Report for LW2

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Chapter 1

Class Index

1.1 Class List

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

Chapter 2

File Index

2.1 File List

Here is a list of all files with brief descriptions:

Chapter 3

Class Documentation

3.1 Child Struct Reference

Public Member Functions

- Child (int year, int squad, std::string name, std::string date, int shift)

Public Attributes

- int year
- int squad
- std::string name
- std::string date
- int shift

Friends

- bool operator== (const Child &a, const Child &b)
- bool operator< (const Child &a, const Child &b)
- bool operator<= (const Child &a, const Child &b)
- bool operator> (const Child &a, const Child &b)
- bool operator>= (const Child &a, const Child &b)
- std::ostream & operator<< (std::ostream &os, const Child &a)

3.1.1 Constructor & Destructor Documentation

3.1.1.1 Child()

```
Child::Child (
          int year,
          int squad,
          std::string name,
          std::string date,
          int shift )  [inline]
```

3.1.2 Friends And Related Function Documentation

3.1.2.1 operator<

```
bool operator< (
            const Child & a,
            const Child & b ) [friend]
```

3.1.2.2 operator<<

```
std::ostream & operator<< (
            std::ostream & os,
            const Child & a ) [friend]
```

3.1.2.3 operator<=

```
bool operator<= (
            const Child & a,
            const Child & b ) [friend]
```

3.1.2.4 operator==

```
bool operator== (
            const Child & a,
            const Child & b ) [friend]
```

3.1.2.5 operator>

```
bool operator> (
            const Child & a,
            const Child & b ) [friend]
```

3.1.2.6 operator>=

```
bool operator>= (
            const Child & a,
            const Child & b ) [friend]
```

3.1.3 Member Data Documentation

3.1.3.1 date

```
std::string Child::date
```

3.1.3.2 name

```
std::string Child::name
```

3.1.3.3 shift

```
int Child::shift
```

3.1.3.4 squad

```
int Child::squad
```

3.1.3.5 year

```
int Child::year
```

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

- main.cpp

Chapter 4

File Documentation

4.1 main.cpp File Reference

```
#include <iostream>
#include <ctime>
#include <fstream>
#include <vector>
#include <chrono>
#include <algorithm>
#include <string>
#include <map>
```

Classes

- struct Child

Functions

- std::ofstream fout (resultFile)
- std::string randomString (const int len)
- std::string randomDate (int minY, int maxY)
- void createInfo ()
- std::vector< std::vector< Child > > readInfo ()
- std::vector< Child > selectSort (std::vector< Child > vec)
- std::vector< Child > insertSort (std::vector< Child > vec)
- std::vector< Child > shakerSort (std::vector< Child > vec)
- void writeResult (std::string title, std::vector< std::vector< Child > > &res)
- void writeTime (std::string title, std::chrono::steady_clock::time_point start, std::chrono::steady_clock::time↩_point end)
- std::vector< int > linearSearch (std::vector< Child > &v, std::string key)
- int getLowerBound (std::vector< Child > &v, std::string key)
- int getUpperBound (std::vector< Child > &v, std::string key)
- std::vector< Child > binarySearch (std::vector< Child > &v, std::string key)
- bool operator< (Child a, Child b)
- int main ()

Variables

- std::string info = "info.txt"
- std::string resultFile = "res.txt"
- std::string timesFile = "times.txt"
- int sizesNum = 7
- int sizes [7] = { 100, 1000, 2000, 5000, 10000, 25000, 100000 }

4.1.1 Function Documentation

4.1.1.1 binarySearch()

```
std::vector< Child > binarySearch (
            std::vector< Child > & v,
            std::string key )
```

4.1.1.2 createInfo()

```
void createInfo ( )
```

4.1.1.3 fout()

```
std::ofstream fout (
            resultFile  )
```

4.1.1.4 getLowerBound()

```
int getLowerBound (
            std::vector< Child > & v,
            std::string key )
```

4.1.1.5 getUpperBound()

```
int getUpperBound (
            std::vector< Child > & v,
            std::string key )
```

