Вход-выход. SQL-запросы в AST-дерево.

Вход 1. select запрос

```
SELECT LastName,
        FirstName
      FROM Person.Person
      WHERE BusinessEntityID IN (
            SELECT BusinessEntityID
                  FROM HumanResources.Employee
                  WHERE BusinessEntityID IN (
                        SELECT BusinessEntityID
                              FROM Sales.SalesPerson)
                  );
```

Выход 1

```
RootQueryNode(
      queries=[
      QueryNode(
      query_statements=[
            FactoredStatementNode(
            select_parts=[
            SelectNode(
                  columns=[
                ExprNode(database_name=None, table_name=None,
column_name='LastName', select_stmt=None),
                ExprNode(database_name=None, table_name=None,
column_name='FirstName', select_stmt=None),
              ],
              tables=[Table_or_subquery(table_name='Person', schema_name='Person',
DOT='.', table_alias=None, K_INDEXED=None, K_BY=None, index_name=None,
K_NOT=None, K_AS=None, table_function_name=None, OPEN_PAR=None,
CLOSE_PAR=None, expr=[], COMMA=[], table_or_subquery=[], join_clause=None,
select_stmt=None)],
                  where=ExprNode(
                database_name=None,
                table_name=None,
                 column_name=None,
                  select_stmt=[
                  Select_or_values(
                    K_SELECT='SELECT',
                    result_column=[ExprNode(database_name=None,
table_name=None, column_name='BusinessEntityID', select_stmt=None)],
                    COMMA=[],
                    K_FROM='FROM',
                    K_WHERE='WHERE',
                     expr=[
                      ExprNode(
                        database_name=None,
                        table_name=None,
                        column_name=None,
                        select_stmt=[
                          Select_or_values(
                            K_SELECT='SELECT',
                            result_column=[ExprNode(database_name=None,
table_name=None, column_name='BusinessEntityID', select_stmt=None)],
                            COMMA=[],
                                K_FROM='FROM',
                            K_WHERE=None,
                            expr=[],
                            K_GROUP=None,
                            K_BY=None,
                            K_DISTINCT=None,
                            K_ALL=None,

table_or_subquery=[Table_or_subquery(table_name='SalesPerson', schema_name='Sales',
DOT='.', table_alias=None, K_INDEXED=None, K_BY=None, index_name=None,
K_NOT=None, K_AS=None, table_function_name=None, OPEN_PAR=None,
CLOSE_PAR=None, expr=[], COMMA=[], table_or_subquery=[], join_clause=None,
select_stmt=None)],
                            join_clause=None,
                            K_HAVING=None,
                               K_VALUES=None,
                            OPEN_PAR=[],
                            CLOSE_PAR=[],
                          ),
                          ],
                        ),
                        ],
                    K_GROUP=None,
                    K_BY=None,
                       K_DISTINCT=None,
                    K_ALL=None,
                    table_or_subquery=[Table_or_subquery(table_name='Employee',
schema_name='HumanResources', DOT='.', table_alias=None, K_INDEXED=None,
K_BY=None, index_name=None, K_NOT=None, K_AS=None, table_function_name=None,
OPEN_PAR=None, CLOSE_PAR=None, expr=[], COMMA=[], table_or_subquery=[],
join_clause=None, select_stmt=None)],
                        join_clause=None,
                    K_HAVING=None,
                    K_VALUES=None,
                    OPEN_PAR=[],
                    CLOSE_PAR=[],
                 ),
                  ],
                  ),
                  group_by=None,
            having=None,
        ),
        ],
       operators=None,
       ),
    ],
    ),
    ],
)
```

Вход 2. select запрос

```
SELECT *
    FROM (
        SELECT Author, stock
            FROM books
            GROUP BY author
    ) AS results
    WHERE author="Robin Sharma";
```

Выход 2

```
RootQueryNode(
    queries=[
    QueryNode(
    query_statements=[
        FactoredStatementNode(
        select_parts=[
        SelectNode(
            columns=[
            '*',
            ],
            tables=[
           Table_or_subquery(
            table_name=None,
            schema_name=None,
              DOT=None,
            table_alias='results',
            K_INDEXED=None,
            K_BY=None,
            index_name=None,
              K_NOT=None,
            K_AS='AS',
            table_function_name=None,
            OPEN_PAR='(',
            CLOSE_PAR=')',
           expr=[],
            COMMA=[],
            table_or_subquery=[],
            join_clause=None,
            select_stmt=[
                       Select_or_values(
                      K_SELECT='SELECT',
                      result_column=[
                        ExprNode(database_name=None, table_name=None,
column_name='Author', select_stmt=None),
                        ExprNode(database_name=None, table_name=None,
column_name='stock', select_stmt=None),
                        ],
                      COMMA=[
                        ',',
                        ],
                      K_FROM='FROM',
                        K_WHERE=None,
                      expr=[ExprNode(database_name=None, table_name=None,
column_name='author', select_stmt=None)],
                      K_GROUP='GROUP',
                        K_BY='BY',
                      K_DISTINCT=None,
                      K_ALL=None,
                      table_or_subquery=[
                        'books',
                        ],
                      join_clause=None,
                      K_HAVING=None,
                         K_VALUES=None,
                      OPEN_PAR=[],
                      CLOSE_PAR=[],
                        ),
                  ],
                   ),
                  ],
              where=ExprNode(database_name=None, table_name=None,
column_name=None, select_stmt=None),
                  group_by=None,
                  having=None,
              ),
            ],
            operators=None,
            ),
      ],
      ),
      ],
)
```

