SIC/XE Assembler (完成)

資訊二丙 D0543000 莊文明

1. 執行程式

* SRCFILE 放 Assembly program, 產生 LISFILE, OBJFILE
* 在資料夾中 (如無法執行，請安裝JDK10版本且設定環境變數)
* 雙點d0543000 sicxeasm.jar
* 在cmd 中輸入java -jar d0543000sicxeasm.jar

1. 開發語言

JAVA

1. 格式輸入

0 ~ 7 Label

8 Blank

9 + or blank (extend or relative)

10~15 operation code

16 Blank

17 @ or # or = (addressing mode or literal)

18~35 operand

36~~ comment

輸入限制:

* 空格使用空白鍵，禁止 TAB。
* 在各自區域內，左邊有空白也可以判讀。
* Operation code可大小寫。
* Label 大小寫不同視為不同。
* EQU 輸入 \* 可計算為當前Loc。
* 可使用Expressions，但中間不能使用 \* (當前位置)。
* 中文敘述有機率亂碼。

1. Addressing modes

* Extended format
* Indirect addressing
* Immediate addressing
* Index addressing
* Relative addressing

1. Assembler directives

* START
* END
* BYTE
* WORD
* RESB
* RESW
* EQU
* Literals
* Expressions
* Program blocks

1. Data structures

SymTab & MidFile & LitTab 使用 Linked list

Literal pool 使用 Stack

1. 特別的Function

* public static linkList preFix(String expression, PassOne pass1)
* 將中序計算式轉換為前序，如果算式中有undefined symbol 會return null
* public static int[] calculation(String expression, PassOne pass1)
* 將前序式的結果計算出來，並回傳一個二維陣列，分別是 值、Type，如果前序式為 null 代表有undefined symbol，回傳 [-1, -1]； 如果Type 不為 1 (Relative) 或 0 (Absolute)，則回傳 [-1, -2]，得以分辨錯誤類別。

1. 計算Location錯誤處理

* Unrecognized operation code，loc + 3
* BYTE operand 錯誤，loc + 1
* WORD operand 錯誤，loc + 3
* RESB operand 錯誤，loc + 1
* RESB operand 錯誤，loc + 3
* Literal operand 錯誤不新增到 Literal table 中

1. 錯誤訊息列表

* " \*\*\* Operand should not follow RSUB statement.”
* " \*\*\* duplicate label definition.”
* " \*\*\* Illegal literal”
* " \*\*\* Missing right quote in a literal.”
* " \*\*\* Illegal hex string in a literal. “
* " \*\*\* Odd length hex string in a literal.”
* " \*\*\* Missing operand in EQU statement. “
* " \*\*\* Missing label in EQU statement.”
* " \*\*\* Symbol must be defined before used in EQU statement.”
* " \*\*\* Operand must be absolute or relative attribute in EQU statement.”
* " \*\*\* Missing operand in RESB statement.”
* " \*\*\* Operand must be absolute attribute in RESB statement.”
* " \*\*\* Symbol must be defined before used in RESB statement.”
* " \*\*\* Illegal USE operand”
* " \*\*\* Missing operand in RESW statement. “
* " \*\*\* Operand must be absolute attribute in RESW statement.”
* " \*\*\* Symbol must be defined before used in RESWB statement.”
* " \*\*\* Missing right quote in BYTE statement.”
* " \*\*\* Illegal operand in BYTE statement."
* " \*\*\* Illegal hex string in BYTE statement."
* " \*\*\* Odd length hex string in BYTE statement."
* " \*\*\* Missing operand in BYTE statement.”
* " \*\*\* Missing right quote in BYTE statement."
* " \*\*\* Illegal operand in BYTE statement."
* " \*\*\* Illegal hex string in BYTE statement"
* " \*\*\* Odd length hex string in BYTE statement."
* " \*\*\* Missing operand in BYTE statement."
* " \*\*\* Undefined symbol in WORD statement."
* " \*\*\* Missing operand in WORD statement."
* " \*\*\* Operand must be absolute or relative attribute in WORD statement."
* " \*\*\* operand should < 16777216."
* " \*\*\* Missing operand in BASE statement."
* " \*\*\* Undefined symbol in BASE statement."

1. 錯誤訊息列表(續)

* " \*\*\* Operand must be absolute or relative attribute in BASE statement."
* " \*\*\* Operand should not follow LTORG statement."
* " \*\*\* Undefined label after END statement."
* " \*\*\* Operand must be absolute or relative attribute in END statement."
* " \*\*\* Unrecognized operation code."
* " \*\*\* Illegal format in operation field.”
* " \*\*\* Missing label in START statement."
* " \*\*\* Missing operand in START statement."
* " \*\*\* Illegal hex string in START statement."
* " \*\*\* Duplicate START statement.\n";
* " \*\*\* Misplaced START statement."
* " \*\*\* Missing START in first statement."
* " \*\*\* Missing Operand in Format 2 instruction."
* " \*\*\* Missing Operand in Format 3 instruction."
* " \*\*\* Missing Operand in Format 4 instruction."
* " \*\*\* Illegal operand in Format 2 instruction."
* " \*\*\* Illegal operand in Format 3 instruction."
* " \*\*\* Illegal operand in Format 4 instruction."
* " \*\*\* Extra operand in Format 1 instruction."
* " \*\*\* Undefined symbol in operand field."
* " \*\*\* Instruction format error."