The NOT NULL Constraint

- Ensures that null values are not permitted for the column

EMP

EMPNO	ENAME	JOB	...	COMM	DEPTNO
7839	KING	PRESIDENT			10
7698	BLAKE	MANAGER			30
7782	CLARK	MANAGER			10
7566	JONES	MANAGER			20
...					

NOT NULL constraint (no row can contain a null value for this column)

Absence of NOT NULL constraint (any row can contain null for this column)

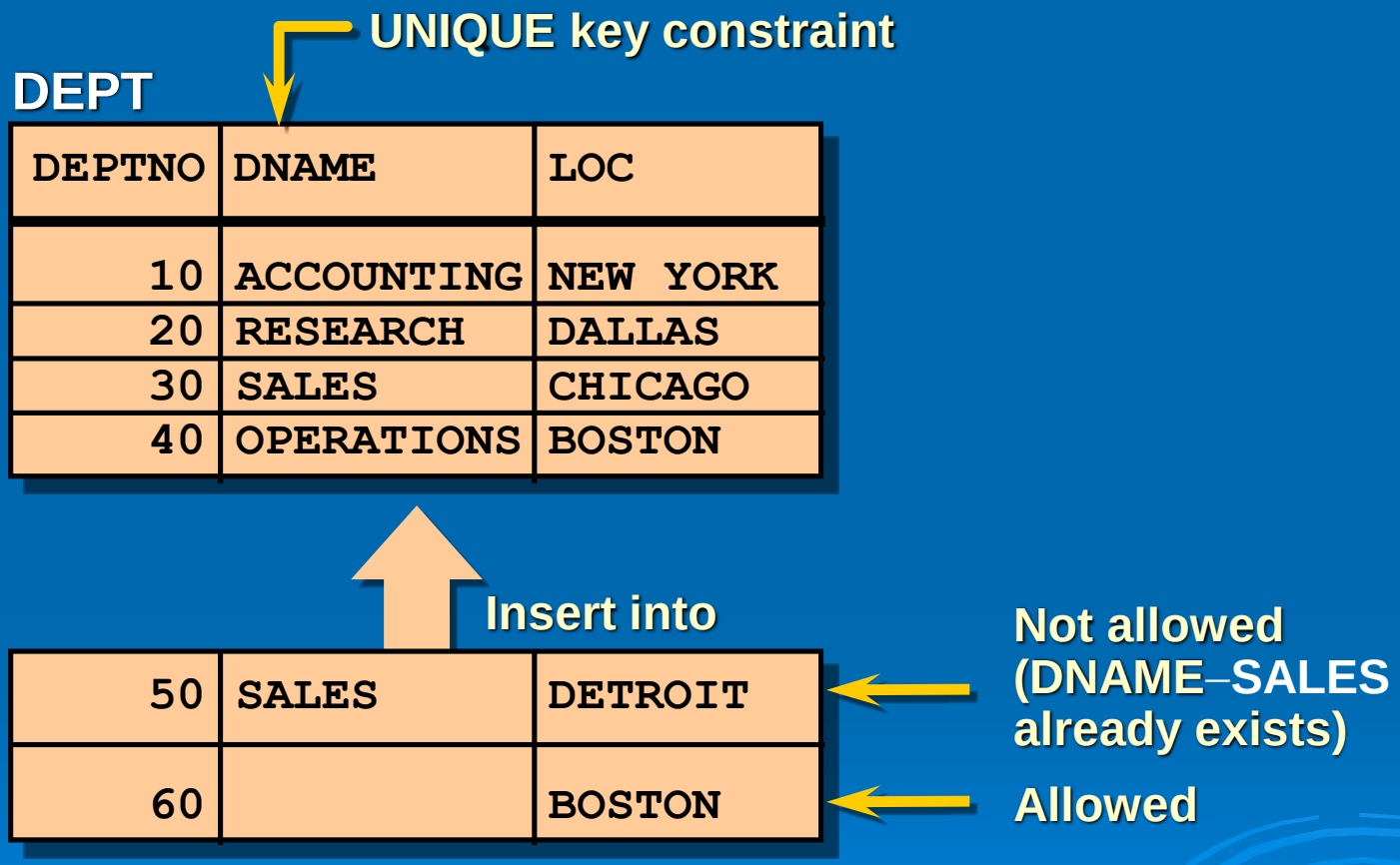
NOT NULL constraint

The NOT NULL Constraint

- Defined at the column level

```
SQL> CREATE TABLE emp(
  2       empno     NUMBER(4),
  3       ename     VARCHAR2(10) NOT NULL,
  4       job       VARCHAR2(9),
  5       mgr       NUMBER(4),
  6       hiredate  DATE,
  7       sal       NUMBER(7,2),
  8       comm      NUMBER(7,2),
  9       deptno    NUMBER(7,2) NOT NULL);
```

