

OTHER SCHEMA OBJECTS

Database Objects

Object	Description
Table	Basic unit of storage; composed of rows
View	Logically represents subsets of data from one or more tables
Sequence	Generates numeric values
Index	Improves the performance of data retrieval queries
Synonym	Gives alternative names to objects

What Is a View?

A view in SQL terminology is a single table that is derived from other tables. It does not necessarily exist in physical form; it is considered a *virtual table* in contrast to base tables whose tuples are actually stored in the database.

Types:

- 1- A view with a single defining table (subset of a table)
- 2- Views defined on multiple tables using joins.
- 3- Views defined using grouping and aggregate functions.

EMPLOYEES table

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY
100	Steven	King	SKING	515.123.4567	17-JUN-87	AD_PRES	24000
101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-89	AD_VP	17000
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-93	AD_VP	17000
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-90	IT_PROG	9000
104	Bruce	Ernst	BERNST	590.423.4568	17-SEP-87	IT_PROG	6000
105	David	Turner	DTURNER	590.423.4569	17-SEP-87	IT_PROG	4200
106	Julia	Abel	JABEL	590.423.4570	17-SEP-87	IT_PROG	4200
107	Walter	Taylor	WTAYLOR	590.423.4571	17-SEP-87	IT_PROG	4200
108	Renske	Adams	RADAMS	590.423.4572	17-SEP-87	IT_PROG	4200
109	Parto	Schuyt	PSCHUYT	590.423.4573	17-SEP-87	IT_PROG	4200
110	Shelley	Higgins	SHIGGINS	515.123.8080	07-JUN-94	AC_ACCOUNT	6900
111	William	Gietz	WGIEZT	515.123.8181	07-JUN-94	AC_ACCOUNT	8300
112	Denise	Baer	DBAER	515.123.8182	07-JUN-94	AC_ACCOUNT	8300
113	John	Fedorov	JFEDOROV	515.123.8183	07-JUN-94	AC_ACCOUNT	8300
114	Ismael	Sciarra	ISCIARRA	515.123.8184	07-JUN-94	AC_ACCOUNT	8300
115	Jose	Tyebati	JTYEBATI	515.123.8185	07-JUN-94	AC_ACCOUNT	8300
116	Timothy	Gauss	TGAUSS	515.123.8186	07-JUN-94	AC_ACCOUNT	8300
117	Rafael	Whalen	RWHALEN	515.123.8187	07-JUN-94	AC_ACCOUNT	8300
118	Kevin	Greenberg	KGREENBERG	515.123.8188	07-JUN-94	AC_ACCOUNT	8300
119	Jay	Smith	JSMITH	515.123.8189	07-JUN-94	AC_ACCOUNT	8300
