10 listCompanys() [1/2]

```
void Market::listCompanys ( ) const
```

A const member function that displays all the companys.

3.9.3.11 listCompanys() [2/2]

```
void Market::listCompanys (
            string business ) const
```

A const member function that displays all the companys from one sector of activity.

3.9.3.12 listInactiveInvestors()

```
void Market::listInactiveInvestors ( )
```

A member function that lists all inactive investors in the inactive-investors hash table.

3.9.3.13 listInvestors()

```
void Market::listInvestors ( )
```

A member function that lists all investors in the priority queue.

3.9.3.14 listInvestorsB()

```
void Market::listInvestorsB (
            double budget )
```

A member function that lists all investors in the priority queue with equal or greater budget than specified.

3.9.3.15 listInvestorsI()

```
void Market::listInvestorsI (
            double maxInvest )
```

A member function that lists all investors in the priority queue with equal or greater maximum transaction value than specified.

3.9.3.16 listSellOrders()

```
void Market::listSellOrders ( ) const
```

A const member function that displays the sell orders.

3.9.3.17 placeOrder()

```
pair< vector< Transaction * >::iterator, vector< Transaction * >::iterator > Market::place↩
Order (
            Order * o )
```

A member function that adds an order to the unfulfilledOrders vector. Can be from Sell or Buy type.

Parameters

o	A pointer to the order.

3.9.3.18 printTransactions() [1/4]

```
void Market::printTransactions ( ) const
```

A const member function that prints the transactions to the COUT output stream.

3.9.3.19 printTransactions() [2/4]

```
void Market::printTransactions (
            string stock ) const
```

Overload of member function that prints the transactions of a given Stock.

Parameters

stock	The Stock's name.

3.9.3.20 printTransactions() [3/4]

```
void Market::printTransactions (
            Date day1,
            Date day2 ) const
```

Overload of member function that prints the transactions between 2 days.

Parameters

day1	The first day of the interval.
day2	The last day of the interval.

3.9.3.21 printTransactions() [4/4]

```
void Market::printTransactions (
            Date d ) const
```

Overload of member function that prints the daily transactions.

Parameters

d	The day whose transactions will be shown.

3.9.3.22 recreditInvestor()

```
void Market::recreditInvestor (
            double loan,
            Investor * investor )
```

A member function that gives capital to an investor making him active, withdrawing him from inactive_investors hash table and placing him in the queue investors.

3.9.3.23 requestInvestement()

```
void Market::requestInvestement (
            double requestValue )
```

A member function that requests a value from an investor to the client. Withdraws from the investor with the smallest budget that covers the client needs.

3.9.3.24 saveChanges()

```
void Market::saveChanges ( ) const
```

A const member function that saves ALL information to the files.

3.9.3.25 showClientHistory()

```
void Market::showClientHistory ( ) const
```

A const member function that displays the client's history of transactions.

3.9.3.26 showClientInfo()

```
void Market::showClientInfo ( ) const
```

A const member function that displays the client's information.

3.9.3.27 showClientOrders()

```
void Market::showClientOrders ( ) const
```

A const member function that displays the client's unfulfilled orders.

3.9.3.28 signIn()

```
bool Market::signIn (
            string name,
            nif_t nif )
```

A member function that signs in the user.

Parameters

name	Name of the client/user
nif	NIF othe client/user

Returns

A boolean, true if signing in was done successfully.

3.9.3.29 signOut()

```
void Market::signOut ( )
```

A member function that signs out the user.

3.9.3.30 signUp()

```
bool Market::signUp (
            string name,
            nif_t nif )
```

A member function that signs up the user.

Parameters

name	Name of the client/user
nif	NIF othe client/user

Returns

A boolean, true if signing up was done successfully.

3.9.4 Friends And Related Function Documentation

3.9.4.1 operator<<

```
ostream& operator<< (
            ostream & out,
            const Market & m )  [friend]
```

Overload of Operator << for class Market. Prints the Market statistics.

Parameters

out	The outstream to write to.
m	The Market.

Returns

Returns the output stream to allow chainning

3.9.5 Member Data Documentation

3.9.5.1 clients

```
map<nif_t, Client *> Market::clients  [private]
```

Map clients. A map where the key's are clients NIF's and the values are client pointers. Corresponds a NIF and a client.

3.9.5.2 clientsChanged

```
bool Market::clientsChanged  [private]
```

bool clientsChanged. Boolean set to true if any changes done to the clients during execution.

3.9.5.3 clientsFile

```
string Market::clientsFile  [private]
```

string clientsFile. String with the client's file name.

