

Drzewo czerwono-czarne

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# Chapter 1

## Hierarchical Index

### 1.1 Class Hierarchy

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

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## Chapter 2

# Class Index

### 2.1 Class List

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

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<b>IRunnable</b>	Interfejs klasy rozruchowej . . . . .	8
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## Chapter 3

# File Index

### 3.1 File List

Here is a list of all files with brief descriptions:

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<b>main.cpp</b>	17
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## Chapter 4

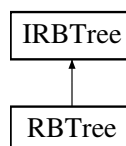
# Class Documentation

### 4.1 IRBTree Class Reference

Interfejs drzewa czerwono-czarnego.

```
#include <itree.hh>
```

Inheritance diagram for IRBTree:



#### Public Member Functions

- virtual void **add** (const int &elem)=0
- virtual int **find** (const int &elem)=0
- virtual void **release** (**Node** \*n)=0
- virtual void **rotate\_left** (**Node** \*n)=0
- virtual void **rotate\_right** (**Node** \*n)=0
- virtual ~**IRBTree** ()

#### 4.1.1 Detailed Description

Interfejs drzewa czerwono-czarnego.

Zawiera metody umożliwiające operacje na drzewie.

Definition at line 12 of file itree.hh.

#### 4.1.2 Constructor & Destructor Documentation

4.1.2.1 virtual IRBTree::~IRBTree ( ) [inline],[virtual]

Definition at line 20 of file itree.hh.

### 4.1.3 Member Function Documentation

4.1.3.1 `virtual void IRBTree::add ( const int & elem )` [pure virtual]

Implemented in **RBTree** (p. 12).

4.1.3.2 `virtual int IRBTree::find ( const int & elem )` [pure virtual]

Implemented in **RBTree** (p. 12).

4.1.3.3 `virtual void IRBTree::release ( Node * n )` [pure virtual]

Implemented in **RBTree** (p. 12).

4.1.3.4 `virtual void IRBTree::rotate_left ( Node * n )` [pure virtual]

Implemented in **RBTree** (p. 13).

4.1.3.5 `virtual void IRBTree::rotate_right ( Node * n )` [pure virtual]

Implemented in **RBTree** (p. 13).

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

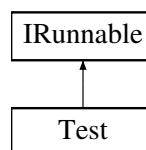
- **itree.hh**

## 4.2 IRunnable Class Reference

Interfejs klasy rozruchowej.

```
#include <irunnable.hh>
```

Inheritance diagram for IRunnable:



### Public Member Functions

- `virtual void run (int Argc, char *Argv[])=0`

#### 4.2.1 Detailed Description

Interfejs klasy rozruchowej.

Zawiera metodę umożliwiającą uruchomienie programu.

Definition at line 9 of file irunnable.hh.

## 4.2.2 Member Function Documentation

4.2.2.1 virtual void IRunnable::run ( int *Argc*, char \* *Argv*[] ) [pure virtual]

Implemented in **Test** (p. 14).

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

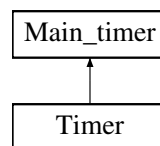
- irunnable.hh

## 4.3 Main\_timer Class Reference

Interfejs stopera.

```
#include <maintimer.hh>
```

Inheritance diagram for Main\_timer:



### Public Member Functions

- virtual long double **get\_ms\_time** ()=0
- virtual void **tim\_start** ()=0
- virtual void **tim\_stop** ()=0
- virtual long double **return\_time** ()=0
- virtual ~**Main\_timer** ()

### 4.3.1 Detailed Description

Interfejs stopera.

Zawiera metody umożliwiające mierzenie czasu.

Definition at line 9 of file maintimer.hh.

### 4.3.2 Constructor & Destructor Documentation

4.3.2.1 virtual Main\_timer::~Main\_timer ( ) [inline],[virtual]

Definition at line 16 of file maintimer.hh.

### 4.3.3 Member Function Documentation

4.3.3.1 virtual long double Main\_timer::get\_ms\_time ( ) [pure virtual]

Implemented in **Timer** (p. 15).

4.3.3.2 virtual long double Main\_timer::return\_time ( ) [pure virtual]

Implemented in **Timer** (p. 15).

4.3.3.3 virtual void Main\_timer::tim\_start ( ) [pure virtual]

Implemented in **Timer** (p. 15).

