DB2 SQL Workshop for Experienced Users (Course Code CF13)

Lab Set Up Guide

ERC 5.0

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<table>
<thead>
<tr>
<th>Trademark</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIX</td>
<td>AS/400</td>
</tr>
<tr>
<td>DB2</td>
<td>DB2 Universal Database</td>
</tr>
<tr>
<td>OS/2</td>
<td>OS/390</td>
</tr>
<tr>
<td>Perform</td>
<td>PowerPC</td>
</tr>
<tr>
<td>QMF</td>
<td>SQL/DS</td>
</tr>
<tr>
<td>DataJoiner</td>
<td>IBM</td>
</tr>
<tr>
<td>OS/400</td>
<td></td>
</tr>
<tr>
<td>PS/2</td>
<td></td>
</tr>
</tbody>
</table>

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## Contents

**Trademarks** ................................................................. v

**Purpose** ........................................................................ vii

**Requirements** ............................................................. 1
  Hardware Requirements for Workstations ................................ 1
  Hardware Requirements for OS/390 ....................................... 2
  Software Requirements for DB2 UDB UNIX, Windows, OS/2 .... 2
  Software Requirements for OS/390 ....................................... 3
  Teams ............................................................................ 4
  Userids .......................................................................... 4
  Authorities for Userids .................................................... 4
  DB2 Authorities ............................................................... 5
  Teams ............................................................................ 6
  Userids .......................................................................... 6
  Data Sets ......................................................................... 6
  Authorities for Userids .................................................... 6
  DB2 Authorities ............................................................... 7

**Set Up Instructions** ...................................................... 9
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Purpose

This Lab Set Up Guide provides directions for installing, preparing, and verifying the lab hardware and software in preparation for conducting a class of course CF13. The Requirements sections of this document may also be used to determine the specific hardware and software needed to conduct a class.
Requirements

The following sections list the hardware, software, and other materials needed to set up a lab set to conduct a class of course CF13.

Hardware Requirements

Hardware Requirements for Workstations

The following table lists the hardware needed to prepare one student lab set. When preparing for a class, multiply the items below by the number of lab sets needed for the class Hardware requirements. You don't need a Client/Server environment for this course so it is probably easiest to set up each workstation with the code for DB2 single user.

Table 1: DB2 UDB for UNIX, Windows, OS/2 Hardware for one student lab set

<table>
<thead>
<tr>
<th>Machine Type</th>
<th>Model</th>
<th>Minimum Memory</th>
<th>Minimum Free DASD</th>
<th>Features (Name)</th>
<th>Feature Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workstation</td>
<td>any</td>
<td>32M</td>
<td>400MB</td>
<td>CD-ROM</td>
<td>N/A</td>
</tr>
</tbody>
</table>

The following table lists any additional hardware needed that is not part of the student lab sets. This hardware is only needed if you run the course using a client server environment with the following machine as server.

Table 2: UDB Hardware not part of student lab sets

<table>
<thead>
<tr>
<th>Machine Type</th>
<th>Model</th>
<th>Minimum Memory</th>
<th>Minimum Free DASD</th>
<th>Features (Name)</th>
<th>Feature Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workstation  - Risc System/6000 or PS/2</td>
<td>any other than PowerPC</td>
<td>64M</td>
<td>500MB</td>
<td>CD-ROM</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Hardware Requirements for OS/390

The following table lists the hardware needed to prepare one student lab set. When preparing for a class, multiply the items below by the number of lab sets needed for the class.

**Table 3: OS/390 Hardware for one student lab set**

<table>
<thead>
<tr>
<th>Machine</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anything that allows the student to use a TSO session</td>
<td></td>
</tr>
</tbody>
</table>

The following table lists any additional hardware needed that is not part of the student lab sets.

**Table 4: OS/390 Hardware not part of student lab sets**

<table>
<thead>
<tr>
<th>Machine</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>An OS/390 system that runs DB2 V6R1 or later. SPUFI must be accessible to students. QMF and other tools that access DB2 for OS/390 may also be made available at the instructor’s discretion.</td>
<td></td>
</tr>
</tbody>
</table>

Software Requirements

Software Requirements for DB2 UDB UNIX, Windows, OS/2

The following table lists the software needed to prepare the student and/or instructor lab set(s). When preparing for a class, be sure you have the correct number of licensed copies of any non-IBM software.

