UNIT 7: DB2 UTILITIES

OVERVIEW

- **CATEGORIES OF DB2 UTILITIES**
- **LOAD UTILITY**

Figure: 7.1 DB2 Utilities

CATEGORIES OF DB2 UTILITIES

- **DATA CONSISTENCY UTILITIES**
- **BACKUP AND RECOVERY UTILITIES.**
- **DATA ORGANIZATION UTILITIES.**
- **CATALOG MANIPULATION UTILITIES**

Figure 7.2Categories of DB2 Utilities

Notes:

DATA CONSISTENCY UTILITIES

The Consistency of data in a database is paramount important and so it must be controlled and monitored. The data consistency utilities are used to monitor, control and administer the data consistency errors.

Three Data consistency utilities

- **CHECK**
- **REPAIR**
- **REPORT**

CHECK:

The CHECK utility checks the integrity of data structures. It has two purposes.

- **The first is to check the referential integrity between two tables, displaying and potentially resolving referential constraint violation.**

- **The second purpose of the CHECK utility is to check DB2 indexes for consistency.**

This consists of comparing the key values of the indexed columns to their corresponding table values, as well as evaluating the RIDs in the tables and indexes being checked.
The CHECK utility has two options CHECK DATA and CHECK INDEX.

Figure 7.3 Data Consistency Utilities

DATA CONSISTENCY UTILITIES (Cont.)

REPAIR:

The REPAIR utility is designed to modify DB2 data and associated data structures when there is an error or problem.

There are 3 distinct uses

- **The first is to test the DBD definitions in the DB2 directory and to synchronies the DB2 catalog database information with the DB2 directory and the DBD definition.**
- **The second is to physically change specific locations in a data set.**
- **The third and final type of REPAIR is to reset pending flags that are erroneously set.**

REPORT:

Two types of reports can be generated with the REPORT UTILITY.

- **The first is a table space set report showing the names of all tables' spaces and table spaces and tables tied together by referential integrity.**
- **The second type of REPORT utility, the REPORT RECOVERY can be used to generate a report on table space recovery information.**

Figure: 7.4 Data Consistency Utilities (Cont.)

BACKUP AND RECOVERY UTILITIES

The backup and recovery utilities supplied with DB2 are very complex. They remove the burden of database recovery from the DBA and place it with the DBMS. The main backup and recovery utilities are

COPY
MERGECOPY
RECOVER

COPY:
The COPY utility is used to create an image copy, back up data set for a complex table space or a single partition of an all space.

MERGECOPY:
The MERGECOPY utility combines multiple incremental image copy data sets into a new full or incremental image copy data set.

RECOVER:
The RECOVER utility is used to restore DB2 table spaces and indexes to a specific point in time. You can run two forms of RECOVER utility. RECOVER TABLESPACE and RECOVER INDEX. The RECOVER TABLESPACE restores table spaces to a current or previous state, whereas the RECOVER INDEX utility can be used to re-create, indexes from current data.

Figure: 7.5 Backup and recovery utilities.

DATA ORGANIZATION UTILITIES

The data organization utilities affect the physical data sets of the DB2 objects for which they are run. Rows of data and their sequence are affected by these utilities. There are 2 data organization utilities

LOAD
REORG

LOAD:

The LOAD utility is used to accomplish bulk inserts to DB2 tables. It can add rows to a table retaining the current data or it can replace the existing rows with new data.

REORG
The REORG utility can be used recognizes DB2 table spaces and indexes thereby improving the efficiency of the access to those objects. Reorganization also re-clusters data, resets free space to amount specified in the CREATE DDL and delete and redefines the underlying VSAM data sets for STOGROUP defined object.

Figure: 7.6 Data organization utilities

Notes:

CATALOG MANIPULATION UTILITIES

The DB2 catalog and directory are essential for the proper functioning of the DB2 subsystem.

It has RUNSTATS utility.

RUNSTATS:

The RUNSTATS utility collects statistical information for DB2 tables, table spaces, partitions, indexes and columns.

It can place this information into the DB2 Catalog Tables. The DB2 optimiser for determining the optimal access paths for the SQL queries reads the tables.

The information can be queried using SQL statements.

Figure: 7.7 Catalog Manipulation Utilities

Notes:

DATA UTILITIES - LOAD

LOAD - Loads the records in INPUT SEQUENCE in one or more tables of the same table spaces.