4.3.3.4 virtual void Main\_timer::tim\_stop ( ) [pure virtual]

Implemented in **Timer** (p. 15).

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

- **maintimer.hh**

## 4.4 Node Class Reference

Klasa węzła.

```
#include <tree.hh>
```

### Private Attributes

- int **elem**
- char **color**
- **Node** \* **father**
- **Node** \* **left\_son**
- **Node** \* **right\_son**

### Friends

- class **RBTree**

### 4.4.1 Detailed Description

Klasa węzła.

Zawiera wskaźniki na ojca, lewego syna i prawego syna.

Definition at line 11 of file tree.hh.

### 4.4.2 Friends And Related Function Documentation

4.4.2.1 friend class **RBTree** [friend]

Definition at line 12 of file tree.hh.

### 4.4.3 Member Data Documentation

4.4.3.1 char **Node::color** [private]

Definition at line 15 of file tree.hh.



4.4.3.2 `int Node::elem` [private]

Definition at line 14 of file tree.hh.

4.4.3.3 `Node* Node::father` [private]

Definition at line 16 of file tree.hh.

4.4.3.4 `Node* Node::left_son` [private]

Definition at line 17 of file tree.hh.

4.4.3.5 `Node* Node::right_son` [private]

Definition at line 18 of file tree.hh.

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

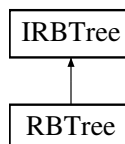
- **tree.hh**

## 4.5 RBTREE Class Reference

Klasa drzewa czerwono czarnego.

```
#include <tree.hh>
```

Inheritance diagram for RBTREE:



### Public Member Functions

- **RBTREE ()**
- **~RBTREE ()**
- void **add** (const int &elem)
- int **find** (const int &elem)
- void **release** (Node \*n)
- void **rotate\_left** (Node \*n)
- void **rotate\_right** (Node \*n)

### Private Attributes

- **Node \* root** =NULL
- **Node \* sentinel** =NULL

### 4.5.1 Detailed Description

Klasa drzewa czerwono czarnego.

Zawiera metody umożliwiające operacje na tablicy.

Definition at line 27 of file tree.hh.

### 4.5.2 Constructor & Destructor Documentation

#### 4.5.2.1 RBTree::RBTree ( )

Definition at line 3 of file tree.cpp.

#### 4.5.2.2 RBTree::~~RBTree ( )

Definition at line 14 of file tree.cpp.

### 4.5.3 Member Function Documentation

#### 4.5.3.1 void RBTree::add ( const int & *elem* ) [virtual]

Funkcja dodająca element do drzewa.

Parameters

in	<i>wartość</i>	typu int
----	----------------	----------

Implements **IRBTree** (p. 8).

Definition at line 88 of file tree.cpp.

#### 4.5.3.2 int RBTree::find ( const int & *elem* ) [virtual]

Funkcja wyszukująca element w drzewie.

Parameters

in	<i>wartość</i>	typu int
----	----------------	----------

Returns

znaleziona wartość typu int

Implements **IRBTree** (p. 8).

Definition at line 170 of file tree.cpp.

#### 4.5.3.3 void RBTree::release ( **Node** \* *n* ) [virtual]

Funkcja usuwająca drzewo lub poddrzewo.

Parameters

in	węzeł	startowy
----	-------	----------

Implements **IRBTree** (p. 8).

Definition at line 20 of file tree.cpp.

#### 4.5.3.4 void RBTREE::rotate\_left ( Node \* n ) [virtual]

Funkcja wykonująca rotację w lewo względem podanego węzła.

Parameters

in	węzeł	rotacyjny
----	-------	-----------

Implements **IRBTree** (p. 8).

Definition at line 30 of file tree.cpp.

#### 4.5.3.5 void RBTREE::rotate\_right ( Node \* n ) [virtual]

Funkcja wykonująca rotację w prawo względem podanego węzła.

Parameters

in	węzeł	rotacyjny
----	-------	-----------

Implements **IRBTree** (p. 8).

Definition at line 59 of file tree.cpp.

### 4.5.4 Member Data Documentation

#### 4.5.4.1 Node\* RBTREE::root =NULL [private]

Definition at line 30 of file tree.hh.

#### 4.5.4.2 Node\* RBTREE::sentinel =NULL [private]

Definition at line 31 of file tree.hh.

