SWE4001- Lab 9

Lab Question 8 – Direct Linking Loader Pass 2

Write a C program to Implement pass two of a direct-linking loader. Sample three input files are given. Sample output files are given.

Algorithm for Pass 2 Direct Linking Loader:

```
Pass 2:

begin
set CSADDR to PROGADDR
set EXECADDR to PROGADDR
while not end of input do
    begin
        read next input record {Header record}
        set CSLTH to control section length
        while record type ≠ 'E' do
            begin
                read next input record
                if record type = 'T' then
                    begin
                        {if object code is in character form, convert
                            into internal representation}
                        move object code from record to location
                            (CSADDR + specified address)
                    end {if 'T'}
                else if record type = 'M' then
                    begin
                        search ESTAB for modifying symbol name
                        if found then
                            add or subtract symbol value at location
                                (CSADDR + specified address)
                        else
                            set error flag (undefined external symbol)
                    end  {if 'M'}
            end {while ≠ 'E'}
        if an address is specified {in End record} then
            set EXECADDR to (CSADDR + specified address)
        add CSLTH to CSADDR
    end  {while not EOF}
jump to location given by EXECADDR {to start execution of loaded program}
end {Pass 2}
```

Figure 3.11(b) Algorithm for Pass 2 of a linking loader.

Input files:

PROGA:

H^PROGA^000000^0063
D^LISTA^000040^ENDA^000054^
R^LISTB^ENDB^LISTC^ENDC
T^000020^0A^03201D^77100004^050014
T^000054^0F^000014^FFFFF6^00003F^000014^FFFFC0
M^000024^05^+LISTB

M^000054^06^+LISTC
M^000057^06^+ENDC
M^000057^06^-LISTC
M^00005A^06^+ENDC
M^00005A^06^-LISTC
M^00005A^06^+PROGA
M^00005D^06^-ENDB
M^00005D^06^+LISTB
M^000060^06^+LISTB
M^000060^06^-PROGA
E^000020

PROGB:

H^PROGB^000000^007F
D^LISTB^000060^ENDB^000070^
R^LISTA^ENDA^LISTC^ENDC
T^000036^0B^03100000^772027^05100000
T^000070^0F^000000^FFFFF6^FFFFFF^FFFFF0^000060
M^000037^05^+LISTA
M^00003E^05^+ENDA
M^00003E^05^-LISTA
M^000070^06^+ENDA
M^000070^06^-LISTA
M^000070^06^+LISTC
M^000073^06^+ENDC
M^000073^06^-LISTC
M^000076^06^+ENDC
M^000076^06^-LISTC
M^000076^06^+LISTA
M^000079^06^+ENDA
M^000079^06^-LISTA
M^00007C^06^+PROGB
M^00007C^06^-LISTA
E

PROGC:

H^PROGC^000000^0051
D^LISTC^000030^ENDC^000042^
R^LISTA^ENDA^LISTB^ENDB
T^000018^0C^03100000^77100004^05100000
T^000042^0F^000030^000008^000011^000000^000000
M^000019^05^+LISTA
M^00001D^05^+LISTB

M^000021^05^+ENDA
M^000021^05^-LISTA
M^000042^06^-ENDA
M^000042^06^-LISTA
M^000042^06^+PROGC
M^000048^06^+LISTA
M^00004B^06^+ENDA
M^00004B^06^-LISTA
M^00004B^06^-ENDB
M^00004B^06^+LISTB
M^00004E^06^+LISTB
M^00004E^06^-LISTA
E

OUTPUT:

Pass two of a Direct-Linking Loader

Control section	Symbol name	Address	Length
PROGA		4000	0063
	LISTA	4040	
	ENDA	4054	
PROGB		4063	007F
	LISTB	40C3	
	ENDB	40D3	
PROGC		40E2	0051
	LISTC	4112	
	ENDC	4124	

Ref No.	Symbol	Address
1	PROGA	4000
2	LISTB	40C3
3	ENDB	40D3
4	LISTC	4112
5	ENDC	4124

Ref No.	Symbol	Address
1	PROGB	4063
2	LISTA	4040
3	ENDA	4054
4	LISTC	4112
5	ENDC	4124

Ref No.	Symbol	Address
1	PROGC	40E2
2	LISTA	4040
3	ENDA	4054
4	LISTB	40C3
5	ENDB	40D3