**Table 5: UDB Software for one student lab set**

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Release Version</th>
<th>LPPs</th>
<th>OPPs</th>
<th>Non-IBM Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS/2</td>
<td>Warp 3 or later</td>
<td>DB2 for OS/2 V7.2 or later</td>
<td>Lab files setup diskette</td>
<td></td>
</tr>
<tr>
<td>Windows</td>
<td>Latest fixpack</td>
<td>DB2 for Windows V7.2 or later</td>
<td>Lab files setup diskette</td>
<td></td>
</tr>
<tr>
<td>Windows 95</td>
<td></td>
<td>DB2 for Windows V7.2 or later</td>
<td>Lab files setup diskette</td>
<td></td>
</tr>
</tbody>
</table>
Table 5: UDB Software for one student lab set

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Release Version</th>
<th>LPPs</th>
<th>OPPs</th>
<th>Non-IBM Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIX</td>
<td>4.1 or later</td>
<td>DB2 for AIX V7.2 or later</td>
<td>Lab files setup diskette</td>
<td></td>
</tr>
</tbody>
</table>

Software Requirements for OS/390

DB2 for OS/390 V6R1 or later. SPUFI must be accessible to students. QMF and other tools that access DB2 for OS/390 may also be made available at the instructor's discretion.

Product Document Requirements

The following table lists documentation needed to conduct the class. Quantities are specified for each class, each lab set, or each student.

Table 6: Product Documentation needed for class

<table>
<thead>
<tr>
<th>Document Name</th>
<th>Form Number</th>
<th>Entire Class</th>
<th>Each Lab Set</th>
<th>Each Student</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM SQL Reference</td>
<td>SC26-8416</td>
<td></td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>IBM SQL Reference for DB2 for OS/390</td>
<td>SC26-9014</td>
<td></td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>IBM SQL Reference for DB2 UDB for UNIX, Windows and OS/2 Vol1&amp;2</td>
<td>SC09-2847, SC09-2848</td>
<td></td>
<td></td>
<td>✔</td>
</tr>
</tbody>
</table>

Note: It is only necessary to supply the manuals for the platforms being used in the lab environment.

Special Materials Requirements

The following table lists any special materials or supplies such as configuration diskettes, project tapes, or bugged logic cards needed to conduct the class. Quantities are specified for each class, each lab set, or each student.
The following sections describe the environment for the lab exercises.

**Note:** On Windows environment be careful. Do not use the default Windows administrator userid `administrator`. Use a userid with a maximum length of 8 characters.

**Note:** The subsequent steps apply to lab setups using a client/server environment. If you use a single user environment, the steps listed below are not necessary. In this case, one workstation with a local DB2 must be provided for each team.

**Teams**

The students will perform the lab exercises in teams or alone. One workstation should be provided for each team or student.

**Userids**

**Instructor Userid**

For each course, the instructor should have a userid through which he can connect to the server.

**Userids for Teams**

Each team should have a unique userid which allows to connect to the server.

**Authorities for Userids**

**Authorities for Instructor Userids**

The instructor userid must have the following authorizations:

- The instructor userid must be able to connect to the server.

In addition, the instructor userids must have authorities for the DB2 systems used by the class.

**Authorities for Student Userids**

The student userids, i.e., the userids for the teams, must have the following authorizations:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Entire Class</th>
<th>Each Lab Set</th>
<th>Each Student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration Diskette</td>
<td>Used to configure student and instructor systems</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

**Table 7: Special Materials needed for class**

- **Item:** Configuration Diskette
  - **Description:** Used to configure student and instructor systems
  - **Entire Class:**
  - **Each Lab Set:**
  - **Each Student:** ✓
• Each student userid must be able to connect to SAMPLE database.

In addition, the student userids must have authorities for the DB2 systems of their team as described later on.

**DB2 Authorities**

**DB2 Authorities for Instructor Userids**

The instructors userid should have the listed authorities if the database for the students is not created in advance.

- SYSADM to create the SAMPLE database
- SELECT on sample tables WITH GRANT OPTION if the sample database was created by another userid.
- REFERENCES to sample tables DEPARTMENT and EMPLOYEE WITH GRANT OPTION if the sample database was created by another userid.

**DB2 Authorities for Student Userids**

The userids for a team should have the following authorities if a client server environment is used.

- CONNECT TO SAMPLE.
- SELECT ON SAMPLE TABLES / VIEWS that are provided.
- REFERENCE to sample tables EMPLOYEE and DEPARTMENT (Unit 3, add foreign key).
- CREATETAB in SAMPLE database.
Lab Environment for OS/390

The following sections describe the environment for the lab exercises.