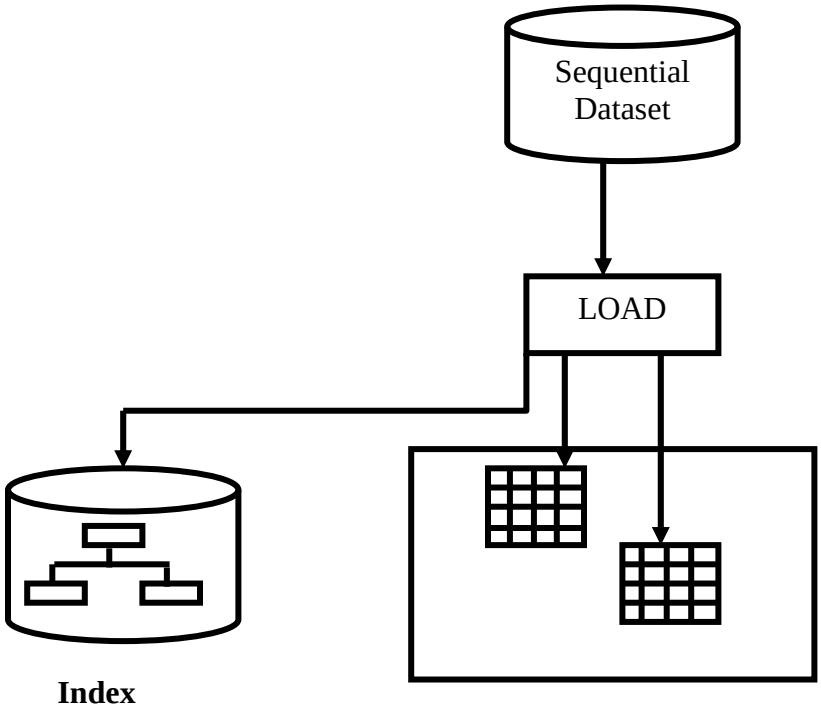


Figure: 7.8 Data utilities – Load

Notes:

Besides the CHECK DATA UTILITY, we also have load utility. It provides a way to LOAD a self-referencing table.

Load will “load” the input records from the sequential file in input file record sequence.

LOADING DATA IN ONE TABLE

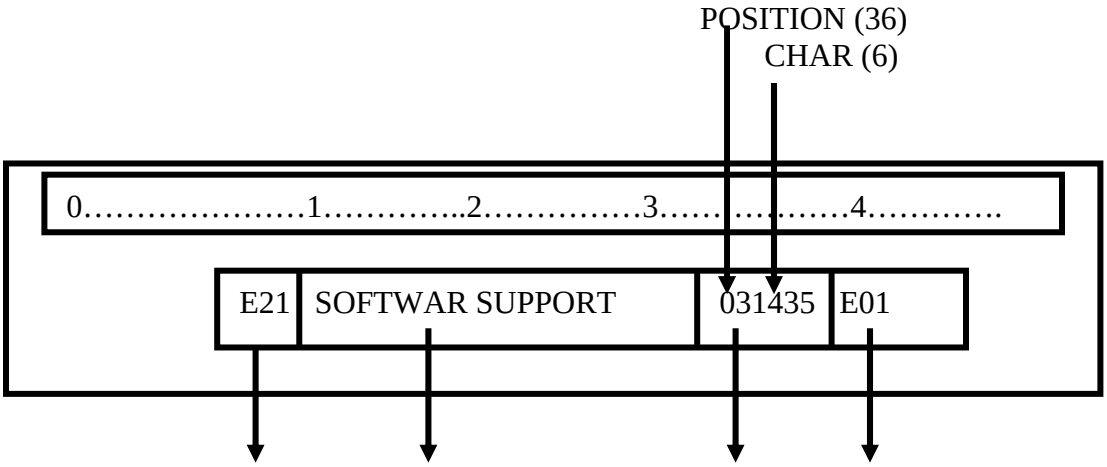


TABLE
DEPT

DEPTNO	DEPTNAME	MGRNO	ADMRDEPT
E21	SOFTWARE SUPPORT	031435	E01

```
LOAD DATA
INTO TABLE DEPT
      (DEPTNO       POSITION (7)    CHAR (3),
      (DEPTNAME     POSITION (10)   CHAR (26),
      (MGRNO        POSITION (36)   CHAR (6),
      (ADMRDEPT     POSITION (42)   CHAR (3))
```

TARGET COLUMN

INPUT FIELD LOCATION

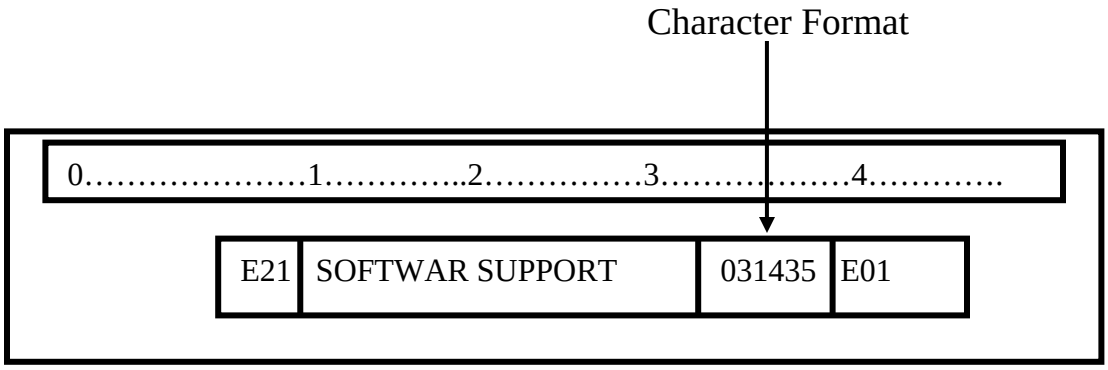
INPUT FIELD TYPE AND LENGTH

Figure:9 loading Data in One table

You see an example of the LOAD utility's control statements needed to load data into a single table.