120	Greg	Deane	GDEANE	515.123.8190	07-JUN-94	AC_ACCOUNT	8300
121	Cheryl	Chae	CCHAEE	515.123.8191	07-JUN-94	AC_ACCOUNT	8300
122	David	Lee	DLEE	515.123.8192	07-JUN-94	AC_ACCOUNT	8300
123	Shirley	Grant	SGRANT	515.123.8193	07-JUN-94	AC_ACCOUNT	8300
124	Robert	Kalita	RKALITA	515.123.8194	07-JUN-94	AC_ACCOUNT	8300
125	Elizabeth	Bratley	EBRATLEY	515.123.8195	07-JUN-94	AC_ACCOUNT	8300
126	Val	Ullrich	VULLRICH	515.123.8196	07-JUN-94	AC_ACCOUNT	8300
127	Samuel	McCoy	SMCCOY	515.123.8197	07-JUN-94	AC_ACCOUNT	8300
128	Pat	Haas	PHAAS	515.123.8198	07-JUN-94	AC_ACCOUNT	8300
129	Shelley	Stevens	SSTEVENS	515.123.8199	07-JUN-94	AC_ACCOUNT	8300
130	Walter	Taylor	WTAYLOR	515.123.8200	07-JUN-94	AC_ACCOUNT	8300
131	Renske	Adams	RADAMS	515.123.8201	07-JUN-94	AC_ACCOUNT	8300
132	Parto	Schuyt	PSCHUYT	515.123.8202	07-JUN-94	AC_ACCOUNT	8300
133	Shelley	Higgins	SHIGGINS	515.123.8203	07-JUN-94	AC_ACCOUNT	8300
134	William	Gietz	WGIEZT	515.123.8204	07-JUN-94	AC_ACCOUNT	8300
135	Denise	Baer	DBAER	515.123.8205	07-JUN-94	AC_ACCOUNT	8300
136	John	Fedorov	JFEDOROV	515.123.8206	07-JUN-94	AC_ACCOUNT	8300
137	Ismael	Sciarra	ISCIARRA	515.123.8207	07-JUN-94	AC_ACCOUNT	8300
138	Jose	Tyebati	JTYEBATI	515.123.8208	07-JUN-94	AC_ACCOUNT	8300
139	Timothy	Gauss	TGAUSS	515.123.8209	07-JUN-94	AC_ACCOUNT	8300
140	Rafael	Whalen	RWHALEN	515.123.8210	07-JUN-94	AC_ACCOUNT	8300
141	Kevin	Greenberg	KGREENBERG	515.123.8211	07-JUN-94	AC_ACCOUNT	8300
142	Jay	Smith	JSMITH	515.123.8212	07-JUN-94	AC_ACCOUNT	8300
143	Greg	Deane	GDEANE	515.123.8213	07-JUN-94	AC_ACCOUNT	8300
144	Cheryl	Chae	CCHAEE	515.123.8214	07-JUN-94	AC_ACCOUNT	8300
145	David	Lee	DLEE	515.123.8215	07-JUN-94	AC_ACCOUNT	8300
146	Shirley	Grant	SGRANT	515.123.8216	07-JUN-94	AC_ACCOUNT	8300
147	Robert	Kalita	RKALITA	515.123.8217	07-JUN-94	AC_ACCOUNT	8300
148	Elizabeth	Bratley	EBRATLEY	515.123.8218	07-JUN-94	AC_ACCOUNT	8300
149	Val	Ullrich	VULLRICH	515.123.8219	07-JUN-94	AC_ACCOUNT	8300
150	Samuel	McCoy	SMCCOY	515.123.8220	07-JUN-94	AC_ACCOUNT	8300
151	Pat	Haas	PHAAS	515.123.8221	07-JUN-94	AC_ACCOUNT	8300
152	Shelley	Stevens	SSTEVENS	515.123.8222	07-JUN-94	AC_ACCOUNT	8300