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

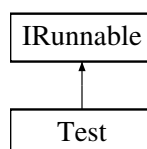
- tree.hh
- tree.cpp

## 4.6 Test Class Reference

Klasa rozruchowa.

```
#include <test.hh>
```

Inheritance diagram for Test:



## Public Member Functions

- void **run** (int Argc, char \*Argv[])

### 4.6.1 Detailed Description

Klasa rozruchowa.

Zawiera metodę umożliwiającą uruchomienie programu.

Definition at line 10 of file test.hh.

### 4.6.2 Member Function Documentation

4.6.2.1 void Test::run ( int Argc, char \* Argv[] ) [virtual]

Implements **IRunnable** (p. 9).

Definition at line 6 of file test.cpp.

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

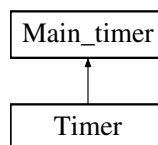
- **test.hh**
- **test.cpp**

## 4.7 Timer Class Reference

Klasa stopera.

```
#include <timer.hh>
```

Inheritance diagram for Timer:



## Public Member Functions

- long double **get\_ms\_time** ()
- void **tim\_start** ()
- void **tim\_stop** ()
- long double **return\_time** ()
- **~Timer** ()

## Private Attributes

- long double **time\_of\_start**
- long double **time\_of\_stop**

### 4.7.1 Detailed Description

Klasa stopera.

Zawiera metody umożliwiające mierzenie czasu. Dokładny opis metod w dokumentacji projektu Lab2.

Definition at line 11 of file timer.hh.

### 4.7.2 Constructor & Destructor Documentation

#### 4.7.2.1 `Timer::~Timer ( )` `[inline]`

Definition at line 21 of file timer.hh.

### 4.7.3 Member Function Documentation

#### 4.7.3.1 `long double Timer::get_ms_time ( )` `[virtual]`

Implements **Main\_timer** (p. 9).

Definition at line 25 of file timer.hh.

#### 4.7.3.2 `long double Timer::return_time ( )` `[virtual]`

Implements **Main\_timer** (p. 10).

Definition at line 47 of file timer.hh.

#### 4.7.3.3 `void Timer::tim_start ( )` `[virtual]`

Implements **Main\_timer** (p. 10).

Definition at line 35 of file timer.hh.

#### 4.7.3.4 `void Timer::tim_stop ( )` `[virtual]`

Implements **Main\_timer** (p. 10).

Definition at line 41 of file timer.hh.

### 4.7.4 Member Data Documentation

#### 4.7.4.1 `long double Timer::time_of_start` `[private]`

Definition at line 13 of file timer.hh.

#### 4.7.4.2 `long double Timer::time_of_stop` `[private]`

Definition at line 14 of file timer.hh.

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

- **timer.hh**



## Chapter 5

# File Documentation

### 5.1 irunnable.hh File Reference

#### Classes

- class **IRunnable**  
*Interfejs klasy rozruchowej.*

### 5.2 itree.hh File Reference

```
#include "tree.hh"
```

#### Classes

- class **IRBTree**  
*Interfejs drzewa czerwono-czarnego.*

### 5.3 main.cpp File Reference

```
#include "test.hh"  
#include <ctime>  
#include <cstdlib>
```

#### Functions

- int **main** (int Argc, char \*Argv[])

#### 5.3.1 Function Documentation

5.3.1.1 int main ( int *Argc*, char \* *Argv*[] )

Definition at line 5 of file main.cpp.

## 5.4 maintimer.hh File Reference

### Classes

- class **Main\_timer**  
*Interfejs stopera.*

## 5.5 test.cpp File Reference

```
#include "test.hh"  
#include "tree.hh"  
#include "timer.hh"  
#include <iostream>
```

## 5.6 test.hh File Reference

```
#include "irunnable.hh"
```

### Classes

- class **Test**  
*Klasa rozruchowa.*

## 5.7 timer.hh File Reference

```
#include <sys/time.h>  
#include "maintimer.hh"
```

### Classes

- class **Timer**  
*Klasa stopera.*

## 5.8 tree.cpp File Reference

```
#include "tree.hh"
```

## 5.9 tree.hh File Reference

```
#include "itree.hh"  
#include <cstddef>
```



## Classes

- class **Node**

*Klasa węzła.*

- class **RBTree**

*Klasa drzewa czerwono czarnego.*

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