64

(a) m.c → m.o *code/link/m.c*

```
void swap();

int buf[2] = {1, 2};

int main()
{
    swap();
    return 0;
}
```

code/link/m.c

(b) swap.c → swap.o *code/link/swap.c*

```
extern int buf[];

int *bufp0 = &buf[0];
int *bufp1;

void swap()
{
    int temp;

    bufp1 = &buf[1];
    temp = *bufp0;
    *bufp0 = *bufp1;
    *bufp1 = temp;
}
```

code/link/swap.c

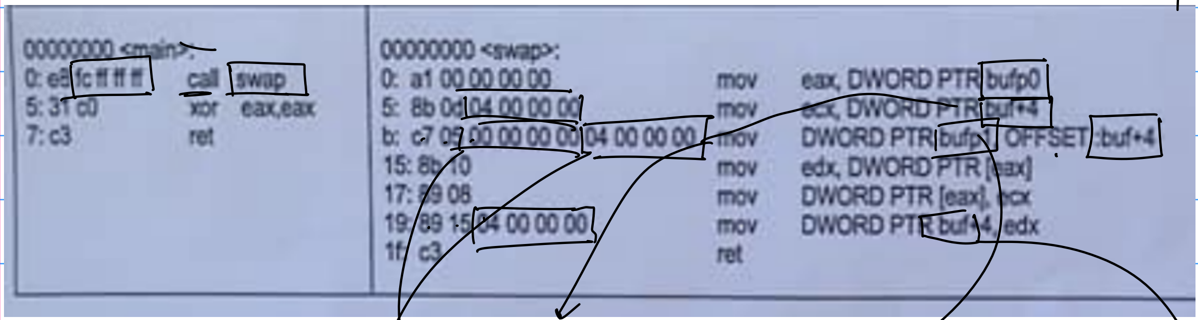
.comm bufp1, 8, 8

Figure 7.5 Example program for Practice Problem 7.1.

Symbol	swap.o .symtab entry?	swap.o Symbol type	Module where defined	Section
buf	✓	extern	m.o	.data
bufp0	✓	glob	swap.o	.data
bufp1	✓	glob	swap.o	comm
swap	✓	glob	swap.o	.text
temp	×	×	×	×

.text, 1, −4, $\underbrace{\text{R\_86\_64\_PC32}}_{\text{pc32}}$, swap

.text, 1, 0, R_86_64_32, bufp0



```
00000000 <main>:
0: e8 fc ff ff ff        call  swap
5: 31 c0                 xor   eax,eax
7: c3                    ret
```

```
00000000 <swap>:
0:  a1 00 00 00 00                   mov   eax, DWORD PTR bufp0
5:  8b 0d 04 00 00 00                mov   ecx, DWORD PTR buf+4
b:  c7 05 00 00 00 00 04 00 00 00    mov   DWORD PTR bufp1 OFFSET :buf+4
15: 8b 10                            mov   edx, DWORD PTR [eax]
17: 89 08                            mov   DWORD PTR [eax], ecx
19: 89 15 04 00 00 00                mov   DWORD PTR buf+4, edx
1f: c3                               ret
```

P, S, A

e8 $\boxed{00}$ 00 00 00

.text, 7, 4, ABS32, buf

.text, d, 0, ABS32, bufp1

−4

.text, 11, 4, ABS32, buf

~~offset~~, 0xaa66

66	aa	00	00

.text, 16, 4, ABS32, buf

$(4)_{10} = (100)_2$

$(4)_{10} = (0\cdots0100)_2^{32}$

$\times(-1)$

$1\cdots\cdot1011 \quad +1$

$(-4)_{10} = (1\cdots\cdot|1100)_2$

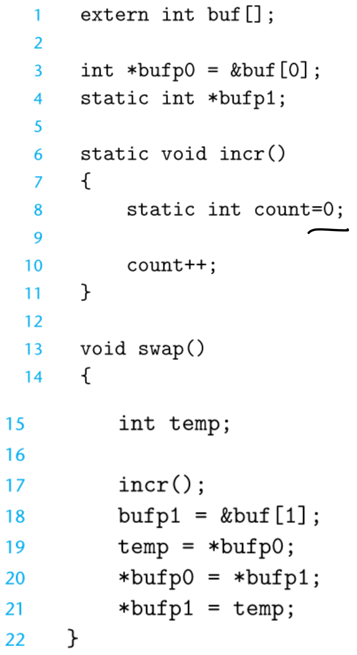
$28/4=7$

$(ffff\,fffc)_{16}$

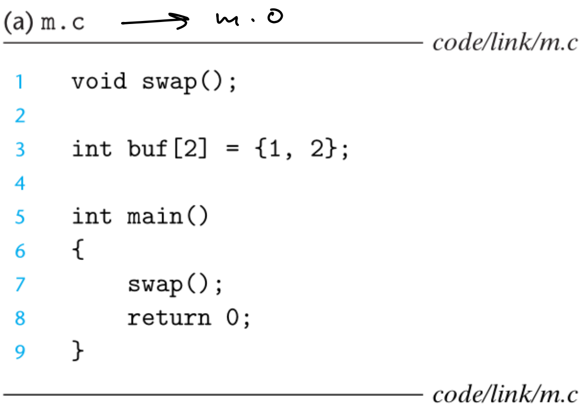
$\boxed{fc\ ff\ ff\ ff}$

A	1010
B	1011
C	1100
D	1101
E	1110
F	1111

swap.c ⟶ swap.o



```
extern int buf[];

int *bufp0 = &buf[0];
static int *bufp1;

static void incr()
{
    static int count=0;

    count++;
}

void swap()
{
    int temp;

    incr();
    bufp1 = &buf[1];
    temp = *bufp0;
    *bufp0 = *bufp1;
    *bufp1 = temp;
}
```

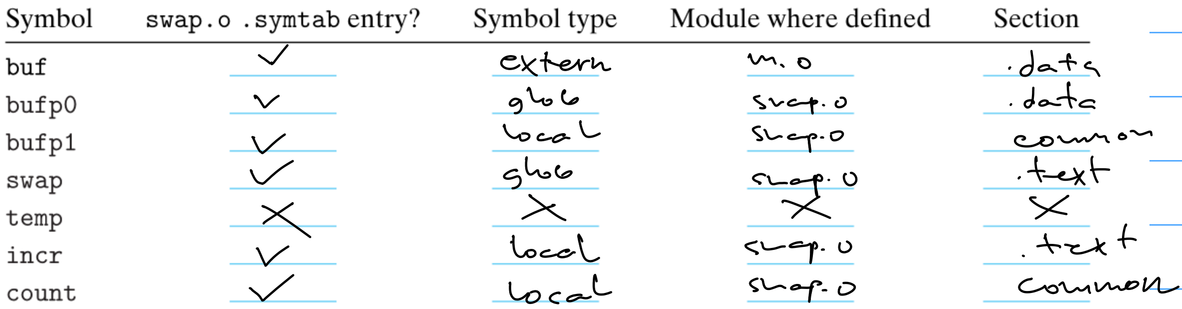


(a) m.c ⟶ m.o

code/link/m.c

```
void swap();

int buf[2] = {1, 2};

int main()
{
    swap();
    return 0;
}
```

code/link/m.c



Symbol	swap.o .symtab entry?	Symbol type	Module where defined	Section
buf	✓	extern	m.o	.data
bufp0	✓	glob	swap.o	.data
bufp1	✓	local	swap.o	common
swap	✓	glob	swap.o	.text
temp	✗	✗	✗	✗
incr	✓	local	swap.o	.text
count	✓	local	swap.o	common