

Отчёта по лабораторной работе 6

Основы работы с Midnight Commander (mc). Структура программы на языке ассемблера NASM

Абрикосов Артем Камович

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1 Цель работы

Целью работы является приобретение практических навыков работы в Midnight Commander. Освоение инструкций языка ассемблера `mov` и `int`.

2 Задание

1. Изучите как работать в Midnight Commander.
2. Изучите примеры программ из задания к работе.
3. Дополните примеры в соответствии с заданием.
4. Загрузите файлы на GitHub.

3 Теоретическое введение

Midnight Commander - это программа, предназначенная для просмотра содержимого каталогов и выполнения основных функций управления файлами в UNIX-подобных операционных системах.

Главное окно программы Midnight Commander состоит из трех полей. Два поля, называемые “панелями”, идентичны по структуре и обычно отображают перечни файлов и подкаталогов каких-то двух каталогов файловой структуры. Эти каталоги в общем случае различны, хотя, в частности, могут и совпасть. Каждая панель состоит из заголовка, списка файлов и информационной строки.

Третье поле экрана, расположенное в нижней части экрана, содержит командную строку текущей оболочки. В этом же поле (самая нижняя строка экрана) содержится подсказка по использованию функциональных клавиш F1 - F10. Самая верхняя строка экрана содержит строку горизонтального меню.

Эта строка может не отображаться на экране; в этом случае доступ к ней можно получить, щелкнув мышью по верхней рамке или нажав клавишу F9.

Панели Midnight Commander обеспечивают просмотр одновременно двух каталогов. Одна из панелей является активной в том смысле, что пользователь может выполнять некоторые операции с отображаемыми в этой панели файлами и каталогами.

4 Выполнение лабораторной работы

1. Создадим новый подкаталог с именем lab06 и в нем файл lab6-1.asm. (рис. 4.1)

