LAB 01 - INSTANCE EXPLORATION
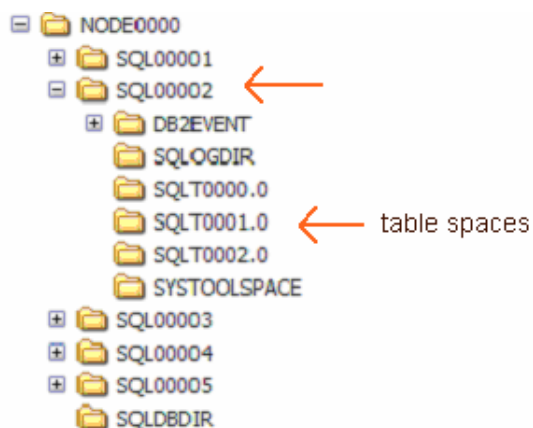
A. DB2 OPERATING SYSTEM DIRECTORIES AND FILES

Let's explore how installed DB2 looks on your Windows Operating system:

1. Open Windows Explorer:

   - My Computer ⇨ C: ⇨ DB2 ⇨ NODE0000

2. Look at directory **SQL0002**

   - This is for the SAMPLE database. True, we're exploring instances in this lab, but we still need to see how databases relate to instances and how each are placed on your operating system. We'll show you later how you know which SQL subdirectory goes with which database.

   ```
   ⊟ 📁 NODE0000
       ⊞ 📁 SQL00001
       ⊟ 📁 SQL00002    ⟵
           ⊞ 📁 DB2EVENT
             📁 SQLOGDIR
             📁 SQLT0000.0
             📁 SQLT0001.0   ⟵  table spaces
             📁 SQLT0002.0
             📁 SYSTOOLSPACE
       ⊞ 📁 SQL00003
       ⊞ 📁 SQL00004
       ⊞ 📁 SQL00005
         📁 SQLDBDIR
   ```

3. Browse the various table space directories and files

   - Did you find DMS and SMS types of table spaces?

   - Remember SMS are subdirectories, DMS are data file based like in Oracle

4. What do you suppose **SQLOGDIR** is?

   - Hint: it's a default directory

5. Can you find these special binary DB2 files? ⚠ Please, do **not** make changes!

   - SQLBP.1 & 2   (buffer pool info)

   - SQLSPCS.1 & 2   (table space info)

   - SQLOG*   (log control files)

   - SQLDBCON   (db configuration

6. To check where to find code is installed

   • Command Prompt ⇨ **db2set –all** (find and note location of DB2PATH)

   > **Note the following kind of DB2 profile registry variables:**
   >
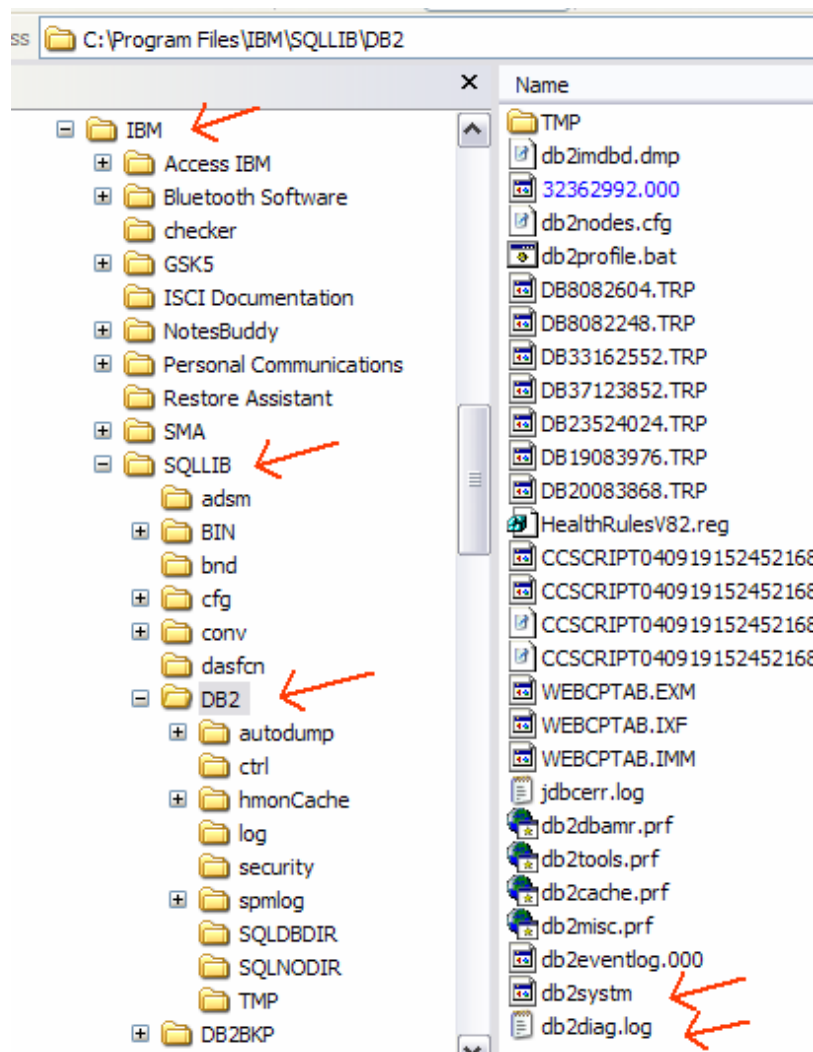   > Environment variables, denoted by [e]
   >
   > Instance level registry, denoted by [i]
   >
   > Global level registry, denoted by [g]
   >
   > Node level registry, denoted by [n]

