**C subset定義（Project4）**

**A. Our Language (a subset of C)**

* Integer data types: int
* Statements for arithmetic computation. (e.g., a=b+2\*(100-1);)
* Comparison expression. (e.g., a > b)，comparison operation: >、>=、<、<=、==、!=
* if-then / if-then-else program constructs.
* For loop
* While loop
* printf() function with one/two parameters. (support types: %d)

For example:

printf("Number is %d\n", var);

printf("Hello\n");

**B. Tokens**

1. 關鍵字：

|  |  |
| --- | --- |
| auto | AUTO\_ |
| include | INCLUDE\_ |
| enum | ENUM\_ |
| extern | EXTERN\_ |
| goto | GOTO\_ |
| inline | INLINE\_ |
| register | REG\_ |
| restrict | RESTRICT\_ |
| return | RETURN\_ |
| signed | SIGNED\_ |
| sizeof | SIZEOF\_ |
| static | STATIC\_ |
| typedef | TYPEDEF\_ |
| union | UNION\_ |
| unsigned | UNSIGNED\_ |
| volatile | VOLATILE\_ |

1. 資料型態 (宣告變數):

|  |  |
| --- | --- |
| char | CHAR\_TYPE |
| bool | BOOL\_TYPE |
| int | INT\_TYPE |
| float | FLOAT\_TYPE |
| double | DOUBLE\_TYPE |
| short | SHORT\_TYPE |
| long | LONG\_TYPE |
| void | VOID\_TYPE |
| const | CONST\_TYPE |
| struct | STRUCT\_TYPE |

1. 註解方式:

|  |  |
| --- | --- |
| // | COMMENT1 |
| /\* | COMMENT2 |
| \*/ |

1. program statement相關之邏輯、數學運算子

|  |  |
| --- | --- |
| & | BITAND\_OP |
| | | BITOR\_OP |
| && | AND\_OP |
| || | OR\_OP |
| << | RSHIFT\_OP |
| >> | LSHIFT\_OP |
| % | MOD\_OP |
| / | DIV\_OP |
| \* | MULT\_OP |
| + | PLUS\_OP |
| - | MINUS\_OP |
| ~ | COMPL\_OP |
| = | ASSIGN\_OP |
| ++ | PP\_OP |
| -- | MM\_OP |
| ! | NOT\_OP |
| == | EQ\_OP |
| < | LESS\_OP |
| > | GREATER\_OP |
| <= | LE\_OP |
| >= | GE\_OP |
| != | NE\_OP |
| += | AA\_OP |
| -= | SA\_OP |
| /= | DA\_OP |
| \*= | MULA\_OP |
| %= | MODA\_OP |

1. 其他標點符號

|  |  |
| --- | --- |
| “ | DOUBLE\_QUOTE |
| ‘ | SINGLE\_QUOTE |
| ; | SEMICOLON |
| , | COMMA |
| : | COLON |
| # | PRE\_PROCESSOR |
| . | PERIOD |
| [ | LEFT\_BRACKET |
| ] | RIGHT\_BRACKET |
| ( | LEFT\_PAREM |
| ) | RIGHT\_PAREM |
| { | LEFT\_BRACE |
| } | RIGHT\_BRACE |

1. 支援之程式控制結構

|  |  |
| --- | --- |
| for | FOR\_LOOP |
| while | WHILE\_LOOP |
| do | DO\_LOOP |
| switch | SWITCH\_COND |
| case | CASE\_COND |
| deafult | DEFAULT\_COND |
| if | IF\_COND |
| else | ELSE\_COND |
| break | BREAK\_ |
| continue | CONTINUE\_ |

1. 部分函式

|  |  |
| --- | --- |
| printf | PRINTF\_FUNC |
| main | MAIN\_FUNC |

1. 特殊符號

|  |  |
| --- | --- |
| 空格 | SPACE |
| \n | NEW\_LINE |
| \t | TAB |
| \r | ENTER |

1. 其他特殊組合

* 首先定義：
  + fragment LETTER : 'a'..'z' | 'A'..'Z' | '\_';
  + fragment DIGIT : '0'..'9';
  + fragment FLOAT\_NUM1: (DIGIT)+'.'(DIGIT)\*;
  + fragment FLOAT\_NUM2: '.'(DIGIT)+;
  + fragment FLOAT\_NUM3: (DIGIT)+;
* ID： (LETTER)(LETTER | DIGIT)\*
  + ID的組成由一任意字母+任意字母與數字的排列
* FLOAT\_NUM: FLOAT\_NUM1 | FLOAT\_NUM2 | FLOAT\_NUM3
  + 浮點數可能有上面三種表現方式
* HEADER\_FILE: (options{greedy=false;}: ID)\* '.h';
  + 標頭檔為結尾是.h的ID字串
* LITERAL: '"' (options{greedy=false;}: .)\* '"';
  + 字面常數為雙引號中的內容
* CHAR: '\'' (options{greedy=false;}: .)? '\'';
  + 這是 char 中的內容，而非 char 資料型態。C語言中的字元資料，為單引號中的內容