Teams

The students will perform the lab exercises in teams or alone. One UserID should be provided for each team or student.

Userids

**Instructor Userid**

For each course, the instructor should have a userid through which he can log on to the OS/390 system, used during the course.

**Userids for Teams**

Each team should have a userid which allows to log on to the OS/390 system of used during the course.

Data Sets

**Data Sets for Instructor Userids**

Partitioned data set which can be used for SPUFI.

**Data Sets for Student Userids**

Partitioned data set which can be used for SPUFI.

Authorities for Userids

**Authorities for Instructor Userids**

The instructor userid must have the following authorizations:

- The instructor userid must be able to define and delete partitioned data set for the students.

In addition, the instructor userids must have authorities for the DB2 systems used by the class.

**Authorities for Student Userids**

The student userids, that is, the userids for the teams, must have the following authorizations:

- Each student userid must have read/write access to its partitioned data set which is used for SPUFI.
In addition, the student userids must have authorities for the DB2 systems of their team as described later on.

**DB2 Authorities**

**DB2 Authorities for Instructor Userids**

The instructors userid should have the listed authorities if the database and table space for the student has not been created in advance.

- CREATE DATABASE
- CREATE TABLESPACE
- USE OF STOGROUP, the stogroup used for the setup
- USE OF BUFFERPOOL, the bufferpool used for the setup
- SELECT on sample tables
- REFERENCES ON sample tables EMP and DEPT WITH GRANT OPTION

**DB2 Authorities for Student Userids**

The userids for a team should have the following authorities:

- CREATETAB in DATABASE, TABLESPACE that are provided.
- SELECT ON SAMPLE TABLES / VIEWS that are provided.
- REFERENCE to sample tables (unit 3, add foreign key)
- USE OF PLAN (SPUFI)
Set Up Instructions

Set Up Instructions for Environment with DB2 UDB UNIX, Windows, OS/2

The following describes the configurations of the student and/or lab set systems.

**Note:** If you do not use a client/server environment, you can provide a diskette containing the setup files. Each team can run the setup and use the diskette for their own environment at home.

**Step 1 - Operating system and DB2 setup**

- Install the workstation operating system(s) you want to use.
- Install DB2 V7.2 or later for the operating system(s) you chose.

**Step 2 - Retrieve Course Material from Repository**

If you have the files ready on a diskette, skip this point.

Retrieve the course material for course CF13 5.0 from the Worldwide Learning Services repository.

**Step 3 - Receive setup files**

If you have the files ready on a diskette, skip this point.

- Transfer the setup files to diskette.
- Use `cf135d01.exe` as the name of the diskette copy of the file.

**Step 4 - Set up a Workstation**

To set up a workstation, complete the following steps:

- Assuming you have created a subdirectory named CF13 on drive D using the command:
  
  - `mkdir d:\cf13`

- Make the cf113 subdirectory your current working directory:
  
  - `CD d:\cf13`

- Insert the diskette in the workstation for setup.
- Copy the setup file (`cf135labfiles.zip`) into the CF13 subdirectory using the command:
  
  - `Copy A:\cf135labfiles.zip D:\cf13\`

- Install the cf13 exercise files:
  
  - Unzip the file `cf135labfiles.zip` and supply requested information.

- This will result in the files described below:
For the installation on DB2 UDB on Workstations:

<table>
<thead>
<tr>
<th>File</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>cf13setup.cmd</td>
<td>Setup for CF13 (Windows NT and Windows 2000)</td>
</tr>
<tr>
<td>cf13setup.bat</td>
<td>Setup for CF13 (Windows 95)</td>
</tr>
<tr>
<td>cf13lab.db2</td>
<td>Create lab tables (WIN)</td>
</tr>
<tr>
<td>cflean.db2</td>
<td>Removes SAMPLE and LAB tables and views (all systems)</td>
</tr>
</tbody>
</table>

For the installation on DB2 UDB for OS390 or DB2 UDB Server:

