

Операционные системы

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Лабораторная работа №14

Реализация функций калькулятора в файле calculate.c

```

emacs@ubuntu$
//////////////////////////////// calculate.c
#include <stdio.h>
#include <math.h>
#include <string.h>
#include "calculate.h"
float Calculate (float Numeral, char Operation[4])
{
    float SecondNumeral;
    if(strcmp(Operation, "+", 1)==0)
    {
        printf("Введите второе число: ");
        scanf("%f", &SecondNumeral);
        return(Numeral+SecondNumeral);
    }
    else if(strcmp(Operation, "-", 1)==0)
    {
        printf("Введите второе число: ");
        scanf("%f", &SecondNumeral);
        return(Numeral-SecondNumeral);
    }
    else if(strcmp(Operation, "*", 1)==0)
    {
        printf("Введите второе число: ");
        scanf("%f", &SecondNumeral);
        return(Numeral*SecondNumeral);
    }
    else if(strcmp(Operation, "/", 1)==0)
    {
        printf("Введите второе число: ");
        scanf("%f", &SecondNumeral);
        if(SecondNumeral==0)
        {
            printf("Деление на ноль!");
            return(HUGE_VAL);
        }
        else return(Numeral/SecondNumeral);
    }
    else if(strcmp(Operation, "pow", 3)==0)
    {
        printf("Введите степень: ");
        scanf("%d", &SecondNumeral);
        return(pow(Numeral, SecondNumeral));
    }
}

U++ calculate.c Top L40 C/C++ Abbrev By man 1 @9:15, 1.12
some of the error in your initialization file. Start Emacs with
the "-debug-init" option to view a complete error backtrace.

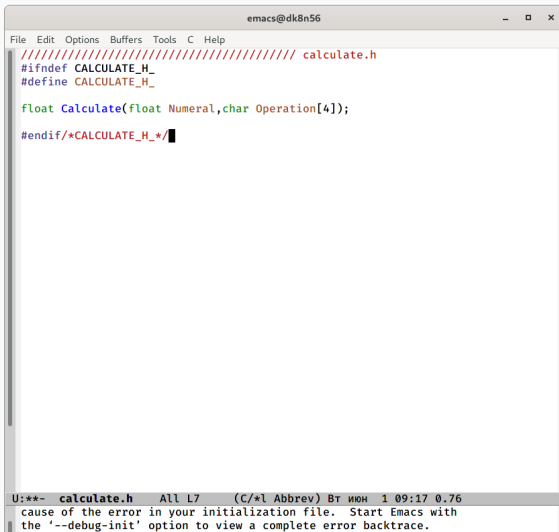
U++ #warnings Bot L8 (Special) By man 1 @9:15, 1.12
Beginning of buffer

```

Figure 1: Первая часть

```
emacs@48b56
File Edit Options Buffers Tools C Help
1  scanf("%i",&SecondNumeral);
2  return(pow(Numeral, SecondNumeral));
3  }
4  else if(strcmp(Operation,"sqrt",&)==0)
5  return(sqrt(Numeral));
6  else
7  {
8  printf("Operation %s is not supported\n",Operation);
9  }
```

Интерфейсный файл `calculate.h`, описывающий формат вызова функции калькулятора

A screenshot of an Emacs editor window. The title bar reads 'emacs@dk8n56'. The menu bar includes 'File', 'Edit', 'Options', 'Buffers', 'Tools', 'C', and 'Help'. The main text area shows the content of a header file 'calculate.h'. The code is as follows:

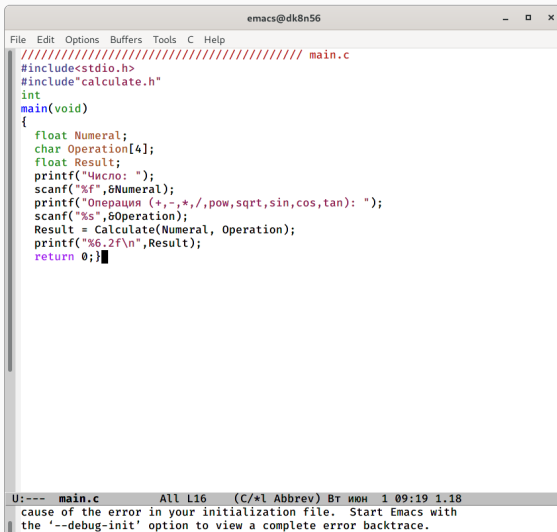
```
//////////////////////////////////// calculate.h
#ifndef CALCULATE_H_
#define CALCULATE_H_

float Calculate(float Numeral, char Operation[4]);

#endif /* CALCULATE_H_ */
```

The status bar at the bottom displays: 'U:**~ calculate.h All L7 (C/*l Abbrev) Вт июн 1 09:17 0.76'. Below this, a message is visible: 'cause of the error in your initialization file. Start Emacs with the '--debug-init' option to view a complete error backtrace.'

