

Rule	Left Side	→	Right Side
1	<i>program</i>	→	<i>statement-List</i>
2	<i>statement-List</i>	→	<i>statement</i>
3	<i>statement-List</i>	→	<i>statement-List statement</i>
4	<i>statement</i>	→	<i>directive</i>
5	<i>statement</i>	→	<i>labeled-item</i>
6	<i>statement</i>	→	<i>item</i>
7	<i>directive</i>	→	<b>org hexint</b>
8	<i>labeled-item</i>	→	<i>label item</i>
9	<i>label</i>	→	<b>identifier</b> ,
10	<i>item</i>	→	<i>instruction</i>
11	<i>item</i>	→	<i>data-definition</i>
12	<i>instruction</i>	→	<b>JnS operand</b>
13	<i>instruction</i>	→	<b>Load operand</b>
14	<i>instruction</i>	→	<b>Store operand</b>
15	<i>instruction</i>	→	<b>Add operand</b>
16	<i>instruction</i>	→	<b>Subt operand</b>
17	<i>instruction</i>	→	<b>Input</b>
18	<i>instruction</i>	→	<b>Output</b>
19	<i>instruction</i>	→	<b>Halt</b>
20	<i>instruction</i>	→	<b>Skipcond operand</b>
21	<i>instruction</i>	→	<b>Jump operand</b>
22	<i>instruction</i>	→	<b>Clear</b>
23	<i>instruction</i>	→	<b>Addl operand</b>
24	<i>instruction</i>	→	<b>Jumpl operand</b>
25	<i>instruction</i>	→	<b>Loadl operand</b>
26	<i>instruction</i>	→	<b>Storcl operand</b>
27	<i>operand</i>	→	<b>hexint</b>
28	<i>operand</i>	→	<b>identifier</b>
29	<i>data-definition</i>	→	<b>Hex hexint</b>
30	<i>data-definition</i>	→	<b>Dec hexint</b>

File	Description
makemas	Script file that creates executable file mas – the MARIE Assembler. Usage \$ makemas
makemasm	Make file that creates executable file mas – the MARIE Assembler. Usage \$ make -f makemasm. Caution: files maslex.cpp and maspar.cpp need to be erased before invoking make. Script file makemas performs the erasures.
mas	Executable MARIE Assembler. Usage \$ mas t00.mas Create file t00.trc that contains a trace of the translation of the assembler source t00.mas.
mas.cpp	Command line interface. Contains function main.
maslabel.cpp	Implements class Label used to define and resolve labels
maslabel.h	Defines class Label used to define and resolve labels
maslex.l	Implements the scanner for the MARIE assembler.
maslex.h	Defines the scanner for the MARIE assembler
maslex.cpp	File maslex.cpp is created by utility lex when the scanner specification in file maslex.l is given to the utility for translation. \$ lex maslex.l
maslist.h	Defines class List that is used to help define and resolve labels
maslist.cpp	Implements class List that is used to help define and resolve labels
masopcodes.h	Defines MARIE's opcodes
maspar.h	Defines the parser for the MARIE assembler language
maspar.y	Implements the parser for the MARIE assembler language
maspar.cpp	Created by the unix utility yacc. Usage \$ yacc -d -v maspar.y
mastkn.h	Created by the makefile makemasm. File mastkn.h defines the token codes employed by the scanner.
masutilities.h	Defines the utilities needed to translate MARIE Assembly Language
masutilities.cpp	Implements the utilities needed to translate MARIE Assembly Language

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$ mkdir mas
$ cd mas
$ cp ~tt/cs3833/MARIE/mas/* .
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