

1. Набрать программу из файла ASM1_AFD.pdf, скомпилировать и сформировать исполняемый файл с помощью команд `masm+link` или `ml`.
2. Проанализировать получившиеся файлы.

```
Directory of C:\LAB_02\.  
.  
..      <DIR>                01-03-2024  19:41  
MAIN    <DIR>                01-03-2024  19:41  
MAIN    ASM                  989 01-03-2024  19:37  
MAIN    EXE                  1,062 01-03-2024  19:40  
MAIN    OBJ                  163 01-03-2024  19:40  
3 File(s)                2,214 Bytes.  
2 Dir(s)                 262,111,744 Bytes free.
```

```
D: > DOSBOX > DOSBox-0.74-3 > Work > lab_02 > ≡ MAIN.EXE  
⚙ 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F Decoded Text  
00000000 4D 5A 26 00 03 00 01 00 20 00 00 00 FF FF 00 00 M Z & . . . . .  
00000010 00 02 00 00 02 00 21 00 1E 00 00 00 01 00 03 00 . . . . . ! . . . . .  
00000020 21 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ! . . . . .  
00000030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000040 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000050 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000060 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000070 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000080 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000090 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
000000A0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
000000B0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
000000C0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
000000D0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
000000E0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
000000F0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000100 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000110 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000120 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000130 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000140 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000150 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000160 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000170 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000180 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000190 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
000001A0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
000001B0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
000001C0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
000001D0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
000001E0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
000001F0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000200 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000210 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000220 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000230 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000240 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .  
00000250 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
```

```

00000260 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
00000270 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
00000280 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
00000290 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
000002A0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
000002B0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
000002C0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
000002D0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
000002E0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
000002F0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
00000300 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
00000310 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
00000320 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
00000330 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
00000340 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
00000350 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
00000360 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
00000370 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
00000380 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
00000390 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
000003A0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
000003B0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
000003C0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
000003D0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
000003E0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
000003F0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 . . . . .
00000400 0D 0A 48 65 6C 6C 6F 2C 20 77 6F 72 6C 64 20 21 . . H e l l o ,   w o r l d   !
00000410 24 00 B8 20 00 8E D8 BA 00 00 B4 09 CD 21 B4 07 $ . . . . . ! . .
00000420 CD 21 B4 4C CD 21 . ! . L . !

```

3. Запустить программу, убедиться в работоспособности.

```
C:\LAB_02>main.exe
```

```
Hello, world !_
```

4. Запустить программу в отладчике, пронаблюдать изменение сегментного регистра DS и изучить содержимое сегментов кода и данных.

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...

AX	1A25	SI	0000	CS	1A26	IP	0005	Stack	+0 0A0D	Flags	7200
BX	0000	DI	0000	DS	19F5			+2	654B		
CX	0000	BP	0000	ES	19F5	HS	19F5	+4	6C6C	OF	DF IF SF ZF AF PF CF
DX	0000	SP	0200	SS	1A05	FS	19F5	+6	2C6F	0	0 1 0 0 0 0 0

CMD >

0002	B8251A	MOV	AX,1A25
0005	8ED8	MOV	DS,AX
0007	BA0000	MOV	DX,0000
000A	B409	MOV	AH,09
000C	BA0000	MOV	DX,0000
000F	B409	MOV	AH,09
0011	CD21	INT	21
0013	BA0000	MOV	DX,0000
0016	B409	MOV	AH,09

1	0	1	2	3	4	5	6	7
DS:0000	CD	20	FF	9F	00	EA	FF	FF
DS:0008	AD	DE	1B	05	C5	06	00	00
DS:0010	18	01	10	01	18	01	92	01
DS:0018	01	01	01	00	02	FF	FF	FF
DS:0020	FF	FF	FF	FF	FF	FF	FF	FF
DS:0028	FF	FF	FF	FF	EB	19	E6	11
DS:0030	A2	01	14	00	18	00	F5	19
DS:0038	FF	FF	FF	FF	00	00	00	00
DS:0040	05	00	00	00	00	00	00	00
DS:0048	00	00	00	00	00	00	00	00

2	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
DS:0000	CD	20	FF	9F	00	EA	FF	FF	AD	DE	1B	05	C5	06	00	00
DS:0010	18	01	10	01	18	01	92	01	01	01	01	00	02	FF	FF	FF
DS:0020	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EB	19	E6	11
DS:0030	A2	01	14	00	18	00	F5	19	FF	FF	FF	FF	00	00	00	00
DS:0040	05	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

1 Step 2ProcStep 3Retrieve 4Help ON 5BRK Menu 6 7 up 8 dn 9 le 10 ri

5. Дописать исходный текст программы так, чтобы строка выводилась на экран 3 раза.

```
C:\>MAIN.EXE
Hello, world !
Hello, world !
Hello, world !
```

```

D: > DOSBOX > DOSBox-0.74-3 > Work > lab_02 > ASM MAIN.ASM
1  StkSeg SEGMENT PARA STACK 'STACK'
2      DB 200h DUP (?)
3  StkSeg ENDS
4      ;
5  DataS SEGMENT WORD 'DATA'
6  HelloMessage DB 13 ;курсор поместить в нач. строки
7      DB 10 ;перевести курсор на нов. строку
8      DB 'Hello, world !' ;текст сообщения
9      DB '$' ;ограничитель для функции DOS
10 DataS ENDS
11      ;
12 Code SEGMENT WORD 'CODE'
13     ASSUME CS:Code, DS:DataS
14 DispMsg:
15     mov AX,DataS ;загрузка в AX адреса сегмента данных
16     mov DS,AX ;установка DS
17     mov DX,OFFSET HelloMessage ;DS:DX - адрес строки
18     mov AH,9 ;AH=09h выдать на дисплей строку
19     mov CX,3
20     print:
21         int 21h
22     loop print
23
24     mov AH,7 ;AH=07h ввести символ без эха
25     INT 21h ;вызов функции DOS
26     mov AH,4Ch ;AH=4Ch завершить процесс
27     int 21h ;вызов функции DOS
28 Code ENDS
29     END DispMsg
30

```