153	Walter	Taylor	WTAYLOR	515.123.8223	07-JUN-94	AC_ACCOUNT	8300
154	Renske	Adams	RADAMS	515.123.8224	07-JUN-94	AC_ACCOUNT	8300
155	Parto	Schuyt	PSCHUYT	515.123.8225	07-JUN-94	AC_ACCOUNT	8300
156	Shelley	Higgins	SHIGGINS	515.123.8226	07-JUN-94	AC_ACCOUNT	8300
157	William	Gietz	WGIEZT	515.123.8227	07-JUN-94	AC_ACCOUNT	8300
158	Denise	Baer	DBAER	515.123.8228	07-JUN-94	AC_ACCOUNT	8300
159	John	Fedorov	JFEDOROV	515.123.8229	07-JUN-94	AC_ACCOUNT	8300
160	Ismael	Sciarra	ISCIARRA	515.123.8230	07-JUN-94	AC_ACCOUNT	8300
161	Jose	Tyebati	JTYEBATI	515.123.8231	07-JUN-94	AC_ACCOUNT	8300
162	Timothy	Gauss	TGAUSS	515.123.8232	07-JUN-94	AC_ACCOUNT	8300
163	Rafael	Whalen	RWHALEN	515.123.8233	07-JUN-94	AC_ACCOUNT	8300
164	Kevin	Greenberg	KGREENBERG	515.123.8234	07-JUN-94	AC_ACCOUNT	8300
165	Jay	Smith	JSMITH	515.123.8235	07-JUN-94	AC_ACCOUNT	8300
166	Greg	Deane	GDEANE	515.123.8236	07-JUN-94	AC_ACCOUNT	8300
167	Cheryl	Chae	CCHAEE	515.123.8237	07-JUN-94	AC_ACCOUNT	8300
168	David	Lee	DLEE	515.123.8238	07-JUN-94	AC_ACCOUNT	8300
169	Shirley	Grant	SGRANT	515.123.8239	07-JUN-94	AC_ACCOUNT	8300
170	Robert	Kalita	RKALITA	515.123.8240	07-JUN-94	AC_ACCOUNT	8300
171	Elizabeth	Bratley	EBRATLEY	515.123.8241	07-JUN-94	AC_ACCOUNT	8300
172	Val	Ullrich	VULLRICH	515.123.8242	07-JUN-94	AC_ACCOUNT	8300
173	Samuel	McCoy	SMCCOY	515.123.8243	07-JUN-94	AC_ACCOUNT	8300
174	Pat	Haas	PHAAS	515.123.8244	07-JUN-94	AC_ACCOUNT	8300
175	Shelley	Stevens	SSTEVENS	515.123.8245	07-JUN-94	AC_ACCOUNT	8300
176	Walter	Taylor	WTAYLOR	515.123.8246	07-JUN-94	AC_ACCOUNT	8300
177	Renske	Adams	RADAMS	515.123.8247	07-JUN-94	AC_ACCOUNT	8300
178	Parto	Schuyt	PSCHUYT	515.123.8248	07-JUN-94	AC_ACCOUNT	8300
179	Shelley	Higgins	SHIGGINS	515.123.8249	07-JUN-94	AC_ACCOUNT	8300
180	William	Gietz	WGIEZT	515.123.8250	07-JUN-94	AC_ACCOUNT	8300
181	Denise	Baer	DBAER	515.123.8251	07-JUN-94	AC_ACCOUNT	8300
182	John	Fedorov	JFEDOROV	515.123.8252	07-JUN-94	AC_ACCOUNT	8300
183	Ismael	Sciarra	ISCIARRA	515.123.8253	07-JUN-94	AC_ACCOUNT	8300
184	Jose	Tyebati	JTYEBATI	515.123.8254	07-JUN-94	AC_ACCOUNT	8300
185	Timothy	Gauss	TGAUSS	515.123.8255	07-JUN-94	AC_ACCOUNT	8300