4.1.1.6 insertSort()

```
std::vector< Child > insertSort (
            std::vector< Child > vec )
```

4.1.1.7 linearSearch()

```
std::vector< int > linearSearch (
            std::vector< Child > & v,
            std::string key )
```

4.1.1.8 main()

```
int main ( )
```

4.1.1.9 operator<()

```
bool operator< (
            Child a,
            Child b )
```

4.1.1.10 randomDate()

```
std::string randomDate (
            int minY,
            int maxY )
```

4.1.1.11 randomString()

```
std::string randomString (
            const int len )
```

4.1.1.12 readInfo()

```
std::vector< std::vector< Child > > readInfo ( )
```

4.1.1.13 selectSort()

```
std::vector< Child > selectSort (
            std::vector< Child > vec )
```

4.1.1.14 shakerSort()

```
std::vector< Child > shakerSort (
            std::vector< Child > vec )
```

4.1.1.15 writeResult()

```
void writeResult (
            std::string title,
            std::vector< std::vector< Child > > & res )
```

4.1.1.16 writeTime()

```
void writeTime (
            std::string title,
            std::chrono::steady_clock::time_point start,
            std::chrono::steady_clock::time_point end )
```

4.1.2 Variable Documentation

4.1.2.1 info

```
std::string info = "info.txt"
```

4.1.2.2 resultFile

```
std::string resultFile = "res.txt"
```

4.1.2.3 sizes

```
int sizes[7] = { 100, 1000, 2000, 5000, 10000, 25000, 100000 }
```

4.1.2.4 sizesNum
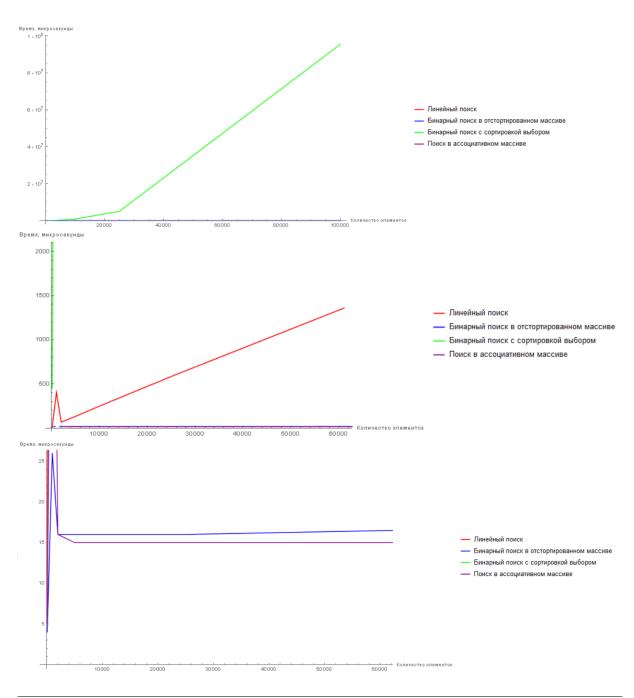
```
int sizesNum = 7
```

4.1.2.5 timesFile

```
std::string timesFile = "times.txt"
```

Chapter 5

Reference for repository

Ref: https://github.com/EvgenijCS202/MP_2

Chapter 6

Graphics

Время, микросекунды

1×10^8

8×10^7

6×10^7 ── Линейный поиск
── Бинарный поиск в отсортированном массиве
── Бинарный поиск с сортировкой выбором
4×10^7 ── Поиск в ассоциативном массиве

2×10^7

20000 40000 60000 80000 100000 Количество элементов

Время, микросекунды

2000

1500 ── Линейный поиск
── Бинарный поиск в отсортированном массиве
1000 ── Бинарный поиск с сортировкой выбором
── Поиск в ассоциативном массиве

500

10000 20000 30000 40000 50000 60000 Количество элементов

Время, микросекунды

25

20

── Линейный поиск
15 ── Бинарный поиск в отсортированном массиве
── Бинарный поиск с сортировкой выбором
── Поиск в ассоциативном массиве
10

5

10000 20000 30000 40000 50000 60000 Количество элементов