**Отчет по лабораторной работе № 9** по курсу

«Языки и методы программирования»

Студент группы М8О-112Б-21 Орешкин Максим Алексеевич, № по списку \_\_\_13\_\_

Контакты www, e-mail: maks-oreh03@mail.ru

Работа выполнена: « » \_\_\_\_\_\_ 202\_ г.

Преподаватель: доцент каф. 806 \_Никулин С.П\_\_\_\_\_\_\_\_\_\_\_\_\_

Входной контроль знаний с оценкой \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Отчет сдан « » \_\_\_\_\_\_\_\_\_202\_ г., итоговая оценка \_\_\_\_\_

Подпись преподавателя \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

ь 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** : Линейный выбор с подсчетом. Структура таблицы: тип ключа - целый; хранение данных и ключей – отдельно; минимальное число элементов таблицы – 10-14
4. **Оборудование** :

ЭВМ , процессор , имя узла сети с ОП ГБ,

НМД ГБ. Терминал адрес . Принтер

Другие устройства

*Оборудование ПЭВМ студента, если использовалось:*

 Процессор intel core i7, с   ОП 8 ГБ, НМД  120832 МБ. Монитор  15,6 /1920\*1820

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 Unix , наименование Ubuntu версия 20.04

интерпретатор команд bash версия 4.4.18

Система программирования версия

Редактор текстов vim версия 8.1

Утилиты операционной системы \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Прикладные системы и программы \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Местонахождение и имена файлов программ и данных на домашнем компьютере \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **Идея, метод, алгоритм**  решения задачи (в формах: словесной, псевдокода, графической [блок-схема, диаграмма, рисунок, таблица] или формальные спецификации с пред- и постусловиями)

Реализовать функции для печати и сортировки.

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.h>

int is\_sorted = 0;

typedef struct Key{

int re;

} Key;

typedef struct PoetryString{

char \*string;

} PoetryString;

int get\_size(FILE \*input){// не трогать

int n = 0;

char \* buffer =malloc(128\*sizeof(char));

size\_t l = sizeof(buffer);

while(!feof(input))

{

getline(&buffer,&l, input);

n++;

}

free(buffer);

rewind(input);

return n;

}

void print\_table(PoetryString \*table, Key \*table\_idx, int size){

printf("-----------------------------------------------------------------\n");

printf("number string| string \n");

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

printf("%13d|%s", table\_idx[i].re, table[i].string);

}

printf("-----------------------------------------------------------------\n");

}

Key \*sort\_table(Key \*array, int n, int k){

Key\* c = (Key\*)malloc((k+1) \* sizeof(\*array));

memset(c, 0, sizeof(\*array)\*(k+1));

for (int i = 0; i < n; ++i) {

++c[array[i].re].re;

}

int b = 0;

for (int i = 0; i < k+1; ++i){

for (int j = 0; j < c[i].re; ++j) {

array[b++].re = i;

}

}

free(c);

}

void mix\_table(Key \*table\_idx, int size){

is\_sorted = 0;

int a, b;

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

a = rand() % size;

b = rand() % size;

Key temp;

temp.re = table\_idx[a].re;

table\_idx[a].re = table\_idx[b].re;

table\_idx[b].re = temp.re;

}

}

void reverse(Key \*table\_idx, PoetryString \*table,int n){

int c ;

PoetryString temp;

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

c = table\_idx[n-i-1].re;

table\_idx[n-i-1].re = table\_idx[i].re;

table\_idx[i].re = c;

temp.string = table[n-i-1].string;

table[n-i-1].string = table[i].string;

table[i].string = temp.string;

}

}

int main()

{

FILE\* input;

input = fopen("poetry.txt" , "r");

if((input == NULL))

{

printf("Error: can't input from poetry.txt\n");

return 1;

}

int n = get\_size(input),action;

n--;

Key \*table\_idx = malloc(n\*sizeof(Key));

PoetryString \*table = malloc(n\*sizeof(PoetryString));

for (int i = 0; i < n; ++i){

table[i].string = malloc(128\*sizeof(char));

}

for(int i =0; i<n; ++i){

fscanf(input, "%d", &table\_idx[i].re);

fgets(table[i].string, 128, input);

}

while(1)

{

printf("Menu\n");

printf("1) Sort\n");

printf("2) Mix\n");

printf("3) Reverse\n");

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

printf("5) Exit\n");

printf("Choose an action\n");

scanf("%d", &action);

switch (action){

case 1:{

sort\_table(table\_idx, n,11);

break;

}

case 2:{

mix\_table(table\_idx, n);

break;

}

case 3:{

sort\_table(table\_idx, n,11);

reverse(table\_idx, table, n);

break;

case 4: {print\_table(table,table\_idx, n); break;}

case 5: return 0;

}

}

}

free(table\_idx);

free(table);

}

Poetry.txt

1 Wait for me, and I'll come back!

2 Wait with all you've got!

2 Wait, when dreary yellow rains

3 Tell you, you should not.

4 Wait when snow is falling fast,

5 Wait when summer's hot,

6 Wait when yesterdays are past,

7 Others are forgot.

8 Wait, when from that far-off place,

9 Letters don't arrive.

9 Wait, when those with whom you wait

10 Doubt if I'm alive.

11 Wait for me, and I'll come back!

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

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

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

maxim@vb:~$ gcc IX.c

maxim@vb:~$ ./a.out

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

4

-----------------------------------------------------------------

number string| string

1| Wait for me, and I'll come back!

2| Wait with all you've got!

2| Wait, when dreary yellow rains

3| Tell you, you should not.