186	Rafael	Whalen	RWHALEN	515.123.8256	07-JUN-94	AC_ACCOUNT	8300
187	Kevin	Greenberg	KGREENBERG	515.123.8257	07-JUN-94	AC_ACCOUNT	8300
188	Jay	Smith	JSMITH	515.123.8258	07-JUN-94	AC_ACCOUNT	8300
189	Greg	Deane	GDEANE	515.123.8259	07-JUN-94	AC_ACCOUNT	8300
190	Cheryl	Chae	CCHAEE	515.123.8260	07-JUN-94	AC_ACCOUNT	8300
191	David	Lee	DLEE	515.123.8261	07-JUN-94	AC_ACCOUNT	8300
192	Shirley	Grant	SGRANT	515.123.8262	07-JUN-94	AC_ACCOUNT	8300
193	Robert	Kalita	RKALITA	515.123.8263	07-JUN-94	AC_ACCOUNT	8300
194	Elizabeth	Bratley	EBRATLEY	515.123.8264	07-JUN-94	AC_ACCOUNT	8300
195	Val	Ullrich	VULLRICH	515.123.8265	07-JUN-94	AC_ACCOUNT	8300
196	Samuel	McCoy	SMCCOY	515.123.8266	07-JUN-94	AC_ACCOUNT	8300
197	Pat	Haas	PHAAS	515.123.8267	07-JUN-94	AC_ACCOUNT	8300
198	Shelley	Stevens	SSTEVENS	515.123.8268	07-JUN-94	AC_ACCOUNT	8300
199	Walter	Taylor	WTAYLOR	515.123.8269	07-JUN-94	AC_ACCOUNT	8300
200	Renske	Adams	RADAMS	515.123.8270	07-JUN-94	AC_ACCOUNT	8300
201	Parto	Schuyt	PSCHUYT	515.123.8271	07-JUN-94	AC_ACCOUNT	8300
202	Shelley	Higgins	SHIGGINS	515.123.8272	07-JUN-94	AC_ACCOUNT	8300
203	William	Gietz	WGIEZT	515.123.8273	07-JUN-94	AC_ACCOUNT	8300
204	Denise	Baer	DBAER	515.123.8274	07-JUN-94	AC_ACCOUNT	8300
205	John	Fedorov	JFEDOROV	515.123.8275	07-JUN-94	AC_ACCOUNT	8300
206	Ismael	Sciarra	ISCIARRA	515.123.8276	07-JUN-94	AC_ACCOUNT	8300
207	Jose	Tyebati	JTYEBATI	515.123.8277	07-JUN-94	AC_ACCOUNT	8300
208	Timothy	Gauss	TGAUSS	515.123.8278	07-JUN-94	AC_ACCOUNT	8300
209	Rafael	Whalen	RWHALEN	515.123.8279	07-JUN-94	AC_ACCOUNT	8300
210	Kevin	Greenberg	KGREENBERG	515.123.8280	07-JUN-94	AC_ACCOUNT	8300
211	Jay	Smith	JSMITH	515.123.8281	07-JUN-94	AC_ACCOUNT	8300
212	Greg	Deane	GDEANE	515.123.8282	07-JUN-94	AC_ACCOUNT	8300
213	Cheryl	Chae	CCHAEE	515.123.8283	07-JUN-94	AC_ACCOUNT	8300
214	David	Lee	DLEE	515.123.8284	07-JUN-94	AC_ACCOUNT	8300
215	Shirley	Grant	SGRANT	515.123.8285	07-JUN-94	AC_ACCOUNT	8300
216	Robert	Kalita	RKALITA	515.123.8286	07-JUN-94	AC_ACCOUNT	8300
217	Elizabeth	Bratley	EBRATLEY	515.123.8287	07-JUN-94	AC_ACCOUNT	8300
218	Val	Ullrich	VULLRICH	515.123.8288	07-JUN-94	AC_ACCOUNT	8300
