

Лабораторная работа 13

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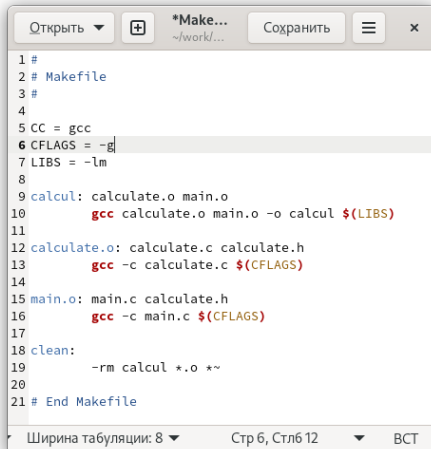
Информация

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Вводная часть

- Приобрести простейшие навыки разработки, анализа, тестирования и отладки приложений.
- Отладка программы-калькулятора

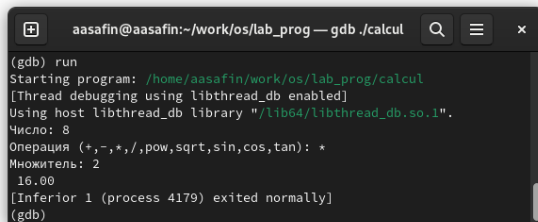
Основная часть



```
1 #
2 # Makefile
3 #
4
5 CC = gcc
6 CFLAGS = -g
7 LIBS = -lm
8
9 calcul: calculate.o main.o
10     gcc calculate.o main.o -o calcul $(LIBS)
11
12 calculate.o: calculate.c calculate.h
13     gcc -c calculate.c $(CFLAGS)
14
15 main.o: main.c calculate.h
16     gcc -c main.c $(CFLAGS)
17
18 clean:
19     -rm calcul *.o *~
20
21 # End Makefile
```

Ширина табуляции: 8 Стр 6, Стлб 12 ВСТ

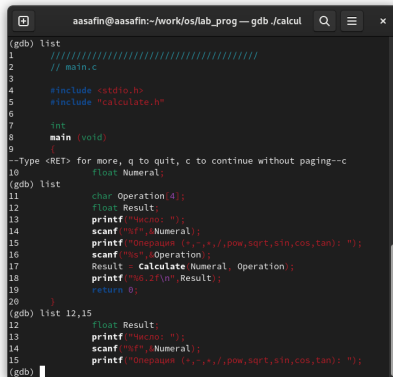
Рис. 1: Makefile



```
aasafin@aasafin:~/work/os/lab_prog — gdb ./calcul
(gdb) run
Starting program: /home/aasafin/work/os/lab_prog/calcul
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib64/libthread_db.so.1".
Число: 8
Операция (+,-,*,/,pow,sqrt,sin,cos,tan): *
Множитель: 2
16.00
[Inferior 1 (process 4179) exited normally]
(gdb)
```

Рис. 2: GDB run

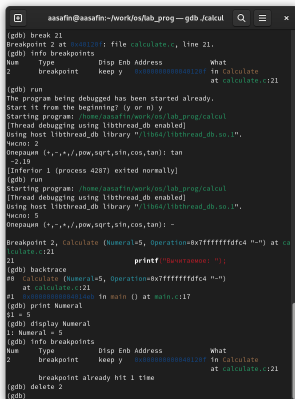
Выполнение лабораторной работы



```
aasafin@aasafin:~/work/os/lab_prog — gdb ./calcul
(gdb) list
1  //////////////////////////////////////////////////
2  // main.c
3
4  #include <stdio.h>
5  #include "calculate.h"
6
7  int
8  main (void)
9  {
--Type <RET> for more, q to quit, c to continue without paging--
10 float Numeral;
(gdb) list
11 char Operation[4];
12 float Result;
13 printf("Число: ");
14 scanf("%f",&Numeral);
15 printf("Операция (+,-,*,/,pow,sqrt,sin,cos,tan): ");
16 scanf("%s",&Operation);
17 Result = Calculate(Numeral, Operation);
18 printf("%.2f\n",Result);
19 return 0;
20 }
(gdb) list 12,15
12 float Result;
13 printf("Число: ");
14 scanf("%f",&Numeral);
15 printf("Операция (+,-,*,/,pow,sqrt,sin,cos,tan): ");
(gdb)
```