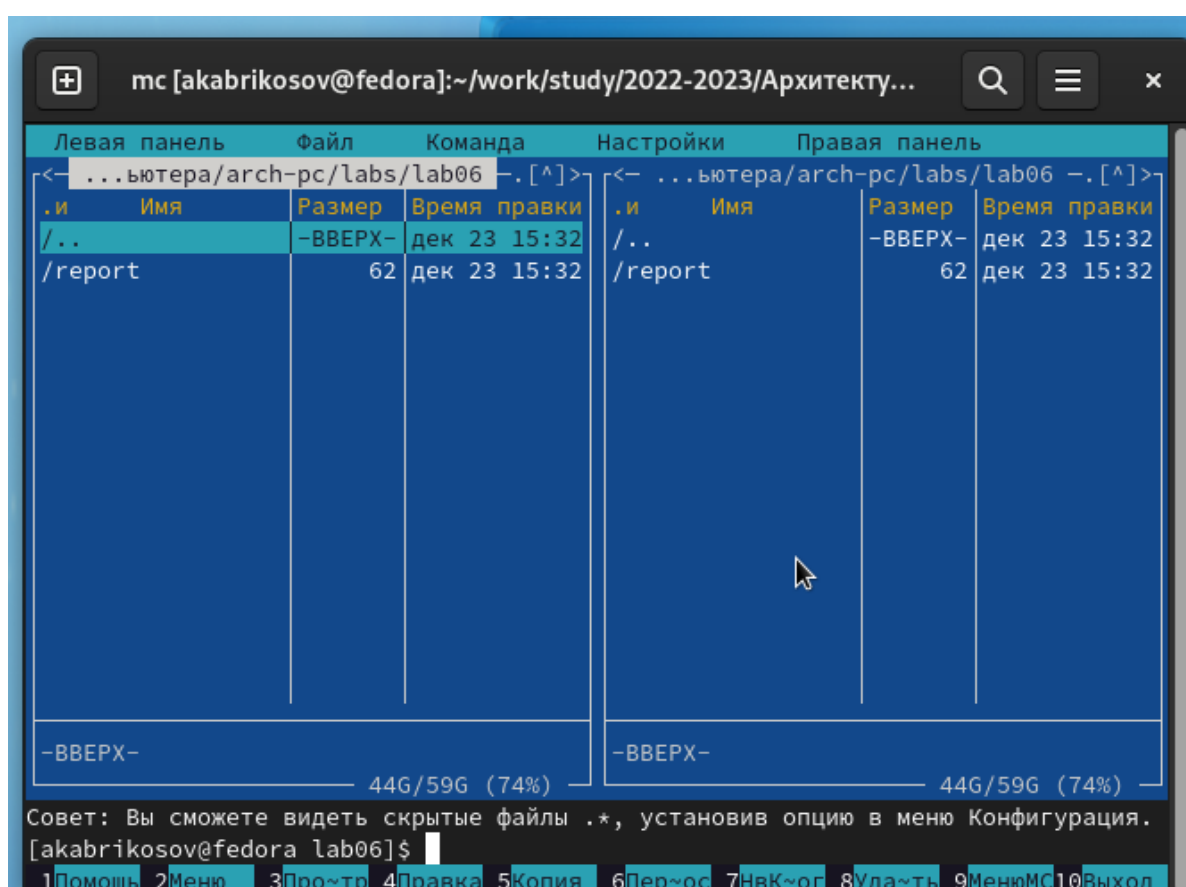
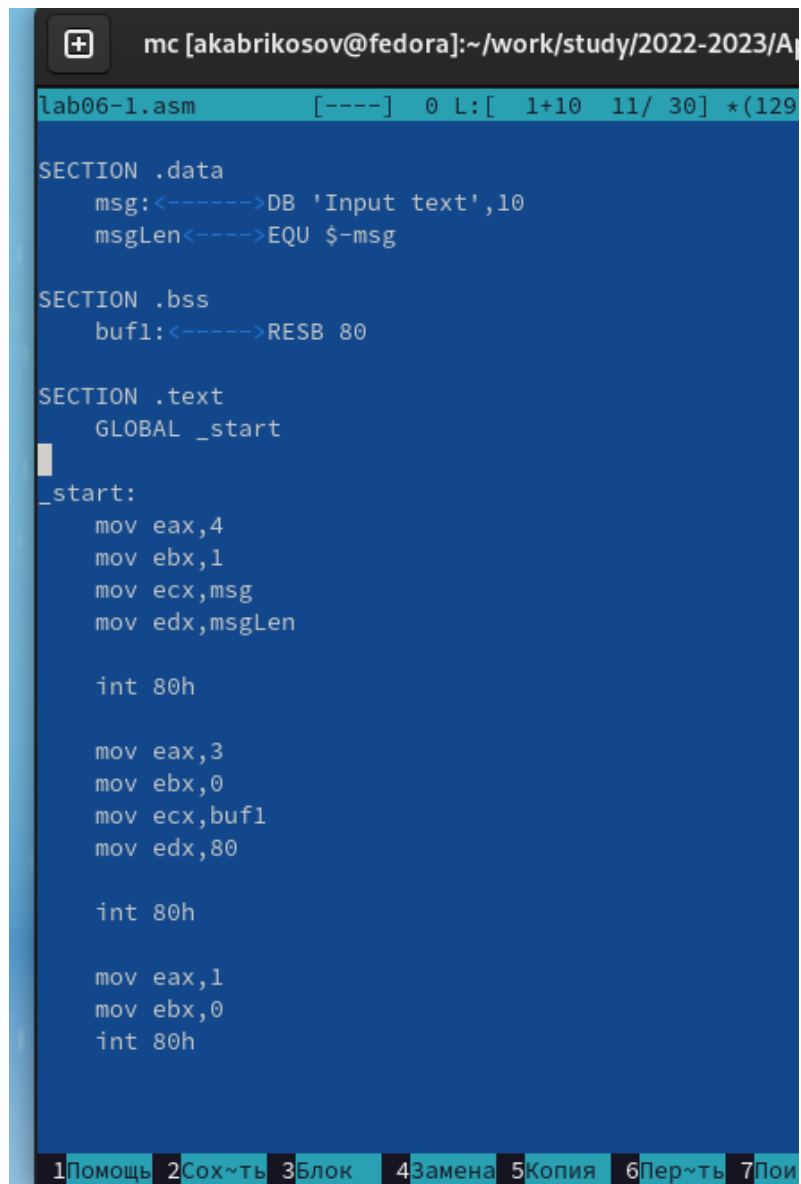


Рис. 4.1: Создание файлов в Midnight Commander

2. Введем в файл lab6-1.asm текст программы вывода сообщения на экран и ввода строки с клавиатуры (Листинг 1.). Создадим исполняемый файл и проверим его работу. (рис. 4.2, 4.3)



