TigerGraph GSQL Query Language 2.1.3 Reference Card

Create | Install | Run | Show | Drop Query

```
CREATE [DISTRIBUTED] QUERY queryName([paramType p1[= defaultVal],…])
  FOR GRAPH graphName [RETURNS (returnType)] [API (verId)] {
   [Tuple Definitions] Ⓐ
   [baseType,Accumulator,fileType Declarations] Ⓑ
   [Exception Declarations]
  Query-body Statements  Ⓒ
}
```

```
DROP QUERY queryName | ALL | *
INSTALL QUERY queryName | ALL | *
SHOW QUERY queryName
RUN QUERY queryName(parameterValues)
```

Types and Tuple Definition

baseType:

```
INT  UINT  FLOAT  DOUBLE  STRING
DATETIME   BOOL
VERTEX<vTypeName>
EDGE<eTypeName>
JSONOBJECT        JSONARRAY
```

paramType:

```
baseType
  (except EDGE,JSONOBJECT,JSONARRAY)
SET<baseType>
BAG<baseType>
```

elementType:

```
baseType | STRING COMPRESS | tupleName
```

accumType:

```
SumAccum<INT|FLOAT|DOUBLE|STRING>       AvgAccum
MaxAccum<INT|FLOAT|DOUBLE>
MinAccum<INT|FLOAT|DOUBLE>
OrAccum         BitwiseOrAccum
AndAccum        BitwiseAndAccum
ListAccum<elementType|ListAccum>
SetAccum<elementType>
BagAccum<elementType>
MapAccum<elementType, elementType|accumType>
ArrayAccum<accumType>
HeapAccum<tupleName>(size, fieldName ASC|DESC ,…)
GroupByAccum<elementType aliasName,…, accumType aliasName,… >
```

Nested accumulator rules:

1. ListAccum: can be nested within ListAccum, up to a depth of 3:
2. MapAccum: All accumulator types, except for HeapAccum, can be nested within MapAccum as the value type.
3. GroupByAccum: All accumulator types, except for HeapAccum, can be nested within GroupByAccum as the accumulator type.

Ⓐ **Tuple definition:** `TYPEDEF TUPLE < baseType fieldName, … > tupleName`

Ⓒ Statements

In general, a Statement is any of the categories below: Declaration, Acccumulator Assignment, Control Flow, DML, or Output. 2 contexts for statements: Query-body level (end with semicolon); DML-sublevel (comma-separated). See GSQL Language Reference for more details.

Ⓑ Declaration Statements

- Declarations must be in order shown in CREATE QUERY syntax.
- At the DML-sublevel, only baseType local variables can be declared.

Global accumulator:

```
[STATIC] accumType<elementType> @@accumName;
```

Vertex-attached accumulator:

```
accumType<elementType> @accumName;
```

Base type:

```
baseType varName [=initValue];
```

File type:

```
FILE fileVar "("filePath")";
```

Exception:

```
EXCEPTION exceptVarName "(" errorInt ")";
 // errorInt > 40000
```

Vertex set: Below are all ways to declare a seed set.

```
SO [ (vtype) ] = CREATE QUERY seedSetExample(
   VERTEX<person> v1, SET<VERTEX> v2)
   FOR GRAPH gName {
  SetAccum<VERTEX> @@testSet;
  S1 = {v1};
  S2 = v2;
  S3 = @@testSet;
  S4 = ANY;       // All vertices
  S5 = person.*; // All person vertices
  S6 = _;         // Equivalent to S4
  S7 = S1;
  S9 = S1 UNION S2; // Union of vertex set vars
  S8 = {@@testSet, v1, v2}; // Union of other
vertex variables
```

Output Statements

```
printExpr: expr [AS key]
```

PRINT: Output arguments to console in JSON format or to filePath in CSV format if condition is true. Query-body level only.

```
PRINT printExpr,… [WHERE condition]
                  [TO_CSV {filePath|fileVar}];
```

println:

```
fileVar".println (" expr,…")";
```

LOG: Write to GPE log if condition is true. Query-body level or DML-sublevel.

```
LOG (condition, printExpr,…);
```

RETURN: Create a subquery. Return type can be any baseType or accumType, except GroupByAccum or an accumulator type using tuple as the element type.

```
CREATE QUERY subQueryName(…)… RETURNS (returnType) {
  …  // query body
  RETURN returnValue;   }
```

Accumulator Assignment Statements

Query-body level or DML-sublevel. Often in ACCUM or POST-ACCUM clause.

```
v.@accumName =  expr
v.@accumName += expr // Accumulation
@@accumName  =  expr // Not allowed at DML-sublevel
@@accumName  += expr // Accumulation
```