7. Now, find that DB2path location by using:

   • Windows Explorer ⇨ Program Files ⇨ IBM ⇨ SQLLIB and explore the files at this location

8. Can you find folder for instance called **DB2**?

- Under **DB2** find file db2systm?
  - This is the dbm config binary file - Please, do **not** make changes!
- Can you find the diagnostic log?
- Can you find the binaries for all the DB2 utilities?

Section answers:

A4.   SQLLOGDIR is where your logs are written to

A6.   DB2PATH should be pointing to c:\program files\ibm\sqllib

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B. START AND STOP A DB2 INSTANCE

Open Windows command prompt:

1. **set db2instance**

   • environment variable shows current instance (somewhat like Oracle sid)

2. **db2stop**

   • Works by default against current instance

   • How long did this take? (Note: DB2 is always very quick to start)

   • db2 "stop dbm" is an alternative using the CLP; you can try it later when we learn how to use it

3. **db2start**

   • How long did this take?

4. Open Services: Services

   • Review all services starting with db2

Name △	Description	Status	Startup Type
DB2 - DB2-0	Allows applications to create, u...	Started	Automatic
DB2 - DB2BKP	Allows applications to create, u...		Manual
DB2 - DB2JNK	Allows applications to create, u...		Manual
DB2 Governor	Collects statistics for applicatio...		Manual
DB2 JDBC Applet Server	Provides JDBC server support f...	Started	Automatic
DB2 License Server	Monitors DB2 license compliance.	Started	Automatic
DB2 Remote Command Server	Supports remote DB2 command...	Started	Automatic
DB2 Security Server	Authenticates DB2 database u...	Started	Automatic
DB2 Warehouse Logger	Provides DB2 warehouse mess...		Manual
DB2 Warehouse Server	Controls the interaction of DB2...		Manual
DB2DAS - DB2DAS00	Supports local and remote data...	Started	Automatic

   • Find "**DB2 - DB2-0**" ⇨ right click on it ⇨ stop

      ▪ What do you suppose this services' naming convention means?

   • Start it again

Section answers:

B2.   db2stop should take between 1 and 2 seconds

B3.   db2start should take just under 3 seconds (DB2 is ALWAYS this fast starting!)

B4.   Windows service naming convention starts all DB2 services with DB2, then it uses "- [instance name]" for all instances running. Other DB2.... names are for remaining services, descriptions are available in the service window for each.

C. CLP INTRODUCTION

Note: This section is to demonstrate a *command line* way to interface with DB2 similar to using SQL*PLUS. Most of this can be done through various GUI tools in DB2 as well. We will explore the Control Center later to get you started on the DB2 GUI.
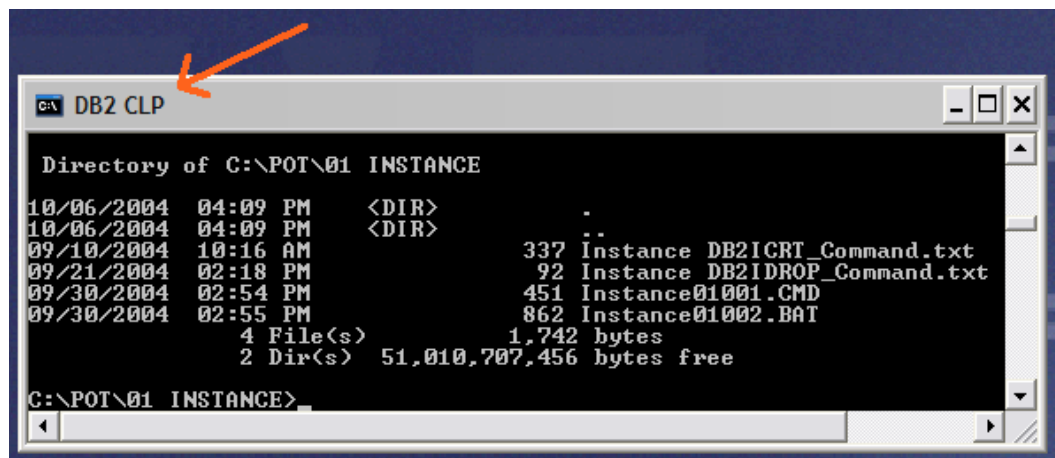

