

# Project 1-1 Grammar Definition

- 각 토큰 사이는 1개 이상의 공백(빈칸, 줄바꿈, 탭 등)으로 구분됨
- [ $\langle \text{TOKEN} \rangle$ ] or  $\langle \text{TOKEN} \rangle?$ 은  $\langle \text{TOKEN} \rangle$ 이 있어도 없어도 됨을 의미함
- $\langle \text{TOKEN} \rangle^*$  은  $\langle \text{TOKEN} \rangle$ 이 0회 이상 반복됨을 의미함
- $\langle \text{TOKEN} \rangle^+$  은  $\langle \text{TOKEN} \rangle$ 이 1회 이상 반복됨을 의미함
- 빨간색 굵은 글씨로 된 키워드들(select, from, create, table 등)은  $\langle \text{LEGAL IDENTIFIER} \rangle$ 가 될 수 없음
- 키워드들은 case insensitive함. 즉 select, SELECT, SeLeCt 등이 모두 허용됨
- exit  $\langle \text{SEMICOLON} \rangle$ 은 프로그램 종료 처리
- 꼭 아래의 문법 대로 구현할 필요는 없지만, 아래의 문법을 지키지 않은 질의들은 Syntax error로 처리되어야 함

## 1. QUERY

$\langle \text{COMMAND} \rangle ::= \langle \text{QUERY LIST} \rangle$

          | exit  $\langle \text{SEMICOLON} \rangle$

$\langle \text{QUERY LIST} \rangle ::= (\langle \text{QUERY} \rangle \langle \text{SEMICOLON} \rangle)^+$

$\langle \text{QUERY} \rangle ::= \langle \text{CREATE TABLE QUERY} \rangle$

          |  $\langle \text{DROP TABLE QUERY} \rangle$

          |  $\langle \text{DESC QUERY} \rangle$

          |  $\langle \text{SELECT QUERY} \rangle$

          |  $\langle \text{INSERT QUERY} \rangle$

          |  $\langle \text{DELETE QUERY} \rangle$

          |  $\langle \text{SHOW TABLES QUERY} \rangle$

$\langle \text{SEMICOLON} \rangle ::= ;$

## 2. CREATE TABLE

$\langle \text{CREATE TABLE QUERY} \rangle ::= \text{create table} \langle \text{TABLE NAME} \rangle \langle \text{TABLE ELEMENT LIST} \rangle$

$\langle \text{TABLE ELEMENT LIST} \rangle ::= \langle \text{LEFT PAREN} \rangle \langle \text{TABLE ELEMENT} \rangle (\langle \text{COMMA} \rangle \langle \text{TABLE ELEMENT} \rangle)^* \langle \text{RIGHT PAREN} \rangle$

$\langle \text{TABLE ELEMENT} \rangle ::= \langle \text{COLUMN DEFINITION} \rangle$

          |  $\langle \text{TABLE CONSTRAINT DEFINITION} \rangle$

$\langle \text{COLUMN DEFINITION} \rangle ::= \langle \text{COLUMN NAME} \rangle \langle \text{DATA TYPE} \rangle [\text{not null}]$

$\langle \text{TABLE CONSTRAINT DEFINITION} \rangle ::= \langle \text{PRIMARY KEY CONSTRAINT} \rangle$

| <REFERENTIAL CONSTRAINT>  
 <PRIMARY KEY CONSTRAINT> ::= **primary key** <COLUMN NAME LIST>  
 <REFERENTIAL CONSTRAINT> ::= **foreign key** <COLUMN NAME LIST> **references** <TABLE NAME>  
 <COLUMN NAME LIST>  
 <COLUMN NAME LIST> ::= <LEFT PAREN> <COLUMN NAME> (<COMMA> <COLUMN NAME>)\*  
 <RIGHT PAREN>  
 <DATA TYPE> ::= **int**  
 | **char** <LEFT PAREN> <INT VALUE> <RIGHT PAREN>  
 | **date**  
 <TABLE NAME> ::= <LEGAL IDENTIFIER>  
 <COLUMN NAME> ::= <LEGAL IDENTIFIER>  
 <LEGAL IDENTIFIERS> ::= <ALPHABET> (<ALPHABET> | <UNDERSCORE>)\*  
 <UNDERSCORE> ::= \_  
 <LEFT PAREN> ::= (  
 <RIGHT PAREN> ::= )  
 <COMMA> ::= ,

### 3. DROP TABLE / DESC / SHOW TABLES

<DROP TABLE QUERY> ::= **drop table** <TABLE NAME>  
 <DESC QUERY> ::= **desc** <TABLE NAME>  
 <SHOW TABLES QUERY> ::= **show tables**

