**CSCI 360 The Location Counter Value**

**Referencing the location counter value**

The value of the location counter is referenced in Assembler code by using the asterisk (\*).

When used in an instruction, the value of the asterisk resolves to the address of that instruction itself.

Loc Cntr Value Assembler Code

000100 B PASTLOAD

000104 L R1,0(,R2)

000108 PASTLOAD M R4,=F'9'

000100 B \*+8

000104 L R1,0(,R2)

000108 M R4,=F'9'

**\*+8** is interpreted as the value of the location counter before

generation of the instruction plus 8

PRO: avoid cluttering up a program with a bunch of labels

CON: must be updated if instructions are added/deleted

**Altering the location counter value**

The value of the location counter can be altered by using the ORG instruction.

Format 1: ORG address comment

- sets the location counter value to the specified address

Format 2: ORG , comment

- sets the location counter value to the next available unused

location in the program

Similar to COBOL's REDEFINES clause

Example 1: Suppose that the routine BUILD has to start at address

000450. It can be positioned at the address using ORG

Loc Cntr Value Assembler Code

ORG X'000450'

000450 BUILD DS 0H

000450 STM R0,R15,BSAVE

000454 LM R3,R5,0(R1)

000458 ...

Example 2: Suppose that an input record can have 2 formats. The

format of the record depends on the first character.

ORG can be used to define storage so NAMED areas of

storage can be referenced in the code, rather than

using displacements.

Name: 1 Code N Address: 1 Code A

2 - 16 First Name 2 - 41 Address

17 - 31 Last Name 42 - 61 City

32 - 80 Unused 62 - 63 State

64 - 80 Unused

**ASSEMBLER code before ORG:**

Loc Cntr Value Assembler Code

000080 BUFFER DS CL80 Input buffer

0000D0 PLINE DC CL1'-' Print line for records

0000D1 DC CL131' '

In the code:

XREAD BUFFER,80 Read a record

CLI BUFFER,C'N' Check for name record

BNE ADDR Goto next check if not N

MVC PLINE+10(15),BUFFER+1 Move first name to print line

MVC PLINE+30(15),BUFFER+16 Move last name to print line

B PRINT Print the line

\*

ADDR CLI BUFFER,C'A' Check for address record

BNE ERROR Goto error routine if not A

MVC PLINE+12(40),BUFFER+1 Move address to print line

MVC PLINE+60(20),BUFFER+41 Move the city to print line

MVC PLINE+85(2),BUFFER+61 Move the state to print line

B PRINT Print the line

\*

ERROR MVC PLINE+1,=C'\*\*\* Error: invalid record \*\*\*'

PRINT XPRNT PLINE,132 Print the line

**ASSEMBLER code after ORG:**

Loc Cntr Value Assembler Code

000080 BUFFER DS CL80

ORG BUFFER change LCV to 000080

000080 CODE DS CL1

000081 RESTREC DS CL79

ORG RESTREC change LCV to 000081

000081 FIRST DS CL15

000090 LAST DS CL15

ORG RESTREC change LCV to 000081

000081 ADDRESS DS CL40

0000A9 CITY DS CL20

0000BD STATE DS CL2

ORG , change LCV to 0000D0

0000D0 PLINE DC CL1'-'

In the code:

XREAD BUFFER,80 Read a record

CLI CODE,C'N' Check for name record

BNE ADDR Goto next check if not N

MVC PLINE+10(15),FIRST Move first name to print line

MVC PLINE+30(15),LAST Move last name to print line

B PRINT Print the line

\*

ADDR CLI CODE,C'A' Check for address record

BNE ERROR Goto error routine if not A

MVC PLINE+12(40),ADDRESS Move address to print line

MVC PLINE+60(20),CITY Move the city to print line

MVC PLINE+85(2),STATE Move the state to print line

B PRINT Print the line

\*

ERROR MVC PLINE+1,=C'\*\*\* Error: invalid record \*\*\*'

PRINT XPRNT PLINE,132 Print the line