The UNIQUE Key Constraint

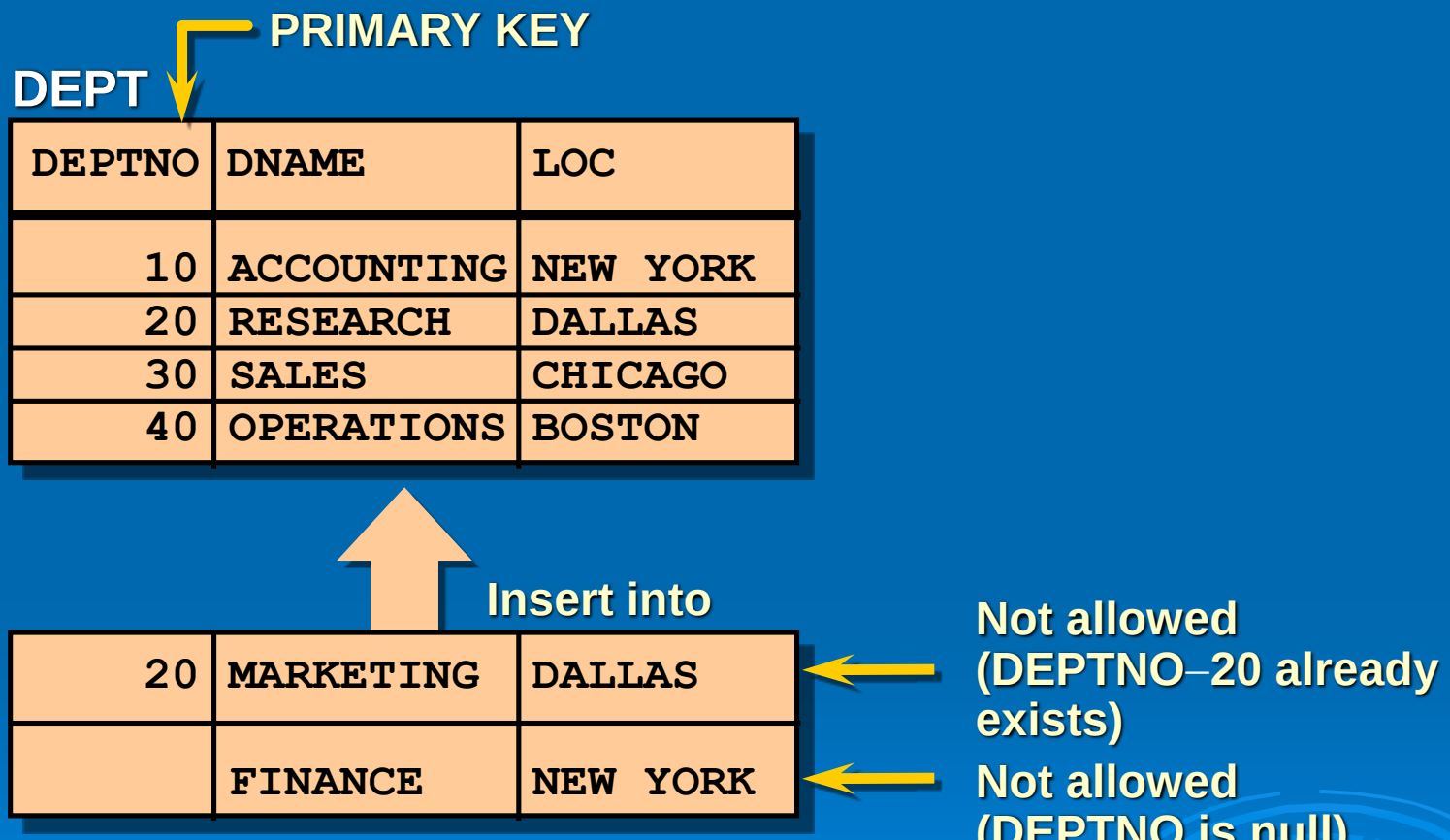


The UNIQUE Key Constraint

- Defined at either the table level or the column level

```
SQL> CREATE TABLE    dept(
  2       deptno     NUMBER(2),
  3       dname      VARCHAR2(14),
  4       loc        VARCHAR2(13),
  5       CONSTRAINT dept_dname_uk UNIQUE(dname));
```

