**Отчет по курсовой работе №9** по курсу\_1\_\_\_\_\_

|  |  |
| --- | --- |
|  | Студент группы М80-105Б-21 Жилов Андрей, № по списку 3  Контакты www, e-mail: [klzxrcn3692@outlook.com](mailto:klzxrcn3692@outlook.com)\_\_\_\_\_\_\_\_\_\_\_  Работа выполнена: «12» мая 2022г.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Преподаватель: В. К. Титов каф. 806\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Входной контроль знаний с оценкой \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Отчет сдан «12» мая 2022 г., итоговая оценка \_\_\_\_\_\_\_\_\_  Подпись преподавателя \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

1. **Тема:** Сортировка и поиск.
2. **Цель работы:** Составить программу на языке Си с использованием процедур и функций для сортировки таблицы заданным методом и двоичного поиска по ключу в таблице.
3. **Задание:** (*Вариант №3*):

Сортировка пузырьком

1. **Оборудование(лабораторное)**:

ЭВМ -, процессор -, имя узла сети - с ОП - ГБ,

НМД - ГБ, терминал- адрес -, принтер –

Другие устройства –

*Оборудование ПЭВМ студента, если использовалось:*

Процессор AMD Ryzen 3500U, с ОП 8 ГБ, НМД 256 ГБ. Монитор 1920x1080 пикс.

Другие устройства –

1. **Программное обеспечение:**

Операционная система семейства -, наименование - версия –

интерпретатор команд – версия

Система программирования - версия –

Редактор текстов - версия –

Утилиты операционной системы –

Прикладные системы и программы –

Местонахождение и имена файлов программ и данных -

*Программное обеспечение ЭВМ студента, если использовалось:*

Операционная система семейства GNU/Linux, наименование Kali версия 5.10.0

интерпретатор команд Bash версия 5.1.8(1)-release

Система программирования \_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_версия\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

редактор текстов emacs версия 27.1

Утилиты операционной системы cmp, diff, tail, od, vi, vim, ed, head, du, xargs, indent, comm, grep, tee, sum, mc, awk, iconv, file,df,split, wc, join, tr,cut,tar,sed,patch,touch, paste, mktemp, dd,sort, uniq, nroff, gzip, bzip2, md5, find, cpp

Прикладные системы и программы –

Местонахождение и имена файлов программ и данных -

1. **Идея, метод, алгоритм** решения задачи (в формах: словесной, псевдокода, графической [блок-схема, диаграмма, рисунок,

Алгоритм сортировки заключается в следующем:

Обходим массив от начала до конца, попутно меняя местами неотсортированные соседние элементы. В результате первого прохода на последнее место попадает максимальный элемент. Теперь снова обходим неотсортированную часть массива (от первого элемента до предпоследнего) и меняем по пути неотсортированных элементы. Второй по величине элемент окажется на предпоследнем месте. Продолжая в том же духе, будем обходить всё уменьшающуюся неотсортированную часть массива, запихивая найденные максимумы в конец.

1. **Сценарий выполнения работы** [план работы, первоначальный текст программы в черновике (можно на отдельном листе) и тесты либо соображения по тестированию].

#include <stdio.h>

#include <stdlib.h>

#include <string>

#include <time.h>

int isSort=0;

struct Key

{

int real;

int imaginary;

} key;

struct Row

{

Key key;

char \*value = new char[100];

};

int countOfString(FILE \*file)

{

int count = 0;

char c = '0';

while (!feof(file))

{

if (c == '\n')

++count;

fscanf(file, "%c", &c);

}

rewind(file);

return count;

}

Row \*makeTable(FILE \*file, int size)

{

Row \*table = new Row[size];

for (int i = 0; i < size; ++i)

{

fscanf(file, "%d %d", &table[i].key.real, &table[i].key.imaginary);

fgets(table[i].value,100,file);

}

return table;

}

void printTable(Row \*table, int size)

{

printf("\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n");

for (int i = 0; i < size; ++i)

{

printf(" %4d %4di | %s \n", table[i].key.real, table[i].key.imaginary, table[i].value);

