(1)⟨*queryexp*⟩ ::= {⟨*collection clause*⟩ | ⟨*select clause*⟩⟨*from clause*⟩[⟨*where clause*⟩][⟨*group by clause*⟩]
[⟨*having clause*⟩]}[⟨*order by clause*⟩]
(2)⟨*collection clause*⟩ ::= ⟨*queryexp*⟩⟨*cop*⟩⟨*queryexp*⟩
(3)⟨*cop*⟩ ::= UNION [ALL]|EXCEPT [ALL]|INTERSECT [ALL]
(4)⟨*from clause*⟩ ::= FROM⟨*tref*⟩[, ⟨*tref*⟩...]
(5)⟨*tref*⟩ ::= ⟨*tname*⟩ | ⟨*joined table*⟩
(6)⟨*joined table*⟩ ::= ⟨*cross join*⟩ | ⟨*qualified join*⟩ | ⟨*natural join*⟩
(7)⟨*cross join*⟩ ::= ⟨*tname*⟩CROSS JOIN⟨*tname*⟩
(8)⟨*qualified join*⟩ ::= ⟨*tname*⟩[INNER|LEFT|RIGHT|FULL] JOIN⟨*tname*⟩⟨*on clause*⟩
(9)⟨*natural join*⟩ ::= ⟨*tname*⟩NATURAL JOIN ⟨*tname*⟩
(10)⟨*on clause*⟩ ::= ON ⟨*bvexp*⟩
(11)⟨*where clause*⟩ ::= WHERE⟨*bvexp*⟩
(12)⟨*select clause*⟩ ::= SELECT ⟨*sop*⟩|⟨*af*⟩ ⟨*slist*⟩
(13)⟨*slist*⟩ ::= ∗|⟨*cname*⟩ [, ⟨*cname*⟩...]
(14)⟨*sop*⟩ ::= DISTINCT |ALL
(15)⟨*af*⟩ ::= MAX |MIN |SUM |COUNT |AVG
(16)⟨*group by clause*⟩ ::= GROUP BY ⟨*cname*⟩
(17)⟨*having clause*⟩ ::= HAVING⟨*bvexp*⟩
(18)⟨*order by clause*⟩ ::= ORDER BY⟨*cname*⟩ASC|DESC
(19)⟨*vexp*⟩ ::= ⟨*nvexp*⟩ | ⟨*svexp*⟩ | ⟨*bvexp*⟩ | ⟨*caseexp*⟩ | ⟨*castexp*⟩ | ⟨*cname*⟩ | *null*
(20)⟨*svexp*⟩ ::= ⟨*concatenation*⟩ | ⟨*character substring function*⟩ | ⟨*trim function*⟩ | ⟨*fold*⟩ | ⟨*vexp*⟩
| *string literal*
(21)⟨*concatenation*⟩ ::= ⟨*svexp*⟩||⟨*svexp*⟩
(22)⟨*character substring function*⟩ ::= SUBSTRING(⟨*svexp*⟩*FROM*⟨*vexp*⟩)
(23)⟨*trim function*⟩ ::= LTRIM|RTRIM(⟨*svexp*⟩)
(24)⟨*fold*⟩ ::= UPPER|LOWER(⟨*svexp*⟩)
(25)⟨*nvexp*⟩ ::= ⟨*arithmetic expression*⟩ | ⟨*modules expression*⟩| ⟨*length expression*⟩
| ⟨*absolute value expression*⟩| ⟨*natural logarithm*⟩| ⟨*exponential function*⟩| ⟨*power function*⟩| ⟨*square root*⟩
| ⟨*floor function*⟩| ⟨*ceiling function*⟩| ⟨*vexp*⟩| *numeric literal*
(26)⟨*arithmetic expression*⟩ ::= ⟨*nvexp*⟩ + ⟨*nvexp*⟩ | ⟨*nvexp*⟩ − ⟨*nvexp*⟩ | ⟨*nvexp*⟩ ∗ ⟨*nvexp* ⟩| ⟨*nvexp*⟩/⟨*nvexp*⟩
(27)⟨*modules expression*⟩ ::= MOD(⟨*nvexp*⟩ , ⟨*nvexp*⟩)
(28)⟨*length expression*⟩ ::= {LENGTH|CHAR˙LENGTH|CHARACTER˙LENGTH}(⟨*svexp*⟩)
(29)⟨*absolute value expression*⟩ ::= ABS(⟨*nvexp*⟩)
(30)⟨*natural logarithm*⟩ ::= LN(⟨*nvexp*⟩)
(31)⟨*exponential function*⟩ ::= EXP(⟨*nvexp*⟩)
(32)⟨*power function*⟩ ::= POWER(⟨*nvexp*⟩, ⟨*nvexp*⟩)
(33)⟨*square root*⟩ ::= SQRT(⟨*nvexp*⟩)
(34)⟨*floor function*⟩ ::= FLOOR(⟨*nvexp*⟩)
(35)⟨*ceiling function*⟩ ::= {CEIL|CEILING}(⟨*nvexp*⟩)
(36)⟨*bvexp*⟩ ::= ⟨*logical expression*⟩ | ⟨*is expression*⟩ | ⟨*comparison expression*⟩ | ⟨*between expression*⟩
⟨*in expression*⟩ | ⟨*exists expression*⟩ | ⟨*null expression*⟩ | ⟨*vexp*⟩ | *true* | *false* | *null*
(37)⟨*logical expression*⟩ ::= ⟨*bvexp*⟩ OR ⟨*bvexp*⟩ | ⟨*bvexp*⟩ AND ⟨*bvexp*⟩ | ⟨*bvexp*⟩ XOR⟨*bvexp*⟩ |NOT ⟨*bvexp*⟩
(38)⟨*is expression*⟩ ::= ⟨*bvexp*⟩ IS [NOT] TRUE|FALSE|UNKNOWN
(39)⟨*comparison expression*⟩ ::= ⟨*bvexp*⟩ = |! = |< |> |>= |<= ⟨*bvexp*⟩
(40)⟨*between expression*⟩ ::= ⟨*nvexp*⟩[NOT] BETWEEN ⟨*nvexp*⟩ AND ⟨*nvexp*⟩
(41)⟨*in expression*⟩ ::= ⟨*vexp*⟩ [NOT] IN ⟨*vlist*⟩
(42)⟨*vlist*⟩ ::= (⟨*vexp*⟩[, ⟨*vexp*⟩...])
(43)⟨*exists expression*⟩ ::= EXISTS ⟨*subquery*⟩
(44)⟨*null expression*⟩ ::= ⟨*bvexp*⟩ IS [NOT] NULL
(45)⟨*subquery*⟩ ::= (⟨*query expression*⟩)
(46)⟨*caseexp*⟩ ::= CASE WHEN ⟨*vexp*⟩ THEN ⟨*vexp*⟩ ELSE ⟨*vexp*⟩
(47)⟨*castexp*⟩ ::= CAST(⟨*vexp*⟩ AS ⟨*data type*⟩)
(48)⟨*data type*⟩ ::= *string* | *numeric* | *boolean*
(50)⟨*tname*⟩ ::= *identifier*
(51)⟨*cname*⟩ ::= *identifier*

Fig. 3: The full list of syntax for SQL