

Лабораторная работа № 14

Средства, применяемые при разработке программного обеспечения в ОС типа UNIX/Linux

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Цель работы:

Приобрести простейшие навыки разработки, анализа, тестирования и отладки приложений в **ОС** типа **UNIX/Linux** на примере создания на языке программирования **C** калькулятора с простейшими функциями.

Зачем?

В этой лабораторной работе мы будем осваивать компиляцию, анализ, тестирование программного кода, который нам пригодится в нашей будущей работе.

Задачи и результаты:

1. Знакомимся с компиляцией с помощью командных инструментов

```
im@kim-VirtualBox:~/work/os/lab_prog$ gcc -c calculate.c
im@kim-VirtualBox:~/work/os/lab_prog$ gcc -c main.c
im@kim-VirtualBox:~/work/os/lab_prog$ gcc calculate.o main.o -o calcul
im@kim-VirtualBox:~/work/os/lab_prog$

x:~/work/os/lab_prog$ gcc -c calculate.c -g
x:~/work/os/lab_prog$ gcc -c main.c -g
x:~/work/os/lab_prog$ gcc calculate.o main.o -o calcul -lm
x:~/work/os/lab_prog$
```

2. Познакомимся с отладкой

```
kim@kim-VirtualBox:~/work/os/lab_prog$ gdb ./calcul
GNU gdb (Ubuntu 9.1-0ubuntu1) 9.1
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-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<http://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
<http://www.gnu.org/software/gdb/documentation/>.
```

For help, type "help"

(gdb) list

```
1      #include <stdio.h>
2      #include "calculate.h"
3
4      int main(void)
5      {
6          float Numeral;
7          char Operation[4];
8          float Result;
9          printf("Число: ");
10         scanf("%f", &Numeral);
```

(gdb) █

kim@kim-VirtualBox: ~/work/os/lab_prog

(gdb) run

Starting program: /home/kim/work/os/lab_prog/calcul

Число: 18

Операция (+,-,*,/,pow,sqrt,sin,cos,tan): +2

Второе слагаемое: 2

20.00

[Inferior 1 (process 5376) exited normally]

(gdb) █

(gdb) list calculate.c:20,27

```
20         }
21         else if(strncmp(Operation, "*", 1) == 0)
22         {
23             printf("Множитель: ");
24             scanf("%f", &SecondNumeral);
25             return(Numeral * SecondNumeral);
26         }
27         else if(strncmp(Operation, "/", 1) == 0)
```

(gdb) break 21

Breakpoint 1 at 0x55555555319: file calculate.c, line 21.

(gdb)

3. Познакомимся с анализом исходных кодов

```
kim@kim-VirtualBox: ~/work/os/lab_prog
kim@kim-VirtualBox:~/work/os/lab_prog$ splint calculate.c
Splint 3.1.2 --- 20 Feb 2018

calculate.h:4:37: 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:6:37: Function parameter Operation declared as manifest array (size
        constant is meaningless)
calculate.c: (in function Calculate)
calculate.c:12:3: 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:18:3: Return value (type int) ignored: scanf("%f", &Sec...
calculate.c:24:3: Return value (type int) ignored: scanf("%f", &Sec...
calculate.c:30:3: Return value (type int) ignored: scanf("%f", &Sec...
calculate.c:31:6: Dangerous equality comparison involving float types:
    SecondNumerical == 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:34:10: Return value type double does not match declared type float:
    (HUGE_VAL)
    To allow all numeric types to match, use +relaxtypes.
calculate.c:42:3: Return value (type int) ignored: scanf("%f", &Sec...
```

```
kim@kim-VirtualBox: ~/work/os/lab_prog
kim@kim-VirtualBox:~/work/os/lab_prog$ splint main.c
Splint 3.1.2 --- 20 Feb 2018

calculate.h:4:37: Function parameter operation declare
        constant is meaningless)
    A formal parameter is declared as an array with size
    is ignored in this context, since the array formal p
    pointer. (Use -fixedformalarray to inhibit warning)
main.c: (in function main)
main.c:10:2: Return value (type int) ignored: scanf("%
    Result returned by function call is not used. If thi
    result to (void) to eliminate message. (Use -retvali
main.c:12:2: Return value (type int) ignored: scanf("%

Finished checking --- 3 code warnings
kim@kim-VirtualBox:~/work/os/lab_prog$
```

Вывод

Приобрела простейшие навыки разработки, анализа, тестирования и отладки приложений в **ОС** типа **UNIX/Linux** на примере создания на языке программирования С калькулятора с простейшими функциями.