4| Wait when snow is falling fast,

5| Wait when summer's hot,

6| Wait when yesterdays are past,

7| Others are forgot.

8| Wait, when from that far-off place,

9| Letters don't arrive.

9| Wait, when those with whom you wait

10| Doubt if I'm alive.

11| Wait for me, and I'll come back!

-----------------------------------------------------------------

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

3

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

4

-----------------------------------------------------------------

number string| string

11| Wait for me, and I'll come back!

10| Doubt if I'm alive.

9| Wait, when those with whom you wait

9| Letters don't arrive.

8| Wait, when from that far-off place,

7| Others are forgot.

6| Wait when yesterdays are past,

5| Wait when summer's hot,

4| Wait when snow is falling fast,

3| Tell you, you should not.

2| Wait, when dreary yellow rains

2| Wait with all you've got!

1| Wait for me, and I'll come back!

-----------------------------------------------------------------

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

2

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

4

-----------------------------------------------------------------

number string| string

2| Wait for me, and I'll come back!

9| Doubt if I'm alive.

1| Wait, when those with whom you wait

7| Letters don't arrive.

3| Wait, when from that far-off place,

9| Others are forgot.

6| Wait when yesterdays are past,

4| Wait when summer's hot,

10| Wait when snow is falling fast,

2| Tell you, you should not.

8| Wait, when dreary yellow rains

11| Wait with all you've got!

5| Wait for me, and I'll come back!

-----------------------------------------------------------------

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

3

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

4

-----------------------------------------------------------------

number string| string

11| Wait for me, and I'll come back!

10| Wait with all you've got!

9| Wait, when dreary yellow rains

9| Tell you, you should not.

8| Wait when snow is falling fast,

7| Wait when summer's hot,

6| Wait when yesterdays are past,

5| Others are forgot.

4| Wait, when from that far-off place,

3| Letters don't arrive.

2| Wait, when those with whom you wait

2| Doubt if I'm alive.

1| Wait for me, and I'll come back!

-----------------------------------------------------------------

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

1

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

4

-----------------------------------------------------------------

number string| string

1| Wait for me, and I'll come back!

2| Wait with all you've got!

2| Wait, when dreary yellow rains

3| Tell you, you should not.

4| Wait when snow is falling fast,

5| Wait when summer's hot,

6| Wait when yesterdays are past,

7| Others are forgot.

8| Wait, when from that far-off place,

9| Letters don't arrive.

9| Wait, when those with whom you wait

10| Doubt if I'm alive.

11| Wait for me, and I'll come back!

-----------------------------------------------------------------

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

2

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

4

-----------------------------------------------------------------

number string| string

5| Wait for me, and I'll come back!

11| Wait with all you've got!

4| Wait, when dreary yellow rains

2| Tell you, you should not.

3| Wait when snow is falling fast,

1| Wait when summer's hot,

6| Wait when yesterdays are past,

7| Others are forgot.

8| Wait, when from that far-off place,

10| Letters don't arrive.

9| Wait, when those with whom you wait

2| Doubt if I'm alive.

9| Wait for me, and I'll come back!

-----------------------------------------------------------------

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

2

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

4

-----------------------------------------------------------------

number string| string

9| Wait for me, and I'll come back!

5| Wait with all you've got!

11| Wait, when dreary yellow rains

1| Tell you, you should not.

2| Wait when snow is falling fast,

4| Wait when summer's hot,

9| Wait when yesterdays are past,

7| Others are forgot.

8| Wait, when from that far-off place,

6| Letters don't arrive.

10| Wait, when those with whom you wait

3| Doubt if I'm alive.

2| Wait for me, and I'll come back!

-----------------------------------------------------------------

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

3

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

4

-----------------------------------------------------------------

number string| string

11| Wait for me, and I'll come back!

10| Doubt if I'm alive.

9| Wait, when those with whom you wait

9| Letters don't arrive.

8| Wait, when from that far-off place,

7| Others are forgot.

6| Wait when yesterdays are past,

5| Wait when summer's hot,

4| Wait when snow is falling fast,

3| Tell you, you should not.

2| Wait, when dreary yellow rains

2| Wait with all you've got!

1| Wait for me, and I'll come back!

-----------------------------------------------------------------

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

1

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

4

-----------------------------------------------------------------

number string| string

1| Wait for me, and I'll come back!

2| Doubt if I'm alive.

2| Wait, when those with whom you wait

3| Letters don't arrive.

4| Wait, when from that far-off place,

5| Others are forgot.

6| Wait when yesterdays are past,

7| Wait when summer's hot,

8| Wait when snow is falling fast,

9| Tell you, you should not.

9| Wait, when dreary yellow rains

10| Wait with all you've got!

11| Wait for me, and I'll come back!

-----------------------------------------------------------------

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

3

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

4

-----------------------------------------------------------------

number string| string

11| Wait for me, and I'll come back!

10| Wait with all you've got!

9| Wait, when dreary yellow rains

9| Tell you, you should not.

8| Wait when snow is falling fast,

7| Wait when summer's hot,

6| Wait when yesterdays are past,

5| Others are forgot.

4| Wait, when from that far-off place,

3| Letters don't arrive.

2| Wait, when those with whom you wait

2| Doubt if I'm alive.

1| Wait for me, and I'll come back!

-----------------------------------------------------------------

Menu

1) Sort

2) Mix

3) Reverse

4) print table

5) Exit

Choose an action

5

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

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

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

11. **Выводы**

Разобрался как сортировать элементы по отдельности.

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