}

}

void swapString(Row \*table, int a, int b)

{

Row tpm = table[a];

table[a] = table[b];

table[b] = tpm;

}

int compareKey(Key a, Key b)

{

if (a.real \* a.real - a.imaginary \* a.imaginary > b.real \* b.real - b.imaginary \* b.imaginary)

return 1;

else if(a.real \* a.real - a.imaginary \* a.imaginary == b.real \* b.real - b.imaginary \* b.imaginary)

return 0;

else

return -1;

}

void bubbleSort(Row \*table, int size)

{

isSort=1;

for (int r = 1; r < size; ++r)

{

for (int i = 0; i < size - r; ++i)

{

if (compareKey(table[i].key, table[i + 1].key)==1)

{

swapString(table, i, i + 1);

}

}

}

}

void reverseTable(Row \*table, int size)

{

Row tmp;

for (int i = 0; i < size/2; ++i)

{

tmp = table[i];

table[i]=table[size-i-1];

table[size-i-1]=tmp;

}

isSort=0;

}

void mixTable(Row \*table, int size)

{

int a,b;

for(int i =0; i< size;++i)

{

a=rand()%size;

b=rand()%size;

swapString(table,a,b);

}

isSort=0;

}

void randomize()

{

int a = time(0);

srand(a);

}

int binarySearch(Row \*table, int size, Key key)

{

int i=0, mid, end = size-1;

while(i<=end)

{

mid=(i+end)/2;

if(compareKey(key,table[mid].key)==0)

{

return mid;

}

else if(compareKey(key,table[mid].key)==-1)

{

end = mid;

}

else if(compareKey(key,table[mid].key)==1)

{

i=mid+1;

}

}

return -1;

}

int main(int argc, char \*argv[])// i need a binary search

{

randomize();

FILE \*inputFile = fopen(argv[1], "r");

if (!inputFile)

{

printf("Can't open file\n");

return 0;

}

int size = countOfString(inputFile);

Row \*table = makeTable(inputFile, size);

printTable(table,size);

int choise;

while(1)

{

printf("Menu\n");

printf("1)Print table\n");

printf("2)Buble sort\n");

printf("3)Binary search\n");

printf("4)Mix table\n");

printf("5)Revers table\n");

printf("0)Exit\n");

printf("Please choose an action:");

scanf("%d",&choise);

switch (choise)

{

case 1:

{

printTable(table,size);

break;

}

case 2:

bubbleSort(table, size);

break;

case 3:

{

if(isSort==1)

{

printf("Please enter the real and imagine value of key:");

int real;

scanf("%d",&real);

int imagine;

scanf("%d",&imagine);

key.real = real;

key.imaginary = imagine;

int search = binarySearch(table,size,key);

if(search==-1)

{

printf("This element is not found\n");

break;

}

printf("Found the string:\n %s\n",table[search].value);

}

else

printf("Table isn't sorted\n");

break;

}

case 4:

{

mixTable(table,size);

break;

}

case 5:

{

reverseTable(table,size);

break;

}

case 0:

return 0;

}

}

return 0;

}

*Пункты 1-7 отчета составляются сторого до начала лабораторной работы.*

*Допущен к выполнению работы.*  **Подпись преподавателя \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. **Распечатка протокола**  (подклеить листинг окончательного варианта программы с тестовыми примерами, подписанный преподавателем).

lain@navi:/mnt/d/mai/sem2/lab/curs9$ cat head\_curs\_9.txt

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| Курсовая работа №9 |

| Сортировка и поиск |

| Студента группы М8О-105Б-21 |

| Жилова Андрея |

| |

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lain@navi:/mnt/d/mai/sem2/lab/curs9$ cat in.txt

1 0 Two roads diverged in a yellow wood,

2 1 And sorry I could not travel both

3 2 And be one traveler, long I stood

4 3 And looked down one as far as I could

5 4 To where it bent in the undergrowth.

6 5 Then took the other, as just as fair,

7 6 And having perhaps the better claim,

8 7 Because it was grassy and wanted wear;

9 8 Though as for that the passing there

10 9 Had worn them really about the same.