Note: Clarification on terms in this lab:

COMMAND PROMPT: Operating System command shell for Windows

WINDOWS EXPLORER: Operating System GUI for Windows

COMMAND WINDOW: DB2 command shell running in OS shell, but still in OS

COMMAND LINE PROCESSOR: DB2 command shell running interactively, not in OS

COMMAND EDITOR: DB2 command GUI tool

To start the CLP command window, open a Windows Command Prompt and type these:

1. **db2cmd**

   - This starts db2 shell over OS shell
   - This is usually called the "DB2 Command Window"
     - Although it is really a mode of the Command Line Processor (CLP)
   - Notice this is slightly different from Oracle SQL*PLUS:
     - You are still in the OS at this point with just a shell intercepting "db2" invocations
     - No logon (connect) is required to be interactive with some DB2 instance and database objects, like the configuration files for example
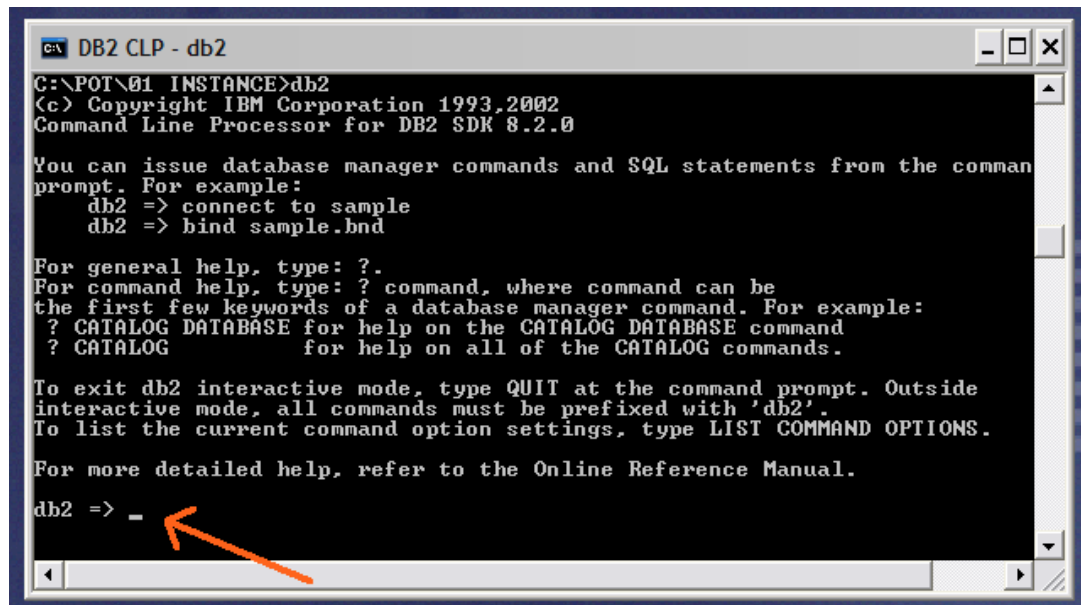
2. From the new command shell window you just opened, type**: db2 get dbm cfg**

   - Close the window you used to execute the DB2 command window, it will just confuse you

   - Notice use of "dbm" (data base manager = instance)

   - These are the instance configuration parameters

3. Type: **db2 get dbm cfg show detail** (all commands to be typed in the labs will be in bold font)

   - If you are not attached to the instance, you cannot get detailed information from it.

   - The "detail" will show temporary changes to the cfg settings (if any) so you need to be attached to the instance to '"find" this information

   - The "cfg" it is referencing is simply information in a binary file and saved changes are persistent; do you remember where it is located?