219	Samuel	McCoy	SMCCOY	515.123.8289	07-JUN-94	AC_ACCOUNT	8300
220	Pat	Haas	PHAAS	515.123.8290	07-JUN-94	AC_ACCOUNT	8300
221	Shelley	Stevens	SSTEVENS	515.123.8291	07-JUN-94	AC_ACCOUNT	8300
222	Walter	Taylor	WTAYLOR	515.123.8292	07-JUN-94	AC_ACCOUNT	8300
223	Renske	Adams	RADAMS	515.123.8293	07-JUN-94	AC_ACCOUNT	8300
224	Parto	Schuyt	PSCHUYT	515.123.8294	07-JUN-94	AC_ACCOUNT	8300
225	Shelley	Higgins	SHIGGINS	515.123.8295	07-JUN-94	AC_ACCOUNT	8300
226	William	Gietz	WGIEZT	515.123.8296	07-JUN-94	AC_ACCOUNT	8300
227	Denise	Baer	DBAER	515.123.8297	07-JUN-94	AC_ACCOUNT	8300
228	John	Fedorov	JFEDOROV	515.123.8298	07-JUN-94	AC_ACCOUNT	8300
229	Ismael	Sciarra	ISCIARRA	515.123.8299	07-JUN-94	AC_ACCOUNT	8300
230	Jose	Tyebati	JTYEBATI	515.123.8300	07-JUN-94	AC_ACCOUNT	8300
231	Timothy	Gauss	TGAUSS	515.123.8301	07-JUN-94	AC_ACCOUNT	8300
232	Rafael	Whalen	RWHALEN	515.123.8302	07-JUN-94	AC_ACCOUNT	8300
233	Kevin	Greenberg	KGREENBERG	515.123.8303	07-JUN-94	AC_ACCOUNT	8300
234	Jay	Smith	JSMITH	515.123.8304	07-JUN-94	AC_ACCOUNT	8300
235	Greg	Deane	GDEANE	515.123.8305	07-JUN-94	AC_ACCOUNT	8300
236	Cheryl	Chae	CCHAEE	515.123.8306	07-JUN-94	AC_ACCOUNT	8300
237	David	Lee	DLEE	515.123.8307	07-JUN-94	AC_ACCOUNT	8300
238	Shirley	Grant	SGRANT	515.123.8308	07-JUN-94	AC_ACCOUNT	8300
239	Robert	Kalita	RKALITA	515.123.8309	07-JUN-94	AC_ACCOUNT	8300
240	Elizabeth	Bratley	EBRATLEY	515.123.8310	07-JUN-94	AC_ACCOUNT	8300
241	Val	Ullrich	VULLRICH	515.123.8311	07-JUN-94	AC_ACCOUNT	8300
242	Samuel	McCoy	SMCCOY	515.123.8312	07-JUN-94	AC_ACCOUNT	8300
243	Pat	Haas	PHAAS	515.123.8313	07-JUN-94	AC_ACCOUNT	8300
244	Shelley	Stevens	SSTEVENS	515.123.8314	07-JUN-94	AC_ACCOUNT	8300
245	Walter	Taylor	WTAYLOR	515.123.8315	07-JUN-94	AC_ACCOUNT	8300
246	Renske	Adams	RADAMS	515.123.8316	07-JUN-94	AC_ACCOUNT	8300
247	Parto	Schuyt	PSCHUYT	515.123.8317	07-JUN-94	AC_ACCOUNT	8300
248	Shelley	Higgins	SHIGGINS	515.123.8318	07-JUN-94	AC_ACCOUNT	8300
249	William	Gietz	WGIEZT	515.123.8319	07-JUN-94	AC_ACCOUNT	8300
250	Denise	Baer	DBAER	515.123.8320	07-JUN-94	AC_ACCOUNT	8300
251	John	Fedorov	JFEDOROV	515.123.8321	07-JUN-94		