11 10 And both that morning equally lay

12 11 In leaves no step had trodden black.

13 12 Oh, I kept the first for another day!

14 13 Yet knowing how way leads on to way,

15 14 I doubted if I should ever come back.

16 15 I shall be telling this with a sigh

17 16 Somewhere ages and ages hence:

18 17 Two roads diverged in a wood, and I—

19 18 I took the one less traveled by,

20 19 And that has made all the difference.

lain@navi:/mnt/d/mai/sem2/lab/curs9$ g++ curs9.cpp

lain@navi:/mnt/d/mai/sem2/lab/curs9$ ./a.out in.txt

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1 0i | Two roads diverged in a yellow wood,

2 1i | And sorry I could not travel both

3 2i | And be one traveler, long I stood

4 3i | And looked down one as far as I could

5 4i | To where it bent in the undergrowth.

6 5i | Then took the other, as just as fair,

7 6i | And having perhaps the better claim,

8 7i | Because it was grassy and wanted wear;

9 8i | Though as for that the passing there

10 9i | Had worn them really about the same.

11 10i | And both that morning equally lay

12 11i | In leaves no step had trodden black.

13 12i | Oh, I kept the first for another day!

14 13i | Yet knowing how way leads on to way,

15 14i | I doubted if I should ever come back.

16 15i | I shall be telling this with a sigh

17 16i | Somewhere ages and ages hence:

18 17i | Two roads diverged in a wood, and I—

19 18i | I took the one less traveled by,

20 19i | And that has made all the difference.

Menu

1)Print table

2)Buble sort

3)Binary search

4)Mix table

5)Revers table

0)Exit

Please choose an action:2

Menu

1)Print table

2)Buble sort

3)Binary search

4)Mix table

5)Revers table

0)Exit

Please choose an action:1

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1 0i | Two roads diverged in a yellow wood,

2 1i | And sorry I could not travel both

3 2i | And be one traveler, long I stood

4 3i | And looked down one as far as I could

5 4i | To where it bent in the undergrowth.

6 5i | Then took the other, as just as fair,

7 6i | And having perhaps the better claim,

8 7i | Because it was grassy and wanted wear;

9 8i | Though as for that the passing there

10 9i | Had worn them really about the same.

11 10i | And both that morning equally lay

12 11i | In leaves no step had trodden black.

13 12i | Oh, I kept the first for another day!

14 13i | Yet knowing how way leads on to way,

15 14i | I doubted if I should ever come back.

16 15i | I shall be telling this with a sigh

17 16i | Somewhere ages and ages hence:

18 17i | Two roads diverged in a wood, and I—

19 18i | I took the one less traveled by,

20 19i | And that has made all the difference.

Menu

1)Print table

2)Buble sort

3)Binary search

4)Mix table

5)Revers table

0)Exit

Please choose an action:4

Menu

1)Print table

2)Buble sort

3)Binary search

4)Mix table

5)Revers table

0)Exit

Please choose an action:1

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1 0i | Two roads diverged in a yellow wood,

6 5i | Then took the other, as just as fair,

10 9i | Had worn them really about the same.

13 12i | Oh, I kept the first for another day!

12 11i | In leaves no step had trodden black.

3 2i | And be one traveler, long I stood

17 16i | Somewhere ages and ages hence:

16 15i | I shall be telling this with a sigh

11 10i | And both that morning equally lay

2 1i | And sorry I could not travel both

15 14i | I doubted if I should ever come back.

9 8i | Though as for that the passing there

19 18i | I took the one less traveled by,

4 3i | And looked down one as far as I could

7 6i | And having perhaps the better claim,

8 7i | Because it was grassy and wanted wear;

20 19i | And that has made all the difference.

18 17i | Two roads diverged in a wood, and I—

14 13i | Yet knowing how way leads on to way,

5 4i | To where it bent in the undergrowth.