3.9.5.4 companys

```
set<Company> Market::companys  [private]
```

Set companys. Implemented as a Binary Search Tree, of Company objects.

3.9.5.5 companysChanged

```
bool Market::companysChanged  [private]
```

bool companysChanged. Boolean set to true if any changes done to the companys during execution.

3.9.5.6 companysFile

```
string Market::companysFile  [private]
```

string companysFile. String with the company's file name.

3.9.5.7 currentNIF

```
nif_t Market::currentNIF  [private]
```

nif_t NIF. Saves the NIF of the current user.

3.9.5.8 inactive_investors

```
unordered_set<Investor*, investorPtrHash, investorPtrHash> Market::inactive_investors  [private]
```

Hash table inactive_investors. Implemented as an unordered_set of investors with hash function

3.9.5.9 investors

```
priority_queue<Investor> Market::investors  [private]
```

Priority Queue investors. Implemented as a priority queue of Investor objects.

3.9.5.10 investorsChanged

```
bool Market::investorsChanged  [private]
```

bool investorsChanged. Boolean set to true if any changes done to the investors during execution.

3.9.5.11 investorsFile

```
string Market::investorsFile  [private]
```

string investorsFile. String with the investor's file name.

3.9.5.12 ordersChanged

```
bool Market::ordersChanged  [private]
```

bool ordersChanged. Boolean set to true if any changes done to the orders during execution.

3.9.5.13 ordersFile

```
string Market::ordersFile  [private]
```

string ordersFile. String with the order's file name.

3.9.5.14 singleton_instance

```
Market * Market::singleton_instance = NULL  [static], [private]
```

Market pointer. Contains the pointer to the singleton instance of Market.

3.9.5.15 transactions

```
vector<Transaction *> Market::transactions  [private]
```

Vector transactions. A vector saving pointers of all Market's transactions.

3.9.5.16 transactionsChanged

```
bool Market::transactionsChanged  [private]
```

bool transactionsChanged. Boolean set to true if any changes done to the transactions during execution.

3.9.5.17 transactionsFile

```
string Market::transactionsFile  [private]
```

string transactionsFile. String with the transaction's file name.

3.9.5.18 unfulfilled_orders

```
vector<Order *> Market::unfulfilled_orders  [private]
```

Vector unfulfilled_orders. A vector saving pointers of all Market's unfulfilled orders.

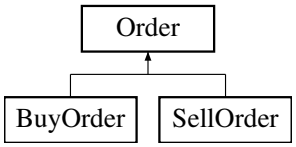
The documentation for this class was generated from the following files:

- D:/ProjetosC++/AEDAv2/StockMarket/Market.h
- D:/ProjetosC++/AEDAv2/StockMarket/Market.cpp

3.10 Order Class Reference

```
#include <Order.h>
```

Inheritance diagram for Order:



Classes

- class InvalidValue

Public Member Functions

- Order (ifstream &in)
- Order (string s, double value, unsigned quant)
- virtual ~Order ()=default
- Date getDatePlaced () const
- string getStock () const
- double getValue () const
- unsigned getQuantity () const
- void printInfo () const
- virtual nif_t getClientNIF () const =0
- virtual Transaction * operator() (Order *o)=0
- virtual void saveChanges (ofstream &out) const

Protected Attributes

- string stock
- double valuePerStock
- unsigned quantity
- Date datePlaced

3.10.1 Detailed Description

Abstract Base class used to represent an order.

3.10.2 Constructor & Destructor Documentation

3.10.2.1 Order() [1/2]

```
Order::Order (
            ifstream & in )
```

A constructor. The construtor creates an order object, reading the data from the input stream passed as argument.

Parameters

in	The input stream to read from in order to build the order object.

3.10.2.2 Order() [2/2]

```
Order::Order (
            string s,
```

```
            double value,
            unsigned quant )
```

A constructor. The construtor creates an order object using the data passed as arguments.

Parameters

s	A string with the stock name.
value	A double with the value per stock.
quant	An unsigned with the stock quantity.

3.10.2.3 ~Order()

```
virtual Order::~Order ( )  [virtual], [default]
```

A virtual destructor.

3.10.3 Member Function Documentation

3.10.3.1 getClientNIF()

```
virtual nif_t Order::getClientNIF ( ) const  [pure virtual]
```

A const abstract member function that returns the NIF of the client associated with the Order.

Returns

The NIF of the Buyer/Seller associated with the Order.

Implemented in SellOrder, and BuyOrder.

