

SWE4001- Lab 6

Lab Question 5 – Direct Linking Loader

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

Algorithm for Pass 1 Direct Linking Loader:

Pass 1:

```
begin
get PROGADDR from operating system
set CSADDR to PROGADDR {for first control section}
while not end of input do
begin
read next input record {Header record for control section}
set CSLTH to control section length
search ESTAB for control section name
if found then
set error flag {duplicate external symbol}
else
enter control section name into ESTAB with value CSADDR
while record type ≠ 'E' do
begin
read next input record
if record type = 'D' then
for each symbol in the record do
begin
search ESTAB for symbol name
if found then
set error flag (duplicate external symbol)
else
enter symbol into ESTAB with value
(CSADDR + indicated address)
end {for}
end {while ≠ 'E'}
add CSLTH to CSADDR {starting address for next control section}
end {while not EOF}
end {Pass 1}
```

Figure 3.11(a) Algorithm for Pass 1 of a linking loader.

Input files:

PROGA:

H^PROGA^000000^0063
D^LISTA^000040^END A^000054^
R^LISTB^ENDB^LISTC^ENDC
T^000020^0A^03201D^77100004^050014
T^000054^0F^000014^FFFFFF6^00003F^000014^FFFFFFC0
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^END A^LISTC^ENDC
T^000036^0B^03100000^772027^05100000
T^000070^0F^000000^FFFFFF6^FFFFFFF^FFFFFF0^000060
M^000037^05^+LISTA
M^00003E^05^+END A
M^00003E^05^-LISTA
M^000070^06^+END A
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^+END A
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 one 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	