<table>
<thead>
<tr>
<th>File</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>cfsendin.cmd</td>
<td>Command script for transfer of instructor files to PDS</td>
</tr>
<tr>
<td>cfsendst.cmd</td>
<td>Command script for transfer of student files to PDS</td>
</tr>
<tr>
<td>cfviews.db2</td>
<td>Create views on sample tables (OS/390 only)</td>
</tr>
<tr>
<td>cftabl.db2</td>
<td>Create sample tables with LIKE (OS/390 only)</td>
</tr>
<tr>
<td>cfsmpl.db2</td>
<td>Create sample tables with DDL (OS/390, DB2 UDB Server)</td>
</tr>
<tr>
<td>cfload.db2</td>
<td>Insert data into Sample Tables (OS/390, DB2 UDB Server)</td>
</tr>
</tbody>
</table>

To be executed for or by every student:

<table>
<thead>
<tr>
<th>File</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>cflab.db2</td>
<td>Create lab tables (OS/390, DB2 UDB Server)</td>
</tr>
<tr>
<td>cflean.db2</td>
<td>Removes SAMPLE and LAB tables and view (all systems)</td>
</tr>
</tbody>
</table>

All solutions have been placed in the \CF13\Sol directory:

<table>
<thead>
<tr>
<th>File</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>cf13e01.db2</td>
<td>Solution for Lab Exercise 1.</td>
</tr>
<tr>
<td>cf13e02.db2</td>
<td>Solution for Lab Exercise 2.</td>
</tr>
<tr>
<td>cf13e03.db2</td>
<td>Solution for Lab Exercise 3.</td>
</tr>
<tr>
<td>cf13e04.db2</td>
<td>Solution for Lab Exercise 4.</td>
</tr>
<tr>
<td>cf13e05.db2</td>
<td>Solution for Lab Exercise 5.</td>
</tr>
<tr>
<td>cf13e06.db2</td>
<td>Solution for Lab Exercise 6.</td>
</tr>
<tr>
<td>cf13e07.db2</td>
<td>Solution for Lab Exercise 7.</td>
</tr>
<tr>
<td>cf13e08.db2</td>
<td>Solution for Lab Exercise 8.</td>
</tr>
</tbody>
</table>

- The file `cf13setup.cmd` or `cf13setup.bat` to start DB2, create the SAMPLE database, connect to it, and execute the file `cf13lab.db2`.

- The file `cf13lab.db2` to create the CARS and the TESTEMP table and the views VDEPARTMENT, VEMPLOYEE, and VPROJECT which are used during some labs in Windows environment.
- The file **README.1ST** containing further information.

- To install the course:
  - Open a DB2 command window.
  - Change to drive D using the command: `D:`.
  - Change the subdirectory using the command: `cd CF13`.
  - Create the Objects using the command: 
    - `cf13setup.cmd` in Windows NT, Windows 2000 or AIX, or 
    - `cf13setup.bat` in Windows 95. 
  - If you use a client/server environment, create the TESTEMP table on each client using the command: `db2 -tvf cf13lab.db2`.
    This step is not necessary if a single DB2 is used on each machine for a team and you have already executed the `cf13setup` command on each machine.
  - For further information, consult the README.1ST file in the CF13 subdirectory.

**Step 5 - Test the lab environment**

- Connect to SAMPLE using the command: `db2 connect to sample`.
- Run the command: `db2 list tables for all`.
- Verify that all the tables described at the beginning of the lab guide were created. Use SELECTs to verify that each table contains data.

**END OF SETUP**
Set Up Instructions for OS/390

The following describes the configurations of the student and/or lab set systems.

**Note:** The views DEPARTMENT, EMPLOYEE, PROJECT, and EMP_ACT are used as SAMPLE TABLES during the course to match the content of the sample tables in DB2 UDB for workstations. The views only show those rows which are available on the workstation platforms.

Scripts are provided to create and load sample tables, if original sample tables have been modified and show different results than expected.

**Step 1 - Retrieve Course Material from Repository**

Retrieve the course material for course CF13 5.0 from the Worldwide Learning Services repository.

**Step 2 - Ensure That Instructor and Student Userids Have Been Set Up**

1. Ensure that instructor userids and the student userids have been defined and authorized for the proper OS/390 system and that they have the required authorities.