3.10.3.2 getDatePlaced()

```
Date Order::getDatePlaced ( ) const
```

A const member function with no arguments to get the orders's place date.

Returns

A Date object , the date when the order was placed.

3.10.3.3 getQuantity()

```
unsigned Order::getQuantity ( ) const
```

A const member function with no arguments to get the order stock quantity.

Returns

An unsigned, the quantity of stock.

3.10.3.4 getStock()

```
string Order::getStock ( ) const
```

A const member function with no arguments to get the orders's stock name.

Returns

A string that is the name of the stock.

3.10.3.5 getValue()

```
double Order::getValue ( ) const
```

A const member function with no arguments to get the value per stock.

Returns

A double, the value per stock.

3.10.3.6 operator()()

```
virtual Transaction* Order::operator() (
            Order * o )  [pure virtual]
```

Abstract overload of function operator. Cheks whether this instance of an Order Object can be fulfilled by the provided Order.

Parameters

an	Order pointer

Returns

A pointer to the transaction generated if successful, NULL otherwise.

Implemented in SellOrder, and BuyOrder.

3.10.3.7 printInfo()

```
void Order::printInfo ( ) const
```

A const member function that prints the order information.

3.10.3.8 saveChanges()

```
void Order::saveChanges (
            ofstream & out ) const  [virtual]
```

A virtual function to save changes in the derived classes.

Reimplemented in SellOrder, and BuyOrder.

3.10.4 Member Data Documentation

3.10.4.1 datePlaced

```
Date Order::datePlaced  [protected]
```

Date datePlaced. The date when the order was placed.

3.10.4.2 quantity

```
unsigned Order::quantity  [protected]
```

unsigned quantity. An unsigned with the stock quantity.

3.10.4.3 stock

```
string Order::stock  [protected]
```

string stock. A string with stock name.

3.10.4.4 valuePerStock

```
double Order::valuePerStock  [protected]
```

valuePerStock. A double with the stock value.

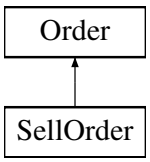
The documentation for this class was generated from the following files:

- D:/ProjetosC++/AEDAv2/StockMarket/Order.h
- D:/ProjetosC++/AEDAv2/StockMarket/Order.cpp

3.11 SellOrder Class Reference

```
#include <Order.h>
```

Inheritance diagram for SellOrder:



Public Member Functions

- SellOrder (ifstream &in)
  ///
- SellOrder (string stock, double val, unsigned quantity, nif_t sellerNIF)
- nif_t getClientNIF () const
- Transaction * operator() (Order *o)
- void saveChanges (ofstream &out) const

Private Attributes

- friend **BuyOrder**
- nif_t sellerNIF

Additional Inherited Members

3.11.1 Detailed Description

Class used to represent a sell order. Derives from Order.

3.11.2 Constructor & Destructor Documentation

3.11.2.1 SellOrder() [1/2]

```
SellOrder::SellOrder (
            ifstream & in )
```

///

A constructor. The construtor creates a SellOrder object, reading the data from the input stream passed as argument.

Parameters

in	The input stream to read from in order to build the SellOrder object.

3.11.2.2 SellOrder() [2/2]

```
SellOrder::SellOrder (
            string stock,
            double val,
            unsigned quantity,
            nif_t sellerNIF )
```

A constructor. The construtor creates a SellOrder object using the data passed as arguments.

Parameters

stock	A string with the stock name.
val	A double with the value per stock.
quantity	An unsigned with the stock quantity.
seller↩ NIF	The seller's NIF.

3.11.3 Member Function Documentation

3.11.3.1 getClientNIF()

```
nif_t SellOrder::getClientNIF ( ) const  [virtual]
```

A const member function that returns the NIF of the client associated with this SellOrder.

Returns

The NIF of the Seller associated with this Order.

Implements Order.

3.11.3.2 operator()()

```
Transaction * SellOrder::operator() (
            Order * o )  [virtual]
```

Overload of operator() for class Order.

Parameters

o	Pointer of an object Order.

Returns

A transaction type object.

Implements Order.

3.11.3.3 saveChanges()

```
void SellOrder::saveChanges (
            ofstream & out ) const  [virtual]
```

A const memeber function to save changes in an output stream.

Parameters

out	The outstream file to write to.

Reimplemented from Order.

3.11.4 Member Data Documentation

3.11.4.1 sellerNIF

```
nif_t SellOrder::sellerNIF  [private]
```

nif_t sellerNIF. The NIF of the seller associated with this Order.