DATA TYPE CONVERSION

Suppose that
- MGRNO was defined as INTEGER in the DEPT table, and
- The input dataset is identical to the one in the previous example.



Defined as INTEGER when
CREATE TABLE was performed

TABLE DEPT

DEPTNO	DEPT NAME	MGRNO	ADMRDEPT
E21	SOFTWARE SUPPORT	031435	E01

```
LOAD DATA
    INTO TABLE DEPT
        (DEPTNO       POSITION (7)    CHAR (3),
        (DEPTNAME     POSITION (10)   CHAR (26),
        (MGRNO        POSITION (36)   INTEGER EXTERNAL(6),
        (ADMRDEPT     POSITION (42)   CHAR (3))
```

In some cases, the data types of the input record field and the target column don't match. In the example, the "INTEGER EXTERNAL" keyword tells DB2 that the record field contains numeric data formatted as characters. The LOAD utility will perform the necessary data conversion.

LOADING NULL VALUES

Setting columns to default values

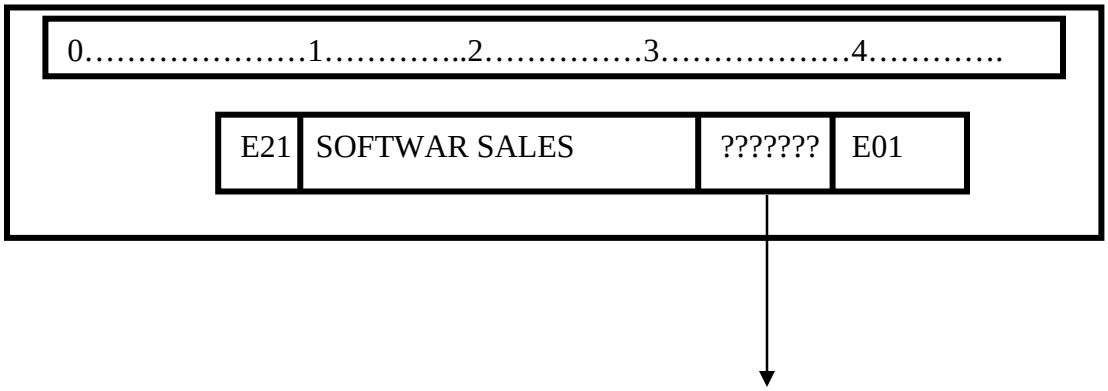


TABLE DEPT

DEPTNO	DEPT NAME	MGRNO	ADMRDEPT
E21	SOFTWARE SUPPORT	---------	E01

The MGRNO column allows NULL values so NULL values So NULL is its default.

```
LOAD DATA
      INTO TABLE DEPT
            (DEPTNO        POSITION (7:9)    CHAR ,
            (DEPTNAME      POSITION (10:35) CHAR,
            (MGRNO         POSITION (36:41) CHAR
                                 DEFAULT (36:41) = '????????'.
            (ADMRDEPT      POSITION (42:44)        CHAR (3))
```

A recognizable string of question marks is used in this example to trigger the loading of NULL values in the column.

LOADING MULTIPLE TABLES IN A TABLESPACE

Loading different tables by testing an input field :

```
LOAD DATA
      INTO TABLE DEPT
            WHEN (51) = 'D'
            (DEPTNO  POSITION(7) CHAR(3),
            DEPTNAME POSITION……
            …….
            ……)

            INTO TABLE EMP
             WHEN (51) = 'E'
             (EMPNO  POSITION(1) CHAR(6),
             ……
             …….)
```

Remember that a DB2 table space can contain several tables.
The LOAD utility always works on a table space .
You can LOAD several tables from one given input dataset by including a record field that distinguishes the data for the different tables.

THE RESUME AND REPLCE PARAMETERS

Initial load :

- Empty table space
  - This is the default

```
LOAD DATA
        RESUME NO
        INTO TABLE EMP
```

Additional load :

- Non – empty tablespace
  - To load another table in the samplespace
  - To add rows to a non-empty table.

```
LOAD DATA
        RESUME YES
        INTO TABLE EMP
```

Replace old data :

- Reset a tablespace and related indexes

To empty before loading

```
LOAD DATA
        REPLACE
        INTO TABLE EMP
```

Easy way to refresh data

This keyword tells DB2 if the tablespace(not the table) is supposed to be empty or not. If not empty, it tells DB2 what to do with the data contained in the tablespace :
Keep it(RESUME YES), or discard ALL data in the tablespace(REPLACE).