The image shows a terminal window with the Midnight Commander (MC) interface. The title bar indicates the user is 'akabrikosov' on a 'fedora' system, working in the directory '~/.work/study/2022-2023/A'. The active file is 'lab06-1.asm'. The editor displays assembly code for three sections: .data, .bss, and .text. The .text section contains assembly instructions for a program that prints a message and reads input. The bottom status bar shows standard MC navigation shortcuts in Russian: 1Помощь, 2Сох~ть, 3Блок, 4Замена, 5Копия, 6Пер~ть, 7Поис.

```
mc [akabrikosov@fedora]:~/work/study/2022-2023/A
lab06-1.asm [----] 0 L: [ 1+10 11/ 30] *(129

SECTION .data
    msg:<----->DB 'Input text',10
    msgLen<----->EQU $-msg

SECTION .bss
    buf1:<----->RESB 80

SECTION .text
    GLOBAL _start
_start:
    mov eax,4
    mov ebx,1
    mov ecx,msg
    mov edx,msgLen

    int 80h

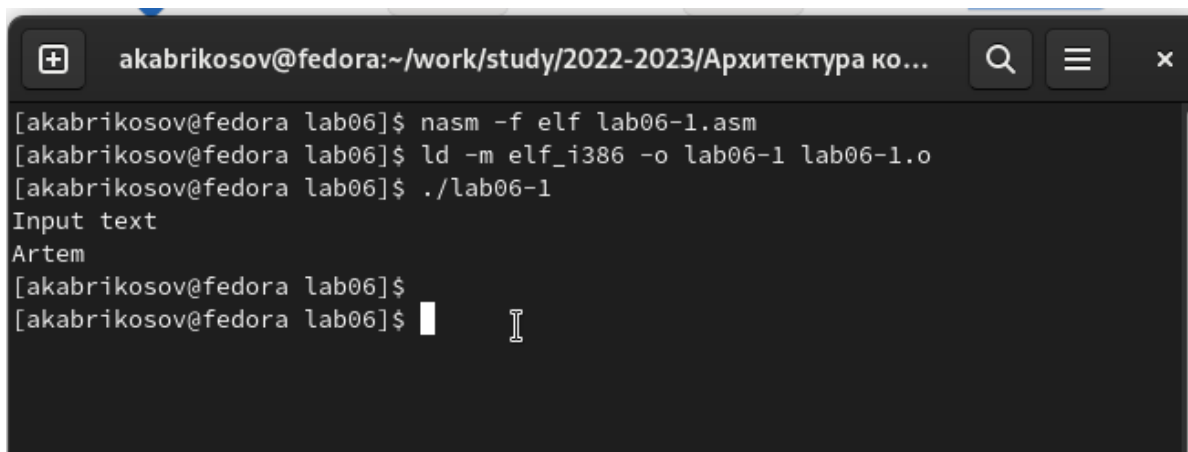
    mov eax,3
    mov ebx,0
    mov ecx,buf1
    mov edx,80

    int 80h

    mov eax,1
    mov ebx,0
    int 80h

1Помощь 2Сох~ть 3Блок 4Замена 5Копия 6Пер~ть 7Поис
```

Рис. 4.2: Редактирование файла 1 в Midnight Commander



```
akabrikosov@fedora:~/work/study/2022-2023/Архитектура ко...
[akabrikosov@fedora lab06]$ nasm -f elf lab06-1.asm
[akabrikosov@fedora lab06]$ ld -m elf_i386 -o lab06-1 lab06-1.o
[akabrikosov@fedora lab06]$ ./lab06-1
Input text
Artem
[akabrikosov@fedora lab06]$
[akabrikosov@fedora lab06]$
```

