

SQL

MODULE SQL-SYNTAX

```
SYNTAX  Stmt ::= CREATE DATABASE Id ;
          | CREATE TABLE Id(Attributes) ;
          | ALTER TABLE Id AlterCommands ;
          | DROP TABLE Tables ;
          | INSERT INTO Id(Columns) VALUES (Values) ;

SYNTAX  Smts ::= Stmt
          | Stmt Smts

SYNTAX  Type ::= VARCHAR
          | SMALLINT

SYNTAX  Command ::= ADD SCHEMA Id(Attributes) ;

SYNTAX  Attribute ::= Id Type

SYNTAX  Attributes ::= List{Attribute, ","}

SYNTAX  Columns ::= List{Id, ","}

SYNTAX  Value ::= Int
          | ' String '
          | null

SYNTAX  Values ::= List{Value, ","}

SYNTAX  Add ::= ADD
          | ADD COLUMN

SYNTAX  AddAttribute ::= Add Attribute

SYNTAX  AddAttributes ::= List{AddAttribute, ","}

SYNTAX  Drop ::= DROP
          | DROP COLUMN
          | DROP IF EXISTS
          | DROP COLUMN IF EXISTS

SYNTAX  DropAttribute ::= Drop Id

SYNTAX  DropAttributes ::= List{DropAttribute, ","}

SYNTAX  RenameColumnAttribute ::= RENAME COLUMN Id TO Id

SYNTAX  RenameColumnAttributes ::= List{RenameColumnAttribute, ","}

SYNTAX  Tables ::= List{Id, ","}

SYNTAX  RenameTable ::= RENAME TO Id

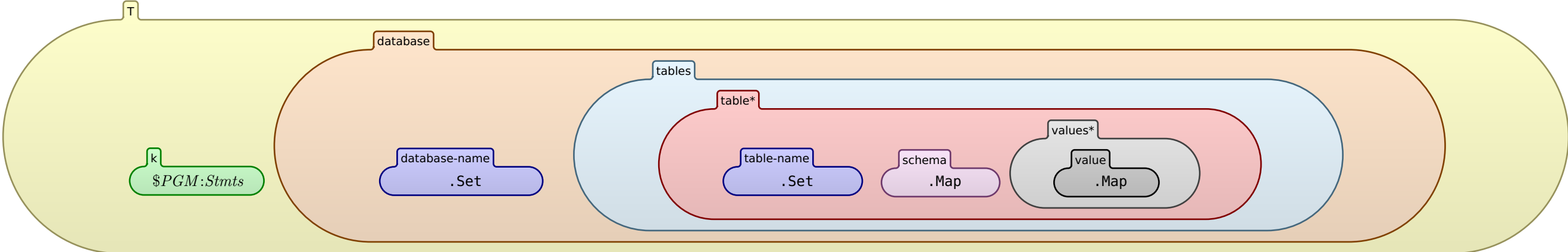
SYNTAX  AlterCommand ::= AddAttribute
          | DropAttribute
          | RenameColumnAttribute
          | RenameTable

SYNTAX  AlterCommands ::= List{AlterCommand, ","}
```

END MODULE

MODULE SQL

CONFIGURATION:



RULE $\frac{S1:Stmt \ S2:Smts}{S1 \frown S2}$

RULE $\frac{\text{CREATE DATABASE } N:Id ;}{\bullet_K}$ $\frac{\text{database-name .Set SetItem}(N)}$

RULE $\frac{\text{CREATE TABLE } N:Id(A:Attributes) ; \quad \text{ADD SCHEMA } N(A) ;}{\bullet_{Bag}}$ $\frac{\text{table table-name .SetItem}(N) \quad \text{schema .Map} \quad \text{values .Map} \bullet_{Bag}}$

RULE $\frac{\text{ADD SCHEMA } N:Id(X:Id \ T:Type, A:Attributes) ;}{A}$ $\frac{\text{table-name SetItem}(N) \quad \text{schema } \frac{M:Map}{M[X \leftarrow T]}}$

RULE $\frac{\text{ADD SCHEMA } N:Id(\bullet_{Attributes}) ;}{\bullet_K}$

RULE $\frac{\text{ALTER TABLE } N:Id \text{ Add } X:Id \ T:Type, A:AddAttributes ;}{A}$ $\frac{\text{table-name SetItem}(N) \quad \text{schema } \frac{M:Map}{M[X \leftarrow T]}}$

RULE $\frac{(\text{ALTER TABLE } N:Id \text{ Add } X:Id \ T:Type ;) ;}{\bullet_K}$ $\frac{\text{table-name SetItem}(N) \quad \text{schema } \frac{M:Map}{M[X \leftarrow T]}}$

RULE $\frac{\text{ALTER TABLE } N:Id \bullet_{AddAttributes} ;}{\bullet_K}$

RULE $\frac{\text{ALTER TABLE } N:Id \text{ Drop } X:Id, D:DropAttributes ;}{D}$ $\frac{\text{table-name SetItem}(N) \quad \text{schema } \frac{M:Map \ X \mapsto \text{---}}{M}}$

RULE $\frac{(\text{ALTER TABLE } N:Id \text{ Drop } X:Id ;) ;}{\bullet_K}$ $\frac{\text{table-name SetItem}(N) \quad \text{schema } \frac{M:Map \ X \mapsto \text{---}}{M}}$

RULE $\frac{\text{ALTER TABLE } N:Id \bullet_{DropAttributes} ;}{\bullet_K}$

RULE $\frac{\text{ALTER TABLE } N:Id \text{ RENAME COLUMN } X:Id \text{ TO } B:Id ;}{\bullet_K}$ $\frac{\text{table-name SetItem}(N) \quad \text{schema } \frac{M:Map \ X \mapsto T:Type}{M[B \leftarrow T]}}$

RULE $\frac{\text{ALTER TABLE } N:Id \text{ RENAME TO } X:Id ;}{\bullet_K}$ $\frac{\text{table-name SetItem}(N) \quad \text{SetItem}(X)}$

RULE $\frac{\text{DROP TABLE } N:Id, T:Tables ;}{T}$ $\frac{\text{table table-name SetItem}(N)}{\bullet_{Bag}}$

RULE $\frac{\text{DROP TABLE } N:Id ;}{\bullet_K}$ $\frac{\text{table table-name SetItem}(N)}{\bullet_{Bag}}$

RULE $\frac{\text{DROP TABLE } \bullet_{Tables} ;}{\bullet_K}$

RULE $\frac{\text{INSERT INTO } N:Id(C:Columns) \text{ VALUES } (V:Values) ;}{\bullet_K}$ $\frac{\text{table-name SetItem}(N) \quad \text{schema } M:Map \quad \text{values } \bullet_{Bag}}{\text{value InsertValues}(C, V, M)}$

SYNTAX Map ::= InsertValues (Columns, Values, Map) [function(function())]

RULE $\frac{\text{InsertValues}(C:Id, S:Columns, V:Value, W:Values, M:Map)}{C \mapsto V \text{ InsertValues}(S, W, M -_{Map} (C \mapsto (M[C])))}$

RULE $\frac{\text{InsertValues}(\bullet_{Columns}, \bullet_{Values}, (X:Id \mapsto T:Type) \ M:Map)}{X \mapsto \text{null InsertValues}(\bullet_{Columns}, \bullet_{Values}, M)}$

RULE $\frac{\text{InsertValues}(\bullet_{Columns}, \bullet_{Values}, \bullet_{Map})}{\bullet_{Map}}$

END MODULE