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

- D:/ProjetosC++/AEDAv2/StockMarket/Order.h
- D:/ProjetosC++/AEDAv2/StockMarket/Order.cpp

3.12 Transaction Class Reference

```
#include <Transaction.h>
```

Public Member Functions

- Transaction ()=default
- Transaction (ifstream &in)
- Transaction (nif_t buyerNIF, nif_t sellerNIF, string stock, double value, unsigned quantity)
- string getStock () const
- double getValue () const
- unsigned getQuantity () const
- nif_t getSellerNIF () const
- nif_t getBuyerNIF () const
- Date getDate () const
- void saveChanges (ofstream &out) const

Private Attributes

- nif_t sellerNIF
- nif_t buyerNIF
- string stock
- double value
- unsigned quantity
- Date time_stamp

Friends

- ostream & operator<< (ostream &, const Transaction &)

3.12.1 Detailed Description

A class used to represent a transaction.

3.12.2 Constructor & Destructor Documentation

3.12.2.1 Transaction() [1/3]

```
Transaction::Transaction ( )  [default]
```

A default constructor.

3.12.2.2 Transaction() [2/3]

```
Transaction::Transaction (
            ifstream & in )
```

A constructor. The construtor creates a transaction object, reading the data from the input stream passed as argument.

Parameters

in	The input stream to read from in order to build the transaction object.

3.12.2.3 Transaction() [3/3]

```
Transaction::Transaction (
            nif_t buyerNIF,
            nif_t sellerNIF,
            string stock,
            double value,
            unsigned quantity )
```

A constructor. The construtor creates a transaction object using the data passed as arguments.

Parameters

buyer↩ NIF	The NIF from the buyer.
seller↩ NIF	The NIF from the seller.
stock	The stock name.
value	The value of the stock.
quantity	The amount of stock.

3.12.3 Member Function Documentation

3.12.3.1 getBuyerNIF()

```
nif_t Transaction::getBuyerNIF ( ) const
```

A const member function with no arguments to get the transaction's buyer NIF.

Returns

A nif_t , the buyer NIF.

3.12.3.2 getDate()

```
Date Transaction::getDate ( ) const
```

A const member function with no arguments to get the transaction's date.

Returns

A Date object , the date of the transaction.

3.12.3.3 getQuantity()

```
unsigned Transaction::getQuantity ( ) const
```

A const member function with no arguments to get the transaction's quantity of stock.

Returns

An unsigned, the quantity.

3.12.3.4 getSellerNIF()

```
nif_t Transaction::getSellerNIF ( ) const
```

A const member function with no arguments to get the transaction's seller NIF.

Returns

A nif_t , the seller NIF.

3.12.3.5 getStock()

```
string Transaction::getStock ( ) const
```

A const member function with no arguments to get the transaction's Stock name.

Returns

A string, the Stock's name.

3.12.3.6 getValue()

```
double Transaction::getValue ( ) const
```

A const member function with no arguments to get the transaction's Value Per Stock.

Returns

A double, the value per stock transactioned.

3.12.3.7 saveChanges()

```
void Transaction::saveChanges (
            ofstream & out ) const
```

A const member function to write the transaction to a save file.

Parameters

out	The outputstream file to write to.

3.12.4 Friends And Related Function Documentation

3.12.4.1 operator<<

```
ostream& operator<< (
            ostream & ,
            const Transaction &  )  [friend]
```

Overload of Operator << for class Transaction. Prints the transaction in a human friendly way.

Parameters

out	The outstream to write to.
t	The transaction to be written.

Returns

Returns the output stream to allow chainning

3.12.5 Member Data Documentation

3.12.5.1 buyerNIF

```
nif_t Transaction::buyerNIF  [private]
```

nif_t buyerNIF. The NIF from the client that bought the stock.

3.12.5.2 quantity

```
unsigned Transaction::quantity  [private]
```

unsigned quantity. The quantity of stock.

3.12.5.3 sellerNIF

```
nif_t Transaction::sellerNIF  [private]
```

nif_t sellerNIF. The NIF from the client that sold the stock.

3.12.5.4 stock

```
string Transaction::stock  [private]
```

string stock. The name of the stock product.

3.12.5.5 time_stamp

```
Date Transaction::time_stamp  [private]
```

Date time_stamp. The time where the transaction occured.

3.12.5.6 value

```
double Transaction::value  [private]
```

double value. The value of the stock.

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

- D:/ProjetosC++/AEDAv2/StockMarket/Transaction.h
- D:/ProjetosC++/AEDAv2/StockMarket/Transaction.cpp

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