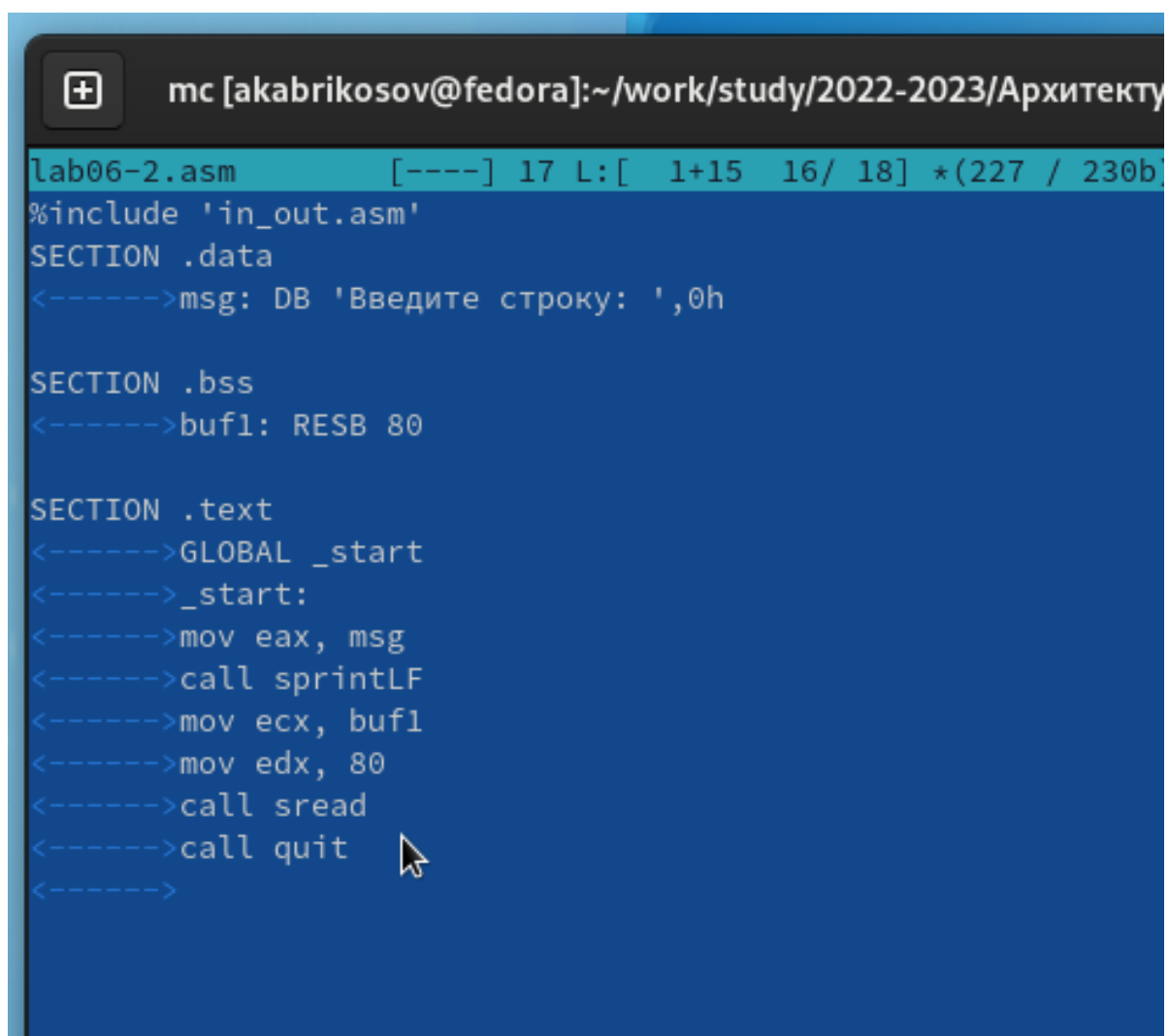
Рис. 4.3: Проверка программы 1

3. Скачали с туис доп файл, скопировали программу. (рис. 4.4)

The image shows a file manager window with a dark theme. The title bar at the top displays the path "mc [akabrikosov@fedora]:~/work/study/2022-2023/Архитекту...". Below the title bar, there are four tabs: "Левая панель", "Файл", "Команда", "Настройки", and "Правая панель". The "Файл" tab is active. The main area is split into two panels. The left panel shows a directory listing for "....ьютера/arch-pc/labs/lab06". The right panel shows a similar listing for "....ьютера/arch-pc/labs/lab06". Both panels list files with their names, sizes, and modification times. The file "in_out.asm" is highlighted in the left panel. The file "lab06-1" is highlighted in the right panel. The file "lab06-1" is also highlighted in the left panel. The file "lab06-1" is also highlighted in the right panel. The file "lab06-1" is also highlighted in the left panel. The file "lab06-1" is also highlighted in the right panel. The file "lab06-1" is also highlighted in the left panel. 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Рис. 4.4: Файл in_out.asm

4. Изменили код программы. (рис. 4.5, 4.6)



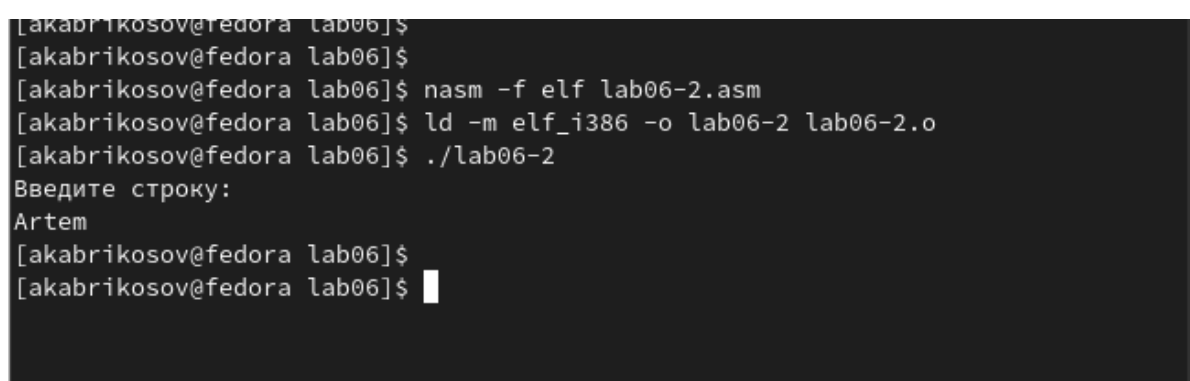
The image shows a terminal window with the Midnight Commander (mc) editor. The title bar indicates the user is 'akabrikosov@fedora' and the current directory is '~/work/study/2022-2023/Архитекту'. The editor is open to a file named 'lab06-2.asm'. The code displayed is assembly language for x86-64, including directives for sections (.data, .bss, .text), a data definition for 'msg', a reserve space definition for 'buf1', and a text block containing instructions for global _start, moving 'msg' to 'eax', calling 'sprintLF', moving 'buf1' to 'ecx', setting 'edx' to 80, calling 'sread', and finally calling 'quit'. A mouse cursor is visible over the 'quit' instruction.

```
mc [akabrikosov@fedora]:~/work/study/2022-2023/Архитекту
lab06-2.asm [----] 17 L:[ 1+15 16/ 18] *(227 / 230b)
#include 'in_out.asm'
SECTION .data
<----->msg: DB 'Введите строку: ',0h

SECTION .bss
<----->buf1: RESB 80

SECTION .text
<----->GLOBAL _start
<----->_start:
<----->mov eax, msg
<----->call sprintLF
<----->mov ecx, buf1
<----->mov edx, 80
<----->call sread
<----->call quit
<----->
```

