INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

System Software
CSN-252
Assembler

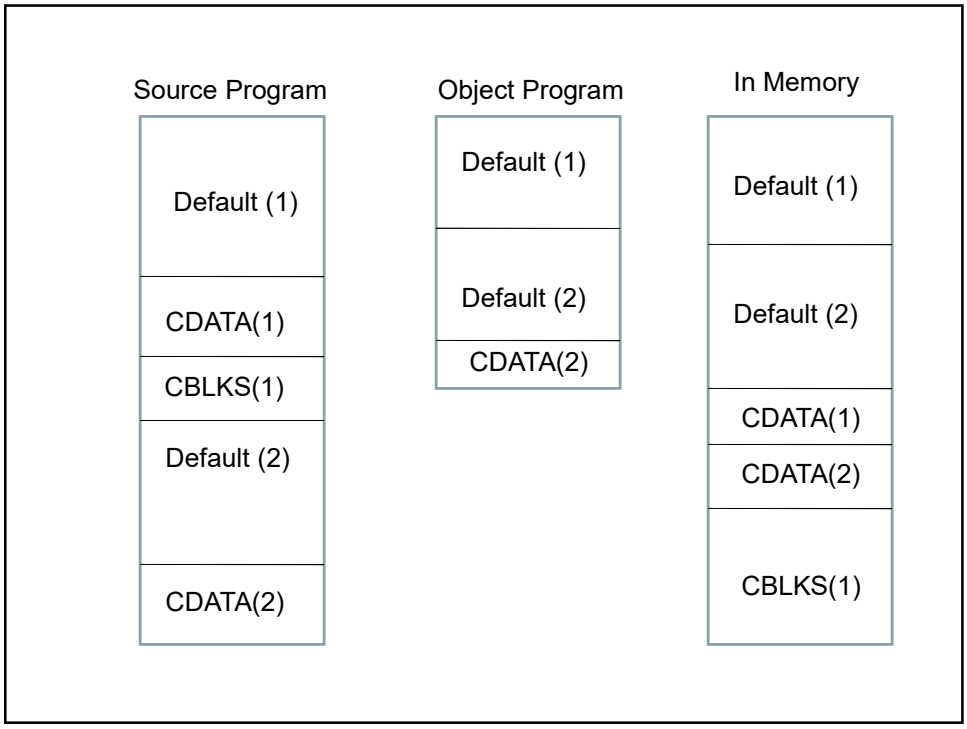
2.3.4 (Program Blocks)
- L. L. Beck

Program Blocks

- A program may contain: Subroutines, data areas etc
- Should assembler treat them as one entity
- Order of machine instructions and data in source program and order (addresses) of instructions and data in object program
- Many assemblers allow the two orders to be different – program blocks

```
1   copy     start  0
2   first    stl    retadr
3   cloop    +jsub  rdrec
4            lda    length
5            comp   #0
6            jeq    endfil
7            j      cloop
8   endfil   j      @retadr
11  retadr   resw   1
12  length   resw   1
13  buffer   resb   4096
14  bufend   equ    *
15  maxlen   equ    bufend-
                    buffer
         :
14  rdrec    clear  x
15           clear  a
16           clear  s
17           +ldt   #maxlen
18  loop     td     input
19           jeq    loop
20           rd     input
21           compr  a, s
22           jeq    exit
23           stch   buffer,x
24           tixr   t
25           jlt    loop
26  exit     stx    length
27           rsub
28  input    byte   x'f3'
29           end    first
```

```
1   copy     start  0
2   first    stl    retadr
3   cloop    jsub   rdrec
                    (format 3)
4            lda    length
5            comp   #0
6            jeq    endfil
7            j      cloop
8   endfil   J      @retadr
9            use    cdata
11  retadr   resw   1
12  length   resw   1
13           use    cblks
13  buffer   resb   4096
14  bufend   equ    *
15  maxlen   equ    bufend-
                    buffer
         :
            use
14  rdrec    clear  x
15           clear  a
16           clear  s
17           +ldt   #maxlen
18  loop     td     input
19           jeq    loop
20           rd     input
21           compr  a, s
22           jeq    exit
23           stch   buffer,x
24           tixr   t
25           jlt    loop
26  exit     stx    length
27           rsub
            use    cdata
28  input    byte   x'f3'
29           end    first
```




```
1              copy      start   0
2    0000 0    first     stl     retadr
3    0003 0    cloop     jsub    rdrec
                      (format 3)
4    0006 0              lda     length
5    0009 0              comp    #0
6    000c 0              jeq     endfil
7    000f  0             j       cloop
8    0012 0    endfil    j       @retadr
9                        use     cdata
11   0000 1    retadr    resw    1
12   0003 1    length    resw    1
13                       use     cblks
13   0000 2    buffer    resb    4096
14   1000 2    bufend    equ     *
15   1000 2    maxlen    equ     bufend-buffer
          :
```

```
                                  use
14      0015 0      rdrec         clear   x
15      0017 0                    clear   a
16      0019 0                    clear   s
17      001b 0                    +ldt    #maxlen
18      001f 0      loop          td      input
19      0022 0                    jeq     loop
20      0025 0                    rd      input
21      0028 0                    compr   a, s
22      002a 0                    jeq     exit
23      002d 0                    stch    buffer,x
24      0030 0                    tixr    t
25      0032 0                    jlt     loop
26      0035 0      exit          stx     length
27      0038 0                    rsub
                                  use     cdata
28      0006 1      input         byte    x'f3'          F3
29                                end     first
```

Block Name	Block Number	Address	Length
default	0	0000	003B
CDATA	1	003B	0007
CBLKS	2	0042	1000

SYMBOL TABLE

Symbol	Block Number	Address	Flags
first	0	0000	R
cloop	0	0003	R
.	.	.	
retadr	1	0000	R
.	.	.	

IIT ROORKEE

```
1                copy        start   0
2    0000 0      first       stl     retadr          172038
3    0003 0      cloop       jsub    rdrec           4B200F
                             (format 3)
4    0006 0                  lda     length          032035
5    0009 0                  comp    #0              290000
6    000c 0                  jeq     endfil          332003
7    000f  0                 j       cloop           3F2FF1
8    0012 0      endfil      j       @retadr         3E2026
9                            use     cdata
11   0000 1      retadr      resw    1
12   0003 1      length      resw    1
13                           use     cblks
13 0000 2        buffer      resb    4096
14 1000 2        bufend      equ     *
15 1000 2        maxlen      equ     bufend-buffer
          :
```

			use		
14	0015 0	rdrec	clear	x	B410
15	0017 0		clear	a	B400
16	0019 0		clear	s	B440
17	001b 0		+ldt	#maxlen	75101000
18	001f 0	loop	td	input	E3201F
19	0022 0		jeq	loop	332FFA
20	0025 0		rd	input	DB2019
21	0028 0		compr	a, s	A004
22	002a 0		jeq	exit	332008
23	002d 0		stch	buffer,x	57A012
24	0030 0		tixr	t	B850
25	0032 0		jlt	loop	3B2FEA
26	0035 0	exit	stx	length	132006
27	0038 0		rsub		**4F0000**
			use	**cdata**	
28	0006 1	input	byte	x'f3'	F3
29			end	first	

Object Program

HCOPY__000000001042
T00000015**1**720384B200F032035290000332003**3**F2FF13E2026
T0000151DB410B400B44075101000E3201F332FFADB2019A004
33200857A012B850
T000032093B2FEA1320064**F0000**
T00004101F3
E000000