Advantages of Views

To restrict
data access

To make complex
queries easy



To provide data
independence

To present different
views of the same
data

Simple Views and Complex Views

Feature	Simple Views	Complex Views
Number of tables	One	One or more
Contain functions	No	Yes
Contain groups of data	No	Yes
DML operations through a view	Yes	Not always

Creating a View

- You embed a subquery in the `CREATE VIEW` statement:

```
CREATE [OR REPLACE] [FORCE|NOFORCE] VIEW view
  [(alias[, alias]...)]
  AS subquery
  [WITH CHECK OPTION [CONSTRAINT constraint]]
  [WITH READ ONLY [CONSTRAINT constraint]];
```

- The subquery can contain complex `SELECT` syntax.

OR REPLACE: Re-creates the view if it already exists.

FORCE: Creates the view regardless of whether or not the base tables exist.

NOFORCE: Creates view only if the base tables exist. (Default)

WITH CHECK OPTION: Specifies that only those rows that are accessible to the view can be inserted or updated.

WITH READ ONLY: Ensures that no DML operations can be performed on this view.

Creating a View

- Create the EMPVU80 view, which contains details of the employees in department 80:

```
CREATE VIEW empvu80
AS SELECT employee_id, last_name, salary
FROM employees
WHERE department_id = 80;
```

```
view EMPVU80 created.
```

- Describe the structure of the view by using the SQL*Plus DESCRIBE command:

```
DESCRIBE empvu80;
```


Creating a View

- Create a view by using column aliases in the subquery:

```
CREATE VIEW    salvu50
AS SELECT      employee_id ID_NUMBER, last_name NAME,
               salary*12 ANN_SALARY
FROM          employees
WHERE         department_id = 50;
```

```
view SALVU50 created.
```

- Select the columns from this view by the given alias names.

Retrieving Data from a View

```
SELECT *
```

```
FROM salvu50;
```

	ID_NUMBER	NAME	ANN_SALARY
1	124	Mourgos	69600
2	141	Rajs	42000
3	142	Davies	37200
4	143	Matos	31200
5	144	Vargas	30000

Modifying a View

- **Modify the EMPVU80 view by using a CREATE OR REPLACE VIEW clause.**
Add an alias for each column name:

```
CREATE OR REPLACE VIEW empvu80
(id_number, name, sal, department_id)
AS SELECT  employee_id, first_name || ' '
           || last_name, salary, department_id
FROM      employees
WHERE     department_id = 80;
```

```
view EMPVU80 created.
```

- **Column aliases in the CREATE OR REPLACE VIEW clause are listed in the same order as the columns in the subquery.**

Creating a Complex View

Create a complex view that contains group functions to display values from two tables:

```
CREATE OR REPLACE VIEW dept_sum_vu
(name, minsal, maxsal, avgsal)
AS SELECT    d.department_name, MIN(e.salary),
             MAX(e.salary), AVG(e.salary)
FROM        employees e JOIN departments d
ON          (e.department_id = d.department_id)
GROUP BY d.department_name;
```

```
view DEPT_SUM_VU created.
```

Rules for Performing DML Operations on a View

- You can usually perform DML operations on simple views.
- You cannot remove a row if the view contains the following:
 - Group functions
 - A `GROUP BY` clause
 - The `DISTINCT` keyword
 - The pseudocolumn `ROWNUM` keyword



Rules for Performing DML Operations on a View

You cannot modify data in a view if it contains:

- Group functions
- A `GROUP BY` clause
- The `DISTINCT` keyword
- The pseudocolumn `ROWNUM` keyword
- Columns defined by expressions

Rules for Performing DML Operations on a View

You cannot add data through a view if the view includes:

- Group functions
- A `GROUP BY` clause
- The `DISTINCT` keyword
- The pseudocolumn `ROWNUM` keyword
- Columns defined by expressions
- `NOT NULL` columns in the base tables that are not selected by the view

Using the WITH CHECK OPTION Clause

- You can ensure that DML operations performed on the view stay in the domain of the view by using the `WITH CHECK OPTION` clause:

```
CREATE OR REPLACE VIEW empvu20
AS SELECT      *
   FROM        employees
   WHERE       department id = 20
   WITH CHECK OPTION CONSTRAINT empvu20 ck ;
```

view EMPVU20 created.

- Any attempt to `INSERT` a row with a `department_id` other than 20, or to `UPDATE` the department number for any row in the view fails because it violates the `WITH CHECK OPTION` constraint.

Denying DML Operations

- You can ensure that no DML operations occur by adding the `WITH READ ONLY` option to your view definition.
- Any attempt to perform a DML operation on any row in the view results in an Oracle server error.



Denying DML Operations

```
CREATE OR REPLACE VIEW empvu10  
    (employee_number, employee_name, job_title)  
AS SELECT      employee_id, last_name, job_id  
    FROM        employees  
    WHERE       department_id = 10  
    WITH READ ONLY ;
```

view EMPVU10 created.