Menu

1)Print table

2)Buble sort

3)Binary search

4)Mix table

5)Revers table

0)Exit

Please choose an action:2

Menu

1)Print table

2)Buble sort

3)Binary search

4)Mix table

5)Revers table

0)Exit

Please choose an action:1

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1 0i | Two roads diverged in a yellow wood,

2 1i | And sorry I could not travel both

3 2i | And be one traveler, long I stood

4 3i | And looked down one as far as I could

5 4i | To where it bent in the undergrowth.

6 5i | Then took the other, as just as fair,

7 6i | And having perhaps the better claim,

8 7i | Because it was grassy and wanted wear;

9 8i | Though as for that the passing there

10 9i | Had worn them really about the same.

11 10i | And both that morning equally lay

12 11i | In leaves no step had trodden black.

13 12i | Oh, I kept the first for another day!

14 13i | Yet knowing how way leads on to way,

15 14i | I doubted if I should ever come back.

16 15i | I shall be telling this with a sigh

17 16i | Somewhere ages and ages hence:

18 17i | Two roads diverged in a wood, and I—

19 18i | I took the one less traveled by,

20 19i | And that has made all the difference.

Menu

1)Print table

2)Buble sort

3)Binary search

4)Mix table

5)Revers table

0)Exit

Please choose an action:5

Menu

1)Print table

2)Buble sort

3)Binary search

4)Mix table

5)Revers table

0)Exit

Please choose an action:1

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

20 19i | And that has made all the difference.

19 18i | I took the one less traveled by,

18 17i | Two roads diverged in a wood, and I—

17 16i | Somewhere ages and ages hence:

16 15i | I shall be telling this with a sigh

15 14i | I doubted if I should ever come back.

14 13i | Yet knowing how way leads on to way,

13 12i | Oh, I kept the first for another day!

12 11i | In leaves no step had trodden black.

11 10i | And both that morning equally lay

10 9i | Had worn them really about the same.

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8 7i | Because it was grassy and wanted wear;

7 6i | And having perhaps the better claim,

6 5i | Then took the other, as just as fair,

5 4i | To where it bent in the undergrowth.

4 3i | And looked down one as far as I could

3 2i | And be one traveler, long I stood

2 1i | And sorry I could not travel both

1 0i | Two roads diverged in a yellow wood,

Menu

1)Print table

2)Buble sort

3)Binary search

4)Mix table

5)Revers table

0)Exit

Please choose an action:2

Menu

1)Print table

2)Buble sort

3)Binary search

4)Mix table

5)Revers table

0)Exit

Please choose an action:1

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1 0i | Two roads diverged in a yellow wood,

2 1i | And sorry I could not travel both

3 2i | And be one traveler, long I stood

4 3i | And looked down one as far as I could

5 4i | To where it bent in the undergrowth.

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13 12i | Oh, I kept the first for another day!

14 13i | Yet knowing how way leads on to way,

15 14i | I doubted if I should ever come back.

16 15i | I shall be telling this with a sigh

17 16i | Somewhere ages and ages hence:

18 17i | Two roads diverged in a wood, and I—

19 18i | I took the one less traveled by,

20 19i | And that has made all the difference.

Menu

1)Print table

2)Buble sort

3)Binary search

4)Mix table

5)Revers table

0)Exit

Please choose an action:3

Please enter the real and imagine value of key:18 17

Found the string:

Two roads diverged in a wood, and I—

Menu

1)Print table

2)Buble sort

3)Binary search

4)Mix table

5)Revers table

0)Exit

Please choose an action:0

1. **Дневник отладки** должен содержать дату и время сеансов отладки и основные события (ошибки в сценарии и программе, нестандартные ситуации) и краткие комментарии к ним. В дневнике отладки приводятся сведения об использовании других ЭВМ, существенном участии преподавателя и других лиц в написании и отладке программы.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| № | Лаб. или дом. | Дата | Время | Событие | Действие по исправлению | Примечание |
|  |  |  |  |  |  |  |

1. **Замечания автора по существу работы:**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. **Выводы**:

В результате выполнения данной лабораторной работы я научился сортировками и поиску на языке Си

Недочеты при выполнении задания могут быть устранены следующим образом:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Подпись студента \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_