Рис. 4.5: Редактирование файла 2 в Midnight Commander

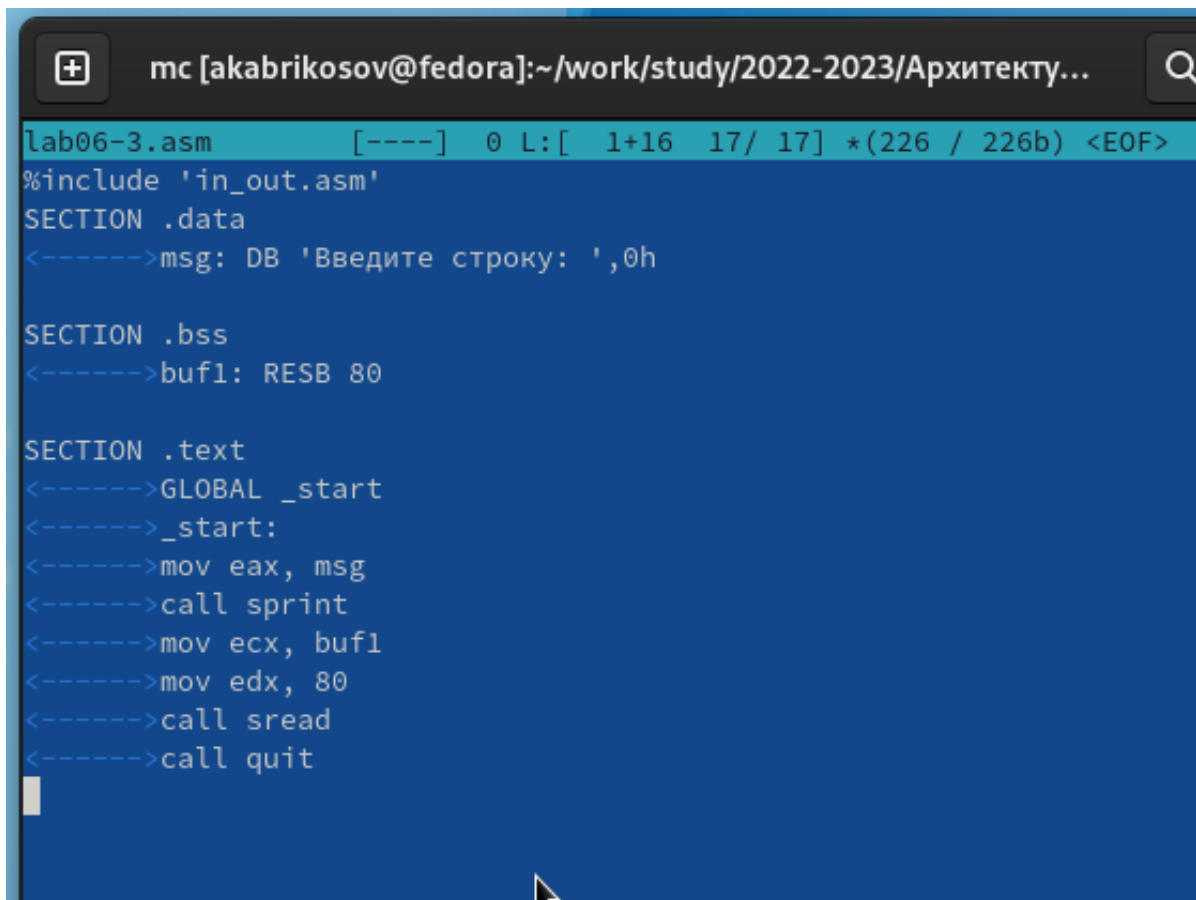


The image shows a terminal window with the following commands and output: the user is in the 'lab06' directory, they compile 'lab06-2.asm' to 'lab06-2.o' using 'nasm -f elf', then link it to an executable 'lab06-2' using 'ld -m elf_i386 -o lab06-2 lab06-2.o'. Finally, they run './lab06-2', which prompts 'Введите строку:' (Enter a line:). The user enters 'Artem', and the prompt returns.

```
[akabrikosov@fedora lab06]$
[akabrikosov@fedora lab06]$
[akabrikosov@fedora lab06]$ nasm -f elf lab06-2.asm
[akabrikosov@fedora lab06]$ ld -m elf_i386 -o lab06-2 lab06-2.o
[akabrikosov@fedora lab06]$ ./lab06-2
Введите строку:
Artem
[akabrikosov@fedora lab06]$
[akabrikosov@fedora lab06]$
```

Рис. 4.6: Проверка программы 2

5. Изменили вызов подпрограммы. Теперь ввод и вывод в одну строку. (рис. 4.7, 4.8)