Exception Statements

Raise statement:

```
RAISE exceptVarName [errorMsg]
```

Try Block:

```
TRY queryBodyStmts
EXCEPTION
    [WHEN exceptVarName THEN queryBodyStmts ]+
    [ELSE queryBodyStmts]
```

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```
}
```

```
END;
```

DML Statements

Edge-induced SELECT: Only SELECT and FROM are required

```
vSetVarName =
  SELECT t   // vertex alias (s or t)
  FROM vSetVarName:s - ((eType1|eType2):e) -> (vType1|vType2):t  // s,e,t are aliases
  WHERE condition   // Evaluates before ACCUM and POST-ACCUM
  SAMPLE expr EDGE|TARGET WHEN condition
  ACCUM DMLSubStatements       // Executed on every edge. s, e, and t can all be used.
  POST-ACCUM DMLSubStatements  // 1. If POST-ACCUM is used with ACCUM, the statements follow the
                               //    result of ACCUM.
                               // 2. Each POST-ACCUM statement can use only s or only t.
  HAVING condition          // Similar to WHERE, but evaluates after ACCUM and POST-ACCUM
  ORDER BY expr ASC|DESC, expr ASC|DESC,…
  LIMIT expr OFFSET expr;  // OFFSET is optionally with LIMIT
```

Vertex-induced SELECT: (Supports all the clauses of Edge-induced SELECT. Only the difference from edge-induced SELECT is shown below.)

```
vSetVarName =
  SELECT s                  // vertex alias (only s)
  FROM vSetVarName:s        // No edge or target vertex
  ACCUM DMLSubStatements;   // Executed on every vertex.
```

query-body DELETE: delete vertices or edges

```
DELETE aliasName
FROM vSetVarName:s - (eType1:e) -> (vType1):t
    // or vSetVarName:s
WHERE condition;
```

DML-sub DELETE: delete vertices or edges

```
DELETE ( aliasName )
```

INSERT INTO: Insert vertices or edges. Either query-body or DML-sublevel

```
INSERT INTO edgeTypeName (FROM, TO, attr1, attr2)
VALUES (fromVertexId fromVertexType, toVertexId
  toVertexType, attrValue1, attrValue2,…);
```

UPDATE: Update vertex or edge attributes

```
UPDATE aliasName
FROM vSetVarName:s - (eType1:e) -> (vType1):t
    // or vSetVarName:s
SET DMLSubStatements
WHERE condition;
```

Control Flow Statement: can be query-body-level or DML-sublevel

IF statement:

```
IF condition THEN statements
[ELSE IF condition THEN statements]…
[ELSE statements] END
```

WHILE statement: (inner statements include CONTINUE BREAK)

```
WHILE condition [LIMIT intExpr]
DO statements END
```

FOREACH statement: (inner statements may include CONTINUE or BREAK)

```
FOREACH varName IN setBagExpr DO statements END
FOREACH varName IN RANGE [ expr, expr ].STEP( expr ) DO statements END
```

CASE statement: Trigger ONLY the first statements whose condition is true.

```
CASE      [WHEN condition THEN statements]+ ELSE statements END
CASE expr [WHEN constant  THEN statements]+ ELSE statements END
```

Operators

Math operators: + - * / % << >> & |
Comparison operators: < <= > >= == !=
String operator: +
Boolean operators: NOT AND OR
Boolean constant: TRUE FALSE

Other operators for condition:

```
expr BETWEEN expr AND expr
expr [NOT] LIKE expr
expr IS [NOT] NULL
```

Set|Bag operators:

```
setBagExpr UNION |INTERSECT | MINUS setBagExpr
expr [NOT] IN setBagExpr
```

Collections

```
(1, 2)          // a set or bag
("a" -> 2)      // key-value pair for map
```

Built-in Functions

Categories of Built-in Functions

See GSQL Language Reference for full list

Math functions
String functions
Type conversion functions
DATETIME functions
JSONARRAY and JSONOBJECT parsing functions
VERTEX functions:

```
INT v.outdegree( [STRING] )
BAG<VERTEX> v.neighbors( [STRING] )
BAG<attr> v.neighborAttributes(STRING,STRING,STRING)
BAG<attr> v.edgeAttribute(STRING, STRING)
```

EDGE function:

```
BOOL e.isDirected()
```

Aggregation functions: The argument is a set or bag

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`["abc", "def"] // a list`	`COUNT SUM MIN MAX AVG`

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