2. All OS/390 users (instructor and all student teams) should have allocated a PDS: userid.CF13.CNTL with the following information:

   Allocate New Data Set
   
   More:

   Data Set Name . . . . : userid.CF13.CNTL

   Management class . . . . (Blank for default management class)
   Storage class . . . . . (Blank for default storage class)
   Volume serial . . . . . (Blank for system default volume)
   Device type . . . . . (Generic unit or device address)
   Data class . . . . . . . CNTL (Blank for default data class)
   Space units . . . . . . TRACK (BLKS, TRKS, CYLS, KB, MB, BYTES or RECORDS)
   Average record unit . . . . . (M, K, or U)
   Primary quantity . . . . 2 (In above units)
   Secondary quantity . . . 2 (In above units)
   Directory blocks . . . . 6 (Zero for sequential data set) *
   Record format . . . . . FB
   Record length . . . . . 80
   Block size . . . . . . 4000
   Data set name type : PDS (LIBRARY, HFS, PDS, or blank) *
Step 3 - Send Lab Exercise Material to Instructor Userid

Log on to instructor userid and send the lab exercise files without changing the format and receive the lab exercise material as members of a partitioned dataset.

a. On MVS exit your ISPF Session or select the ISPF COMMAND SHELL (Option 6)
b. Modify - if necessary - the command script cf13sendin.cmd. This command script sends all necessary files from your workstation to OS/390.
c. From your workstation submit the following command: cf13sendin.cmd

Step 4 - Send Lab Exercise Material to Student Userid

Log on to every studentid userid and send the lab exercise files without changing the format and receive the lab exercise material as members of a partitioned dataset.

a. Create a PDF as described in step 2.
b. On MVS exit your ISPF Session or select the ISPF COMMAND SHELL (Option 6)
c. Modify - if necessary - the command script cf13sendst.cmd. This command script sends all necessary files from your workstation to OS/390.
d. From your workstation submit the following command: cf13sendst.cmd

Step 5a - Create views on sample tables (DSN8710)

If sample tables EMP, DEPT, PROJ and EMPPROJACT exists on DB2 for OS/390, corresponding view with the name EMPLOYEE, DEPARTMENT, PROJECT and EMP_ACT will be created by using SPUFI and execute the script cfviews.

It may be necessary to change the table schema to refer to existing tables.

All necessary privileges will be established.

Step 5b - Create table sample tables (if step 5a is not possible)

It is a common experience that the sample tables on OS/390 have been modified and can not be used to achieve the expected result during the lab sessions. Further more the contents of these sample tables may vary in different versions of DB2 for OS/390.

Creating consistent sample tables EMPLOYEE, DEPARTMENT, PROJECT and EMP_ACT to be used for this course can be done in two different ways.

a. Create your own tables based on DDL statements in member cfsampl
   i. Create a database and or tablespace for the class.
      Modify and use SPUFI to execute member cfsampl.
      All sample tables will be created.
b. Create your own tables based on sample tables in DB2 on OS/390.
   i. Modify and use SPUFI to execute member cftabl. All sample tables will be created.
c. Load data into sample tables
   i. Use SPUFI to execute member cfload.

**Step 6 - Create table TESTEMP and Views**

Using instructor userid, edit the member cflab in SPUFI. Complete the IN clause of the CREATE statement for the TESTEMP table. Enter the name of the database and tablespace you want to use for the table.

Execute the member cflab in SPUFI. The member creates the table TESTEMP. Also, the views VDEPARTMENT, VEMPLOYEE, and VPROJECT are created which must be used for the exercises of the outer join unit.

**Step 7 - Establish TESTEMP table**

Each team needs its own TESTEMP table. Copy or send the member cflab to the partitioned dataset of each team if you have not done so already, and run the member under each userid or tell the students that they should run the member.

If you want, you can provide the TESTEMP table once and tell the students they should use the following SQL statements to create and load their table TESTEMP:

```
CREATE TABLE TESTEMP LIKE userid.TESTEMP IN database-name
INSERT INTO TESTEMP SELECT * from userid.TESTEMP
```

**Step 8 - Verify that objects are created**

Verify that all the following objects are created. Use SELECT statements to test that the EMPTEST table contains data and that the views correspond to the descriptions in the Exercise Guides.

List of tables:

**Step 8 - Grant the students to the sample tables**

In Unit 2, create objects, the students will create a table and add foreign keys that references the sample tables DSN8x10.EMP and DSN8x10.DEPT. The required referential constraints must directly be defined on the base tables, that is, DSN8x10.DEPT and DSN8x10.EMP. They cannot be based on the views. Therefore, the students need the REFERENCE privilege for these tables. You can do this by means of the following SQL statement:

```
GRANT REFERENCES ON DSN8710.DEPT, DSN8710.EMP TO UserIDs
```

**END OF SETUP**
Verification Procedures

To verify the correct installation of the lab exercises, it is highly recommended that you perform all lab exercises once using a student userid.