Removing a View

You can remove a view without losing data because a view is based on underlying tables in the database.

```
DROP VIEW view;
```

```
DROP VIEW empvu80;
```

```
view EMPVU80 dropped.
```

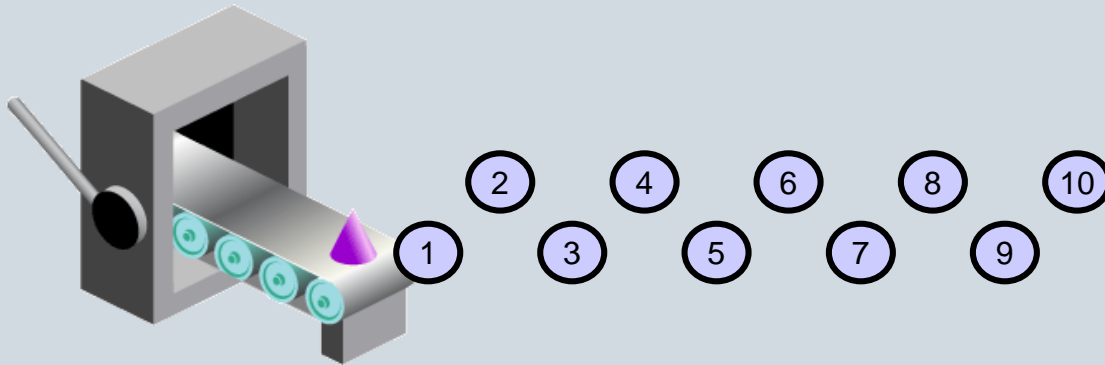
Sequences

Object	Description
Table	Basic unit of storage; composed of rows
View	Logically represents subsets of data from one or more tables
Sequence	Generates numeric values
Index	Improves the performance of some queries
Synonym	Gives alternative names to objects

Sequences

A sequence:

- Can automatically generate unique numbers
- Is a shareable object
- Can be used to create a primary key value
- Replaces application code
- Speeds up the efficiency of accessing sequence values when cached in memory



CREATE SEQUENCE Statement: Syntax

Define a sequence to generate sequential numbers automatically:

```
CREATE SEQUENCE sequence
    [INCREMENT BY n]
    [START WITH n]
    [{MAXVALUE n | NOMAXVALUE}]
    [{MINVALUE n | NOMINVALUE}]
    [{CYCLE | NOCYCLE}]
    [{CACHE n | NOCACHE}];
```

NOMAXVALUE : Specifies a maximum value of 10^{27} for an ascending sequence and -1 for a descending sequence. (Default option)

NOMINVALUE: Specifies a minimum value of 1 for an ascending sequence and $-(10^{26})$ for the descending sequence (Default)

CYCLE | NOCYCLE: specifies whether the sequence continues to generate values after reaching its maximum or minimum value. (NOCYCLE is default)

CACHE | NOCACHE: Specifies how many values the Oracle Server preallocates and keeps in memory. (Default 20 values)

Creating a Sequence

- Create a sequence named `DEPT_DEPTID_SEQ` to be used for the primary key of the `DEPARTMENTS` table.
- Do not use the `CYCLE` option.

```
CREATE SEQUENCE dept_deptid_seq  
            INCREMENT BY 10  
            START WITH 120  
            MAXVALUE 9999  
            NOCACHE  
            NOCYCLE;
```

```
sequence DEPT_DEPTID_SEQ created.
```

NEXTVAL and CURRVAL Pseudocolumns

- NEXTVAL returns the next available sequence value. It returns a unique value every time it is referenced, even for different users.
- CURRVAL obtains the current sequence value.
- NEXTVAL must be issued for that sequence before CURRVAL contains a value.