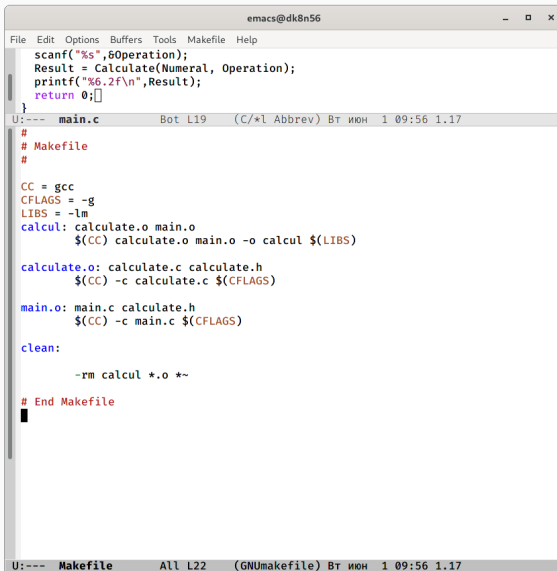
Основной файл main.c, реализующий интерфейс пользователя калькулятору



```
emacs@dk8n56
File Edit Options Buffers Tools C Help
//////////////////////////////////// main.c
#include<stdio.h>
#include"calculate.h"
int
main(void)
{
    float Numeral;
    char Operation[4];
    float Result;
    printf("Число: ");
    scanf("%f",&Numeral);
    printf("Операция (+,-,*,/,pow,sqrt,sin,cos,tan): ");
    scanf("%s",&Operation);
    Result = Calculate(Numeral, Operation);
    printf("%.2f\n",Result);
    return 0;}

U:--- main.c All L16 (C/*l Abbrev) Вт июн 1 09:19 1.18
cause of the error in your initialization file. Start Emacs with
the '--debug-init' option to view a complete error backtrace.
```

Makefile



The screenshot shows an Emacs editor window titled 'emacs@dk8n56'. The menu bar includes 'File', 'Edit', 'Options', 'Buffers', 'Tools', 'Makefile', and 'Help'. The editor is displaying two files. The first file, 'main.c', contains the following C code:

```
scanf("%s",&Operation);
Result = Calculate(Numeral, Operation);
printf("%.2f\n",Result);
return 0;
```

The second file, 'Makefile', contains the following content:

```
#
# Makefile
#

CC = gcc
CFLAGS = -g
LIBS = -lm
calcul: calculate.o main.o
    $(CC) calculate.o main.o -o calcul $(LIBS)

calculate.o: calculate.c calculate.h
    $(CC) -c calculate.c $(CFLAGS)

main.o: main.c calculate.h
    $(CC) -c main.c $(CFLAGS)

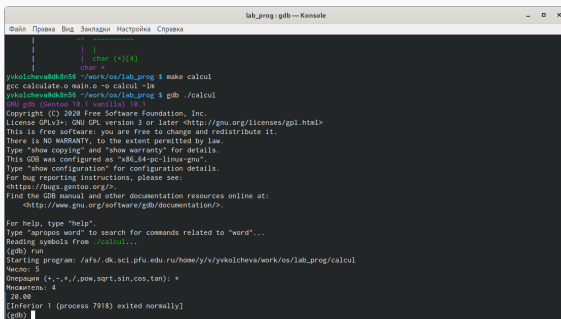
clean:

    -rm calcul *.o *~

# End Makefile
```

The status bar at the bottom of the window shows 'U:--- main.c Bot L19 (C/*l Abbrev) Вт июн 1 09:56 1.17' for the first file and 'U:--- Makefile All L22 (GNUmakefile) Вт июн 1 09:56 1.17' for the second file.

Для запуска программы внутри отладчика ввела команду «run».



```
lab_prog: gdb — Konsole
Файл Правка Вид Закладки Настройка Справка

| |
| | char (*)[4]
| | char *
yvkolcheva@ddns56 ~/work/os/lab_prog $ make calcul
gcc calculate.o main.o -o calcul -lm
yvkolcheva@ddns56 ~/work/os/lab_prog $ gdb ./calcul
GNU gdb (Gentoo 10.1 vanilla) 10.1
Copyright (C) 2020 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software; you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
Type "show copying" and "show warranty" for details.
This GDB was configured as "x86_64-pc-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<https://bugs.gentoo.org/>.
Find the GDB manual and other documentation resources online at:
<http://www.gnu.org/software/gdb/documentation/>.
For help, type "help".
Type "command word" to search for commands related to "word"...
Reading symbols from ./calcul...
(gdb) run
Starting program: /afs/dk.sci.pfu.edu.ru/home/y/yvkolcheva/work/os/lab_prog/calcul
Число: 5
Операция (+, -, *, /, pow, sqrt, sin, cos, tan): *
Множитель: 4
20.00
[Inferior 1 (process 7918) exited normally]
(gdb)
```

Figure 6: Работа программы

В ходе выполнения данной лабораторной работы я приобрела простейшие навыки разработки, анализа, тестирования и отладки приложений в ОС типа UNIX/Linux на примере создания на языке программирования C калькулятора с простейшими функциями.

Спасибо за внимание!