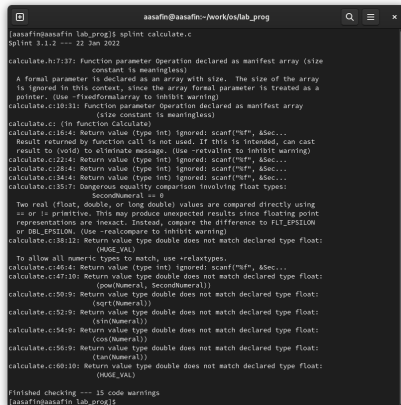
Рис. 3: GDB list

Выполнение лабораторной работы



```
aasafin@aasafin:~/work/os/lab_prog — gdb ./calcul
(gdb) break 21
Breakpoint 2 at 0x40120f: file calculate.c, line 21.
(gdb) info breakpoints
Num Type Disp Enb Address What
2 breakpoint keep y 0x000000000040120f in calculate
at calculate.c:21
(gdb) run
The program being debugged has been started already.
Start it from the beginning? (y or n) y
Starting program: /home/aasafin/work/os/lab_prog/calcul
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib64/libthread_db.so.1".
Число: 2
Операция (+,-,*,/,pow,sqrt,sin,cos,tan): tan
-2,19
[Inferior 1 (process 4287) exited normally]
(gdb) run
Starting program: /home/aasafin/work/os/lab_prog/calcul
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib64/libthread_db.so.1".
Число: 5
Операция (+,-,*,/,pow,sqrt,sin,cos,tan): -
Breakpoint 2, calculate (Numeral=5, Operation=0x7fffffffdfc4 "--") at ca
lculate.c:21
21 printf("Numramoo: ");
(gdb) backtrace
#8 calculate (Numeral=5, Operation=0x7fffffffdfc4 "--")
at calculate.c:21
#1 0x000000000040120f in main () at main.c:17
(gdb) print Numeral
$1 = 5
(gdb) display Numeral
1: Numeral = 5
(gdb) info breakpoints
Num Type Disp Enb Address What
2 breakpoint keep y 0x000000000040120f in calculate
at calculate.c:21
breakpoint already hit 1 time
(gdb) delete 2
(gdb)
```

Рис. 4: GDB breakpoint



```
aasafin@aasafin:~/work/os/lab_prog
[aasafin@aasafin lab_prog]$ splint calculate.c
splint 3.1.2 --- 22 Jan 2022

calculate.h:7:37: Function parameter Operation declared as manifest array (size
constant is meaningless)
A formal parameter is declared as an array with size. The size of the array
is ignored in this context, since the array formal parameter is treated as a
pointer. (Use -fixedformalarray to inhibit warning)
calculate.c:10:13: Function parameter Operation declared as manifest array
(size constant is meaningless)
calculate.c: (in function Calculate)
calculate.c:16:4: Return value (type int) ignored: scanf("%f", &sec...
Result returned by function call is not used. If this is intended, can cast
result to (void) to eliminate message. (Use -retvalint to inhibit warning)
calculate.c:22:4: Return value (type int) ignored: scanf("%f", &sec...
calculate.c:28:4: Return value (type int) ignored: scanf("%f", &sec...
calculate.c:34:4: Return value (type int) ignored: scanf("%f", &sec...
calculate.c:35:7: Dangerous equality comparison involving float types:
SecondNumeral == 0
Two real (float, double, or long double) values are compared directly using
== or != primitive. This may produce unexpected results since floating point
representations are inexact. Instead, compare the difference to FLT_EPSILON
or DBL_EPSILON. (Use -realcompare to inhibit warning)
calculate.c:38:12: Return value type double does not match declared type float:
(HUGE_VAL)
To allow all numeric types to match, use +relaxtypes.
calculate.c:46:4: Return value (type int) ignored: scanf("%f", &sec...
calculate.c:47:10: Return value type double does not match declared type float:
(pow(Numeral, SecondNumeral))
calculate.c:50:9: Return value type double does not match declared type float:
(sqrt(Numeral))
calculate.c:52:9: Return value type double does not match declared type float:
(sin(Numeral))
calculate.c:54:9: Return value type double does not match declared type float:
(cos(Numeral))
calculate.c:56:9: Return value type double does not match declared type float:
(tan(Numeral))
calculate.c:60:10: Return value type double does not match declared type float:
(HUGE_VAL)

Finished checking --- 15 code warnings
[aasafin@aasafin lab_prog]$
```

Рис. 5: splint

Заключительная часть

- Навык работы со средствами отладки получен.