Вход 3. select запрос

```
SELECT members.firstname || ' ' || members.lastname AS "Full Name"
      FROM borrowings
      INNER JOIN members ON
```

```
        members.memberid=borrowings.memberid
    INNER JOIN books ON
        books.bookid=borrowings.bookid
    WHERE borrowings.bookid IN (SELECT bookid
    FROM books)
    GROUP BY members.firstname, members.lastname;
```

Выход 3

```
RootQueryNode(
    queries=[
    QueryNode(
    query_statements=[
        FactoredStatementNode(
        select_parts=[
        SelectNode(
            columns=[
            Result_column(
              STAR=None,
            table_name=None,
            DOT=None,
            expr=ExprNode(database_name=None, table_name=None,
column_name=None, select_stmt=None),
               column_alias='"Full Name"',
            K_AS='AS',
            ),
            ],
            tables=None,
            where=ExprNode(
           database_name=None,
          table_name=None,
          column_name=None,
            select_stmt=[
            Select_or_values(
             K_SELECT='SELECT',
             result_column=[ExprNode(database_name=None,
table_name=None, column_name='bookid', select_stmt=None)],
             COMMA=[],
             K_FROM='FROM',
             K_WHERE=None,
             expr=[],
             K_GROUP=None,
             K_BY=None,
             K_DISTINCT=None,
             K_ALL=None,
             table_or_subquery=[
               'books',
                ],
             join_clause=None,
             K_HAVING=None,
                        K_VALUES=None,
                    OPEN_PAR=[],
                    CLOSE_PAR=[],
                  ),
                  ],
                  ),
                  group_by=[
                ExprNode(database_name=None, table_name='members',
column_name='firstname', select_stmt=None),
                ExprNode(database_name=None, table_name='members',
column_name='lastname', select_stmt=None),
                  ],
              having=None,
            ),
            ],
          operators=None,
            ),
      ],
      ),
      ],
)
```

Вход 4. update запрос

```
UPDATE Laptop
      SET price = price*0.9;
```

Выход 4

```
RootQueryNode(
      queries=[
      QueryNode(
      query_statements=[
            Update_stmt(
            K_UPDATE='UPDATE',
          qualified_table_name='Laptop',
            K_SET='SET',
            column_name=[
            'price',
            ],
            ASSIGN=[
           '=',
            ],
            expr=[
            ExprNode(
                  database_name=None,
                  table_name=None,
                  column_name=None,
                 select_stmt=None,
                  expr=[
                    ExprNode(database_name=None, table_name=None,
column_name='price', select_stmt=None, expr=[], literal_value=None),
                  ExprNode(database_name=None, table_name=None,
column_name=None, select_stmt=None, expr=[], literal_value='0.9'),
                  ],
                  literal_value=None,
            ),
            ],
            with_clause=None,
            K_OR=None,
            K_ROLLBACK=None,
            K_ABORT=None,
            K_REPLACE=None,
            K_FAIL=None,
            K_IGNORE=None,
          COMMA=[],
            K_WHERE=None,
            ),
      ],
      ),
      ],
)
```

Вход 5. create запрос

```
CREATE TABLE sales(
    visit_id INT PRIMARY KEY IDENTITY (1, 1),
    first_name VARCHAR (50) NOT NULL,
    last_name VARCHAR (50) NOT NULL,
    visited_at DATETIME,
    phone VARCHAR(20),
    store_id INT NOT NULL,
    FOREIGN KEY (store_id) REFERENCES sales (store_id)
);
```