The PRIMARY KEY Constraint

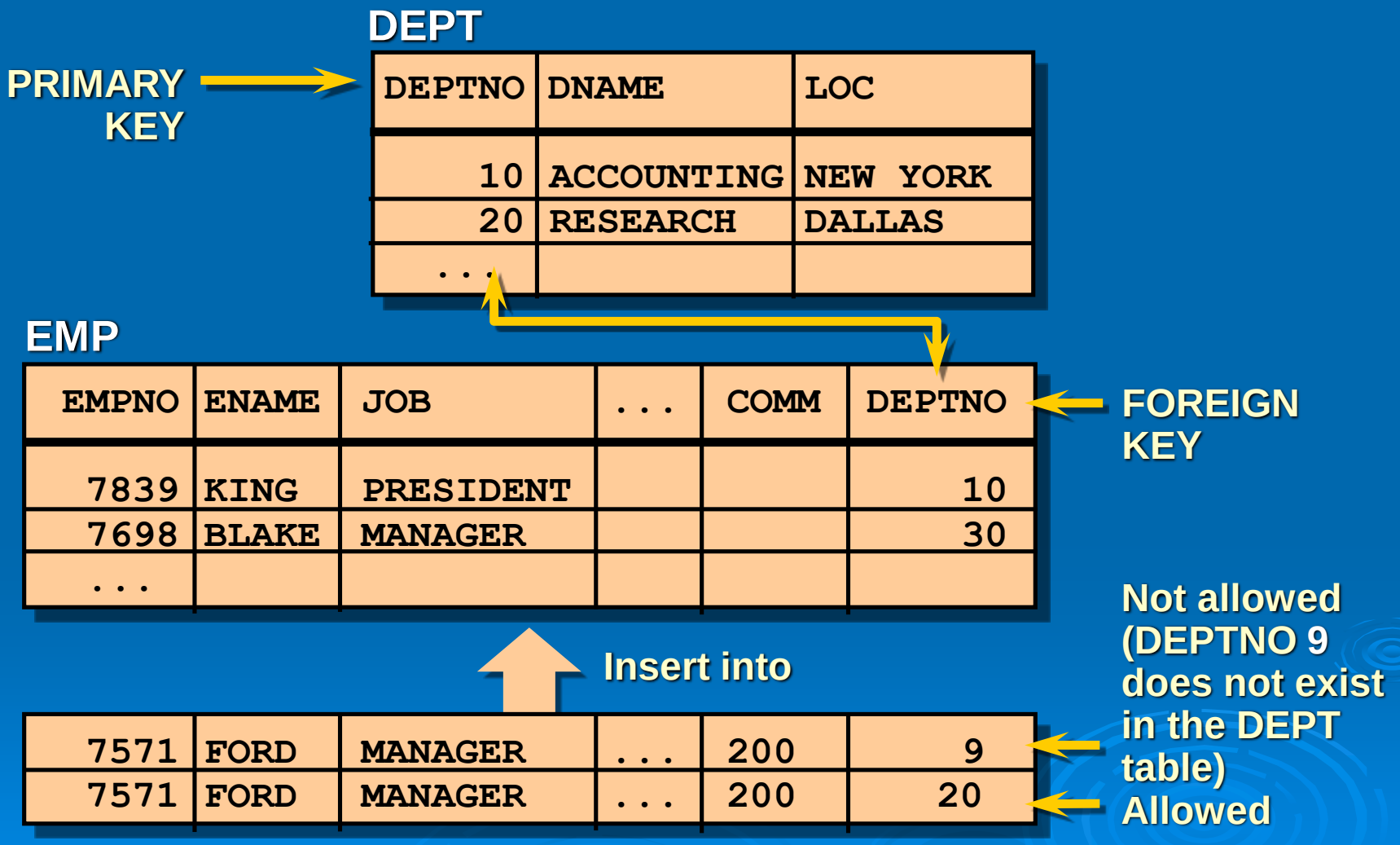


The PRIMARY KEY Constraint

- Defined at either the table level or the column level

```
SQL> CREATE TABLE    dept(
  2       deptno     NUMBER(2),
  3       dname      VARCHAR2(14),
  4       loc        VARCHAR2(13),
  5       CONSTRAINT dept_dname_uk UNIQUE (dname),
  6       CONSTRAINT dept_deptno_pk PRIMARY KEY(deptno));
```

The FOREIGN KEY Constraint



The FOREIGN KEY Constraint

```
SQL> CREATE TABLE emp(
  2       empno     NUMBER(4),
  3       ename     VARCHAR2(10) NOT NULL,
  4       job       VARCHAR2(9),
  5       mgr       NUMBER(4),
  6       hiredate  DATE,
  7       sal       NUMBER(7,2),
  8       comm      NUMBER(7,2),
  9       deptno    NUMBER(7,2) NOT NULL,
 10       CONSTRAINT emp_deptno_fk FOREIGN KEY (deptno)
 11                 REFERENCES dept (deptno));
```

FOREIGN KEY Constraint Keywords

- FOREIGN KEY

  Defines the column in the child table at the table constraint level
- REFERENCES

  Identifies the table and column in the parent table
- ON DELETE CASCADE

  Allows deletion in the parent table and deletion of the dependent rows in the child table

The CHECK Constraint

- Defines a condition that each row must satisfy

```
..., deptno   NUMBER(2),
      CONSTRAINT emp_deptno_ck
            CHECK (DEPTNO BETWEEN 10 AND 99),...
```

Adding a Constraint

```
ALTER TABLE  table
ADD [CONSTRAINT constraint] type (column);
```

- Add or drop, but not modify, a constraint
- Enable or disable constraints
- Add a NOT NULL constraint by using the MODIFY clause

Adding a Constraint

- Add a FOREIGN KEY constraint to the EMP table indicating that a manager must already exist as a valid employee in the EMP table.

```
SQL> ALTER TABLE     emp
  2  ADD CONSTRAINT  emp_mgr_fk
  3           FOREIGN KEY(mgr) REFERENCES emp(empno);
Table altered.
```

Dropping a Constraint

- Remove the manager constraint from the EMP table.

```
SQL> ALTER TABLE       emp
  2  DROP CONSTRAINT   emp_mgr_fk;
Table altered.
```