### 4. SELECT

<SELECT QUERY> ::= **select** <SELECT LIST> <TABLE EXPRESSION>  
 <SELECT LIST> ::= \*  
 | <SELECTED COLUMN> (<COMMA> <SELECTED COLUMN>)\*  
 <SELECTED COLUMN> ::= [<TABLE NAME> <PERIOD>] <COLUMN NAME> [**as** <COLUMN NAME>]  
 <PERIOD> ::= .  
 <TABLE EXPRESSION> ::= <FROM CLAUSE> [<WHERE CLAUSE>]  
 <FROM CLAUSE> ::= **from** <TABLE REFERENCE LIST>  
 <TABLE REFERENCE LIST> ::= <REFERED TABLE> (<COMMA> <REFERED TABLE>)\*  
 <REFERED TABLE> ::= <TABLE NAME> [**as** <TABLE NAME>]  
 <WHERE CLAUSE> ::= **where** <BOOLEAN VALUE EXPRESSION>  
 <BOOLEAN VALUE EXPRESSION> ::= <BOOLEAN TERM> ( **or** <BOOLEAN TERM>)\*

<BOOLEAN TERM> ::= <BOOLEAN FACTOR> ( and <BOOLEAN FACTOR> ) \*  
 <BOOLEAN FACTOR> ::= [not] <BOOLEAN TEST>  
 <BOOLEAN TEST> ::= <PREDICATE>  
                                   | <PARENTHEZIZED BOOLEAN EXPRESSION>  
 <PARENTHEZIZED BOOLEAN EXPRESSION> ::= <LEFT PAREN> <BOOLEAN VALUE EXPRESSION>  
 <RIGHT PAREN>  
 <PREDICATE> ::= <COMPARISON PREDICATE>  
                                   | <NULL PREDICTE>  
 <COMPARISON PREDICATE> ::= <COMP OPERAND> <COMP OP> <COMP OPERAND>  
 <COMP OPERAND> ::= <COMPARABLE VALUE>  
                                   | [ <TABLE NAME> <PERIOD> ] <COLUMN NAME>  
 <COMP OP> ::= < | > | = | > = | < = | !=  
 <COMPARABLE VALUE> ::= <INT VALUE>  
                                   | <CHAR STRING>  
                                   | <DATE VALUE>  
 <NULL PREDICATE> ::= [ <TABLE NAME> <PERIOD> ] <COLUMN NAME> <NULL OPERATION>  
 <NULL OPERATION> ::= is [not] null

## 5. INSERT / DELETE

<INSERT QUERY> ::= insert into <TABLE NAME> <INSERT COLUMNS AND SOURCE>  
 <INSERT COLUMNS AND SOURCE> ::= [ <COLUMN NAME LIST> ] <VALUE LIST>  
 <VALUE LIST> ::= values <LEFT PAREN> <VALUE> ( <COMMA> <VALUE> ) \* <RIGHT PAREN>  
 <VALUE> ::= null  
                                   | <COMPARABLE VALUE>  
 <DELETE QUERY> ::= delete from <TABLE NAME> [ <WHERE CLAUSE> ]

## 6. TOKENS

<CHAR STRING> ::= <QUOTE> ( <NON QUOTE CHARACTER> ) \* <QUOTE>  
 <INT VALUE> ::= [ <SIGN> ] ( <DIGIT> ) +  
 <DIGIT> ::= 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9  
 <SIGN> ::= + | -  
 <DATE VALUE> ::= <NNNN> - <NN> - <NN>  
 <NNNN> ::= <DIGIT> <DIGIT> <DIGIT> <DIGIT>

$\langle \text{NN} \rangle ::= \langle \text{DIGIT} \rangle \langle \text{DIGIT} \rangle$

$\langle \text{NON QUOTE CHARACTER} \rangle ::= \langle \text{DIGIT} \rangle$

$| \langle \text{ALPHABET} \rangle$

$| \langle \text{NON QUOTE SPECIAL CHARACTERS} \rangle$

$| \langle \text{SPACE} \rangle$

$\langle \text{QUOTE} \rangle ::= \text{'}$

$\langle \text{NON QUOTE SPECIAL CHARACTERS} \rangle ::=$  키보드에서 입력 가능한 특수 문자들 중 따옴표(' and ") 제외한 전부 (!, @, #, \$ 등)

$\langle \text{ALPHABET} \rangle ::=$  영문 알파벳 소문자, 대문자 전부

$\langle \text{SPACE} \rangle ::=$  스페이스 한 칸 공백