Выход 5

```
RootQueryNode(
    queries=[
        QueryNode(
            query_statements=[
                Create_table_stmt(
                    K_CREATE='CREATE',
                    K_TABLE='TABLE',
                    table_name='sales',
                    OPEN_PAR='(',
                    column_def=[
                        Column_def(
                            column_name='visit_id',
                            type_name=Type_name(name=['INT', 'PRIMARY', 'KEY', 'IDENTITY'],
OPEN_PAR='(', signed_number=['1', '1'], CLOSE_PAR=')', COMMA=','),
                            column_constraint=[],
                        ),
                        Column_def(
                            column_name='first_name',
                            type_name=Type_name(name=['VARCHAR'], OPEN_PAR='(',
signed_number=['50'], CLOSE_PAR=')', COMMA=None),
                            column_constraint=[
                                Column_constraint(
                                    K_PRIMARY=None,
                                    K_KEY=None,
                                    conflict_clause=Conflict_clause(K_ON=None, K_CONFLICT=None,
K_ROLLBACK=None, K_ABORT=None, K_FAIL=None, K_IGNORE=None,
K_REPLACE=None),
                                    K_NULL='NULL',
                                    K_UNIQUE=None,
                                    K_CHECK=None,
                                    OPEN_PAR=None,
                                    expr=None,
                                    CLOSE_PAR=None,
                                    K_DEFAULT=None,
                                    K_COLLATE=None,
                                    collation_name=None,
                                    foreign_key_clause=None,
                                    K_CONSTRAINT=None,
                                    name=None,
                                    signed_number=None,
                                    literal_value=None,
                                    K_AUTOINCREMENT=None,
                                    K_NOT='NOT',
                                    K_ASC=None,
                                    K_DESC=None,
                                ),
                            ],
                        ),
                        Column_def(
                            column_name='last_name',
                            type_name=Type_name(name=['VARCHAR'], OPEN_PAR='(',
signed_number=['50'], CLOSE_PAR=')', COMMA=None),
                            column_constraint=[
                                Column_constraint(
                                    K_PRIMARY=None,
                                    K_KEY=None,
                                    conflict_clause=Conflict_clause(K_ON=None, K_CONFLICT=None,
K_ROLLBACK=None, K_ABORT=None, K_FAIL=None, K_IGNORE=None,
K_REPLACE=None),
                                    K_NULL='NULL',
                                    K_UNIQUE=None,
                                    K_CHECK=None,
                                    OPEN_PAR=None,
                                    expr=None,
                                    CLOSE_PAR=None,
                                    K_DEFAULT=None,
                                    K_COLLATE=None,
                                    collation_name=None,
                                    foreign_key_clause=None,
                                    K_CONSTRAINT=None,
                                    name=None,
                                    signed_number=None,
                                    literal_value=None,
                                    K_AUTOINCREMENT=None,
                                    K_NOT='NOT',
                                    K_ASC=None,
                                    K_DESC=None,
                                ),
                            ],
                        ),
                        Column_def(column_name='visited_at', type_name=['DATETIME'],
column_constraint=[]),
                        Column_def(
                            column_name='phone',
                            type_name=Type_name(name=['VARCHAR'], OPEN_PAR='(',
signed_number=['20'], CLOSE_PAR=')', COMMA=None),
                            column_constraint=[],
                        ),
                        Column_def(
                            column_name='store_id',
                            type_name=[
                                'INT',
                            ],
                            column_constraint=[
                                Column_constraint(
                                    K_PRIMARY=None,
                                    K_KEY=None,
                                    conflict_clause=Conflict_clause(K_ON=None, K_CONFLICT=None,
K_ROLLBACK=None, K_ABORT=None, K_FAIL=None, K_IGNORE=None,
K_REPLACE=None),
                                    K_NULL='NULL',
                                    K_UNIQUE=None,
                                    K_CHECK=None,
                                    OPEN_PAR=None,
                                    expr=None,
                                    CLOSE_PAR=None,
                                    K_DEFAULT=None,
                                    K_COLLATE=None,
                                    collation_name=None,
                                    foreign_key_clause=None,
                                    K_CONSTRAINT=None,
                                    name=None,
                                    signed_number=None,
                                    literal_value=None,
                                    K_AUTOINCREMENT=None,
                                    K_NOT='NOT',
                                    K_ASC=None,
                                    K_DESC=None,
                                ),
                            ],
                        ),
                    ],
                    CLOSE_PAR=')',
                    K_AS=None,
                    select_stmt=None,
                    K_IF=None,
                    K_NOT=None,
                    K_EXISTS=None,
                    database_name=None,
                    DOT=None,
                    K_TEMP=None,
                    K_TEMPORARY=None,
                    COMMA=[
                        ',',
                        ',',
                        ',',
                        ',',
                        ',',
                        ',',
                    ],
                    table_constraint=[
                        Table_constraint(
                            OPEN_PAR='(',
                            indexed_column=[],
                            CLOSE_PAR=')',
                            conflict_clause=None,
                            K_CHECK=None,
                            expr=None,
                            K_FOREIGN='FOREIGN',
                            K_KEY='KEY',
                            column_name=[
                                'store_id',
                            ],

foreign_key_clause=Foreign_key_clause(K_REFERENCES='REFERENCES',
foreign_table='sales', OPEN_PAR='(', column_name=['store_id'], CLOSE_PAR=')',
K_DEFERRABLE=None, K_ON=[], K_MATCH=[], name=[], COMMA=[],
K_DELETE=[], K_UPDATE=[], K_NOT=None, K_INITIALLY=None,
K_DEFERRED=None, K_IMMEDIATE=None, K_SET=[], K_NULL=[], K_DEFAULT=[],
K_CASCADE=[], K_RESTRICT=[], K_NO=[], K_ACTION=[]),
                            K_CONSTRAINT=None,
                            name=None,
                            K_PRIMARY=None,
                            K_UNIQUE=None,
                            COMMA=[],
                        ),
                    ],
                    K_WITHOUT=None,
                    IDENTIFIER=None,
                ),
            ],
        ),
    ],
)
```