Oracle SQL Data Types

Data Types in Oracle SQL

Oracle SQL provides different data types for handling numbers, characters, dates, and large objects (LOBs).

1. Numeric Data Types

- NUMBER(p,s): Fixed or floating-point number. p (precision), s (scale).
- FLOAT(p): Floating-point number with precision in binary digits.
- BINARY_FLOAT: 32-bit floating-point number.
- BINARY_DOUBLE: 64-bit floating-point number, high precision.
- INTEGER: Equivalent to NUMBER(38,0), stores whole numbers.
- SMALLINT: Equivalent to NUMBER(38,0), for smaller numbers.

Example:

```
CREATE TABLE numbers_example (
    id NUMBER(5),
    salary NUMBER(7,2),
    rating FLOAT(6),
    pi_value BINARY_DOUBLE
);
```

2. Character Data Types

- CHAR(n): Fixed-length character data (up to 2000 bytes).
- VARCHAR2(n): Variable-length character data (up to 4000 bytes).
- NCHAR(n): Fixed-length Unicode character data.
- NVARCHAR2(n): Variable-length Unicode character data.

Example:

```
CREATE TABLE employees (
    emp_name VARCHAR2(50),
```

```
    emp_code CHAR(10),
    remarks NVARCHAR2(100)
);
```

3. Date & Time Data Types

- DATE: Stores date & time in 'DD-MON-YY HH:MI:SS' format.
- TIMESTAMP(n): Stores date/time with fractional seconds.
- TIMESTAMP WITH TIME ZONE: Stores timestamp with time zone.
- TIMESTAMP WITH LOCAL TIME ZONE: Stores timestamp in session time zone.
- INTERVAL YEAR TO MONTH: Stores a time difference in years & months.
- INTERVAL DAY TO SECOND: Stores a time difference in days, hours, minutes, seconds.

Example:

```
CREATE TABLE date_example (
    event_date DATE,
    event_time TIMESTAMP(6),
    event_timezone TIMESTAMP WITH TIME ZONE
);
```

4. Large Object (LOB) Data Types

- CLOB: Stores up to 4GB of text.
- NCLOB: Stores Unicode text up to 4GB.
- BLOB: Stores binary data (images, videos) up to 4GB.
- BFILE: Stores file locators for external files.

Example:

```
CREATE TABLE documents (
    doc_id NUMBER PRIMARY KEY,
    doc_text CLOB,
    doc_image BLOB
);
```

5. Boolean & Pseudocolumns

- BOOLEAN (Not available in Oracle).

- ROWID: Stores the physical address of a row.
- UROWID: Stores logical row addresses.

Example:

```
CREATE TABLE settings (
    id NUMBER PRIMARY KEY,
    is_active CHAR(1) CHECK (is_active IN ('Y', 'N'))
);
```

6. XML & JSON Data Types
- XMLTYPE: Stores XML data.
- JSON: Stores JSON data (Oracle 21c+).

Example:

```
CREATE TABLE json_data (
    id NUMBER PRIMARY KEY,
    data JSON
);
```

Summary

- Numeric: NUMBER, FLOAT, INTEGER, BINARY_FLOAT, BINARY_DOUBLE.
- Character: CHAR, VARCHAR2, NCHAR, NVARCHAR2.
- Date & Time: DATE, TIMESTAMP, INTERVAL YEAR TO MONTH, INTERVAL DAY TO SECOND.
- Large Objects (LOBs): CLOB, NCLOB, BLOB, BFILE.
- Boolean (Simulation): CHAR(1), NUMBER(1).
- XML & JSON: XMLTYPE, JSON.