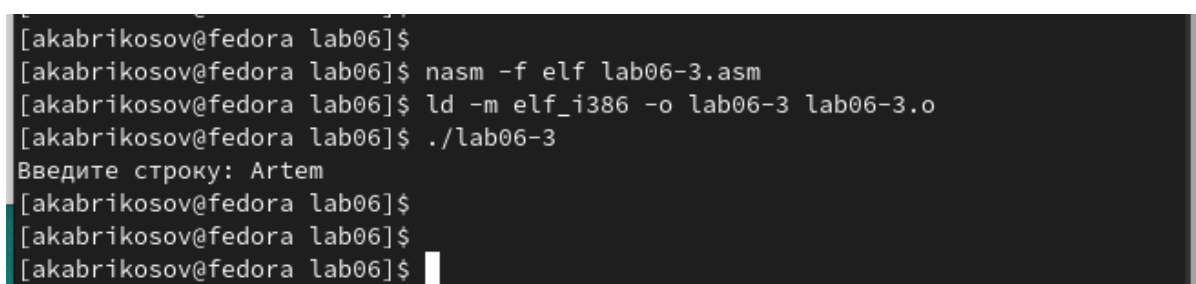


```
mc [akabrikosov@fedora]:~/work/study/2022-2023/Архитекту...
lab06-3.asm [----] 0 L: [ 1+16 17/ 17] *(226 / 226b) <EOF>
%include 'in_out.asm'
SECTION .data
<----->msg: DB 'Введите строку: ',0h

SECTION .bss
<----->buf1: RESB 80

SECTION .text
<----->GLOBAL _start
<----->_start:
<----->mov eax, msg
<----->call sprint
<----->mov ecx, buf1
<----->mov edx, 80
<----->call sread
<----->call quit
```

Рис. 4.7: Редактирование файла 3 в Midnight Commander



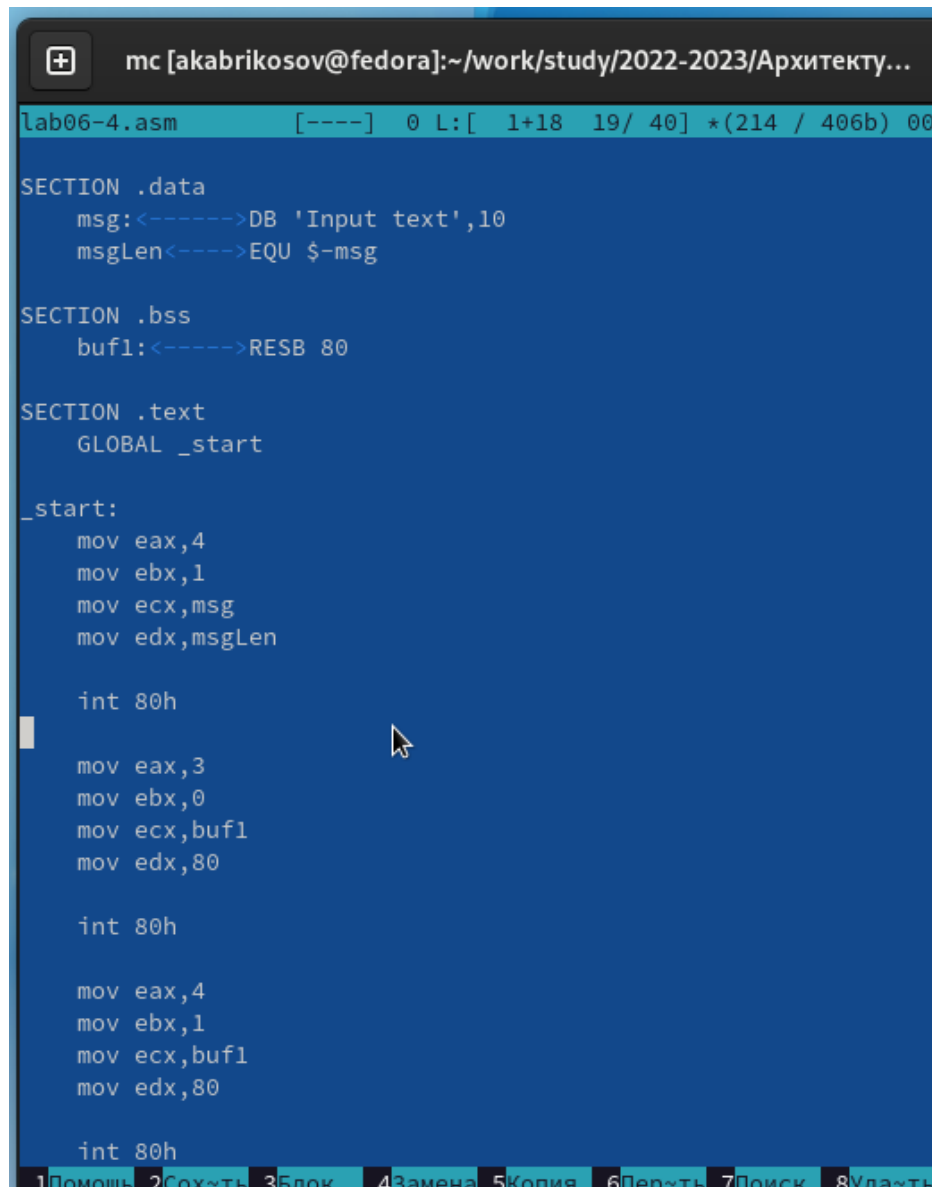
```
[akabrikosov@fedora lab06]$
[akabrikosov@fedora lab06]$ nasm -f elf lab06-3.asm
[akabrikosov@fedora lab06]$ ld -m elf_i386 -o lab06-3 lab06-3.o
[akabrikosov@fedora lab06]$ ./lab06-3
Введите строку: Artem
[akabrikosov@fedora lab06]$
[akabrikosov@fedora lab06]$
[akabrikosov@fedora lab06]$
```