Using a Sequence

- Insert a new department named “Support” in location ID 2500:

```
INSERT INTO departments (department_id,  
                        department_name, location_id)  
VALUES (dept_deptid_seq.NEXTVAL,  
      'Support', 2500);
```

```
1 rows inserted
```

- View the current value for the DEPT_DEPTID_SEQ sequence:

```
SELECT dept_deptid_seq.CURRVAL  
FROM dual;
```

Caching Sequence Values

- Caching sequence values in memory gives faster access to those values.
- Gaps in sequence values can occur when:
 - A rollback occurs
 - The system crashes
 - A sequence is used in another table

Modifying a Sequence

Change the increment value, maximum value, minimum value, cycle option, or cache option:

```
ALTER SEQUENCE dept_deptid_seq  
        INCREMENT BY 20  
        MAXVALUE 999999  
        NOCACHE  
        NOCYCLE;
```

```
sequence DEPT_DEPTID_SEQ altered.
```

Guidelines for Modifying a Sequence

- You must be the owner or have the `ALTER` privilege for the sequence.
- Only future sequence numbers are affected.
- The sequence must be dropped and re-created to restart the sequence at a different number.
- Some validation is performed.
- To remove a sequence, use the `DROP` statement:

```
DROP SEQUENCE dept_deptid_seq;
```

```
sequence DEPT_DEPTID_SEQ dropped.
```

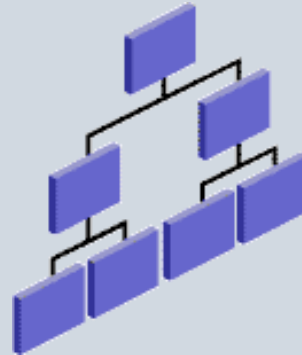
Indexes

Object	Description
Table	Basic unit of storage; composed of rows
View	Logically represents subsets of data from one or more tables
Sequence	Generates numeric values
Index	Improves the performance of some queries
Synonym	Gives alternative names to objects

Indexes

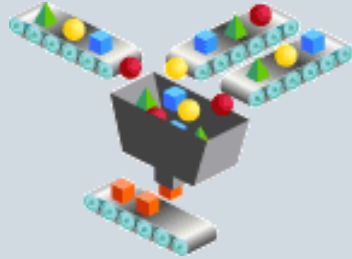
An index:

- Is a schema object
- Can be used by the Oracle server to speed up the retrieval of rows by using a pointer
- Can reduce disk input/output (I/O) by using a rapid path access method to locate data quickly
- Is dependent on the table that it indexes
- Is used and maintained automatically by the Oracle server



How Are Indexes Created?

- Automatically: A unique index is created automatically when you define a `PRIMARY KEY` or `UNIQUE` constraint in a table definition.



- Manually: Users can create nonunique indexes on columns to speed up access to the rows.



Index Creation Guidelines

Create an index when:

- ✓ A column contains a wide range of values
- ✓ A column contains a large number of null values
- ✓ One or more columns are frequently used together in a `WHERE` clause or a join condition
- ✓ The table is large and most queries are expected to retrieve less than 2% to 4% of the rows in the table

Do not create an index when:

- ✗ The columns are not often used as a condition in the query
- ✗ The table is small or most queries are expected to retrieve more than 2% to 4% of the rows in the table
- ✗ The table is updated frequently
- ✗ The indexed columns are referenced as part of an expression

Synonyms

Object	Description
Table	Basic unit of storage; composed of rows
View	Logically represents subsets of data from one or more tables
Sequence	Generates numeric values
Index	Improves the performance of some queries
Synonym	Gives alternative names to objects

Creating a Synonym for an Object

Simplify access to objects by creating a synonym (another name for an object). With synonyms, you can:

- Create an easier reference to a table that is owned by another user
- Shorten lengthy object names

```
CREATE [PUBLIC] SYNONYM synonym  
FOR    object;
```

Creating and Removing Synonyms

- Create a shortened name for the DEPT_SUM_VU view:

```
CREATE SYNONYM d_sum  
FOR dept_sum_vu;  
synonym D_SUM created.
```

- Drop a synonym:

```
DROP SYNONYM d_sum;  
synonym D_SUM dropped.
```