Рис. 4.8: Проверка программы 3

6. Внесем изменения в программу (без использования внешнего файла in_out.asm), так чтобы она работала по следующему алгоритму: (рис. 4.9,

4.10)

- вывести приглашение типа “Введите строку:”;
- ввести строку с клавиатуры;
- вывести введенную строку на экран.



The screenshot shows the Midnight Commander (mc) interface editing a file named lab06-4.asm. The window title is 'mc [akabrikosov@fedora]:~/work/study/2022-2023/Архитекту...'. The file path is shown as 'lab06-4.asm' with a status bar indicating '0 L: [1+18 19/ 40] *(214 / 406b) 00'. The code is as follows:

```
SECTION .data
    msg:<----->DB 'Input text',10
    msgLen<----->EQU $-msg

SECTION .bss
    buf1:<----->RESB 80

SECTION .text
    GLOBAL _start

_start:
    mov eax,4
    mov ebx,1
    mov ecx,msg
    mov edx,msgLen

    int 80h

    mov eax,3
    mov ebx,0
    mov ecx,buf1
    mov edx,80

    int 80h

    mov eax,4
    mov ebx,1
    mov ecx,buf1
    mov edx,80

    int 80h
```

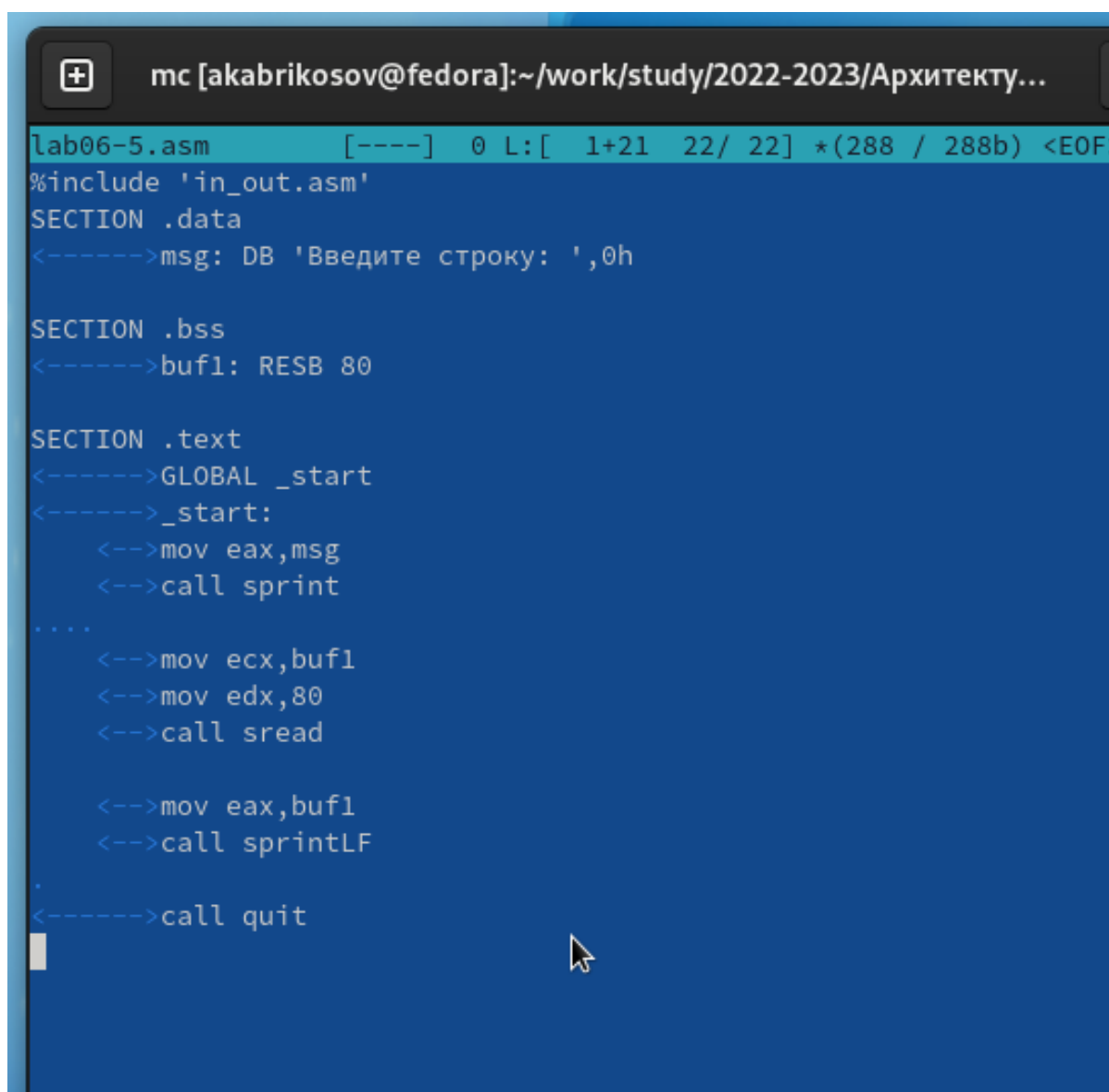
At the bottom, there is a menu bar with options: 1Помощь, 2Создать, 3Блок, 4Замена, 5Копия, 6Переместить, 7Поиск, 8Удалить.

Рис. 4.9: Редактирование файла 4 в Midnight Commander

```
[akabrikosov@fedora lab06]$  
[akabrikosov@fedora lab06]$  
[akabrikosov@fedora lab06]$ nasm -f elf lab06-4.asm  
[akabrikosov@fedora lab06]$ ld -m elf_i386 -o lab06-4 lab06-4.o  
[akabrikosov@fedora lab06]$ ./lab06-4  
Input text  
Artem  
Artem  
[akabrikosov@fedora lab06]$
```

Рис. 4.10: Проверка программы 4

7. Сделаем тоже самое с файлом in_out.asm (рис. 4.11, 4.12)



The image shows a screenshot of the Midnight Commander file manager and editor. The title bar indicates the user is 'akabrikosov@fedora' and the current directory is '~/work/study/2022-2023/Архитекту...'. The editor window displays the assembly file 'lab06-5.asm'. The code includes a header, data and bss sections, and a text section with assembly instructions for printing a message and reading input. The status bar at the top shows the file is 288 bytes long.

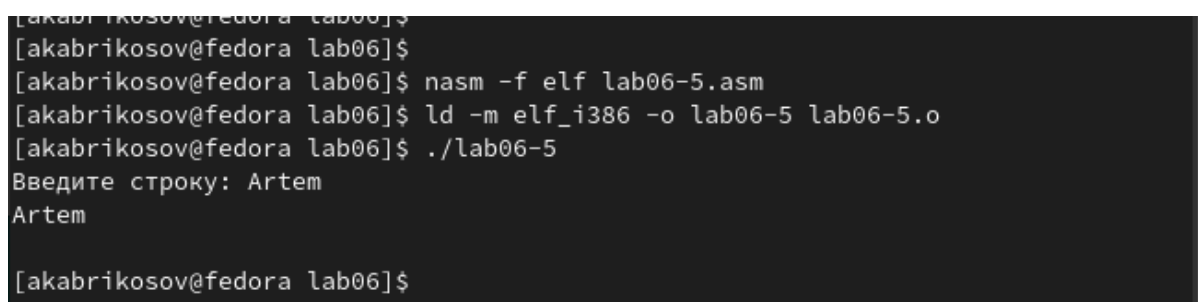
```
lab06-5.asm [----] 0 L: [ 1+21 22/ 22] *(288 / 288b) <EOF
%include 'in_out.asm'
SECTION .data
<----->msg: DB 'Введите строку: ',0h

SECTION .bss
<----->buf1: RESB 80

SECTION .text
<----->GLOBAL _start
<----->_start:
    <-->mov eax,msg
    <-->call sprint
    ....
    <-->mov ecx,buf1
    <-->mov edx,80
    <-->call sread

    <-->mov eax,buf1
    <-->call sprintLF
.
<----->call quit
```

Рис. 4.11: Редактирование файла 5 в Midnight Commander



The image shows a terminal window with the following commands and output:

```
[akabrikosov@fedora lab06]$
[akabrikosov@fedora lab06]$
[akabrikosov@fedora lab06]$ nasm -f elf lab06-5.asm
[akabrikosov@fedora lab06]$ ld -m elf_i386 -o lab06-5 lab06-5.o
[akabrikosov@fedora lab06]$ ./lab06-5
Введите строку: Artem
Artem
[akabrikosov@fedora lab06]$
```

Рис. 4.12: Проверка программы 5

5 Выводы

Научились писать базовые ассемблерные программы. Освоили ассемблерные инструкции `mov` и `int`.

Список литературы

1. Справочная система по языку Assembler
2. Midnight Commander