4. **db2 attach to db2**

5. **db2 get dbm cfg show detail**

6. **db2 get admin config**

   - This is the DB2 Administration Server or DAS settings

   - This is a special process that helps administrate communication between instances and databases, locally and remotely which has its own configuration settings

Try the CLP "interactive mode", type these:

7. **db2**

    • This is usually called the "DB2 Command Line Processor" or CLP

8. **get instance**

9. **!db2cc** (launches Control Center)

    • Click on SAMPLE database, then TABLES (this starts a database and session)

10. **list active databases**

    • Active databases have at least one connection to them by at least one application

11. **list applications show detail**
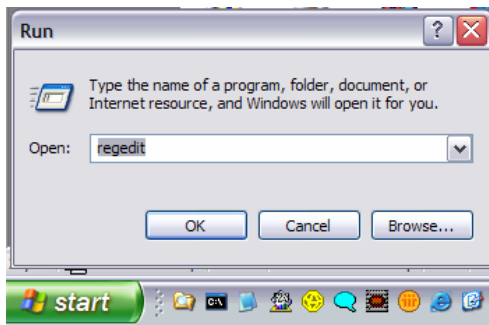
    • Oracle uses sessions for similar information

12. **Quit** (exits interactive mode)

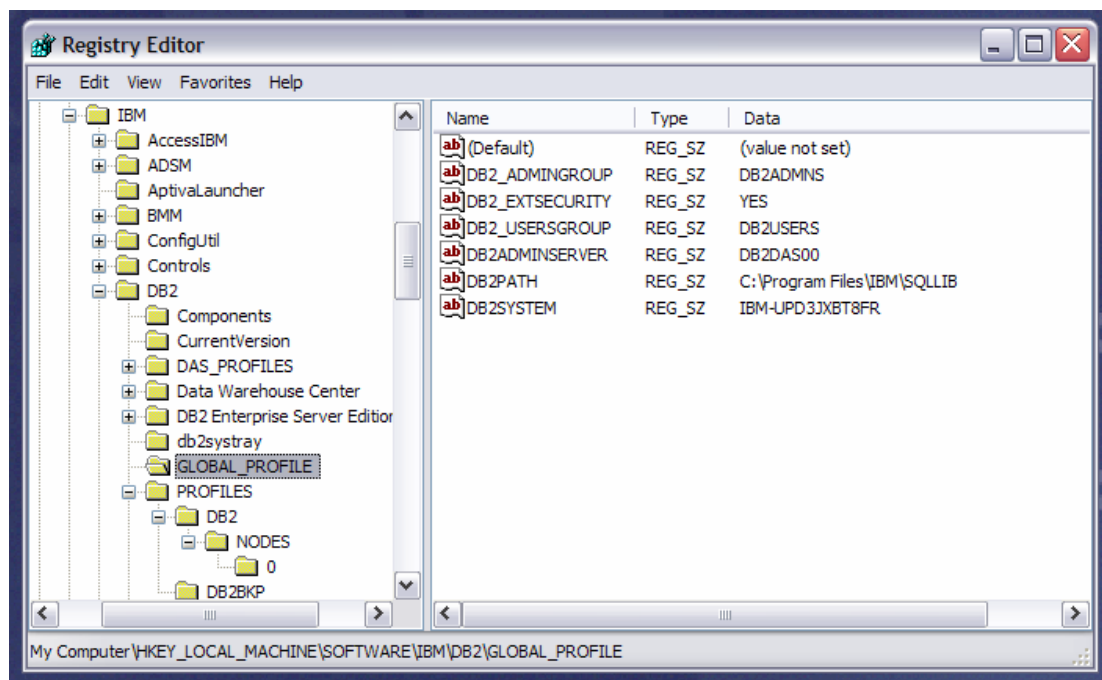**Section Answers:**

C3.   Config file is in C:/DB2/NODE0000/SQL0002/SQLDBCON

D. DB2 WINDOWS REGISTRY

1. Start ⇨ Run

2. Open ⇨ Regedit ⇨ OK ⚠ Please, do **not** make changes here!

3. Go to ⇨ HKEY_LOCAL_MACHINE\SOFTWARE\ IBM\DB2\PROFILES\

   • DB2 is the instance

   • GLOBAL_PROFILE is for all DB2 instances on server

   • Just note for now the various registers that are kept for DB2

E. CREATE A NEW DB2 INSTANCE

Note: DB2 instance creation on Windows:

1. Requires administration authority to run
2. Creates a Windows Service   (with "DB2 – [instance_name – node_name]" convention)
3. Creates an Instance Directory (usually …IBM/SQLLIB/instance_name)
4. Creates a Registry Key   (regedit, HKEY_LOCAL…)

Note: DB2 Instance creation on UNIX:

1. Sets environment variables DB2INSTANCE and PATH
   - Creates /SQLLIB subdirectory in $HOME of the SYSADM
   - Configures communication based on servers available protocol
2. Creates files
   - db2profile – for main environment variable settings
   - userprofile – for upgrade and additional environment variable settings
3. Requires instance owner ids to:
   - Run with root authority - creation of users and groups as well as other reasons require this
   - Have their own home file system and home directory to prevent environmental conflicts
   - Have SYSADMIN authority

Here's how we create a DB2 instance and then verify it in Windows:

1. Make sure you position yourself in the C:/POT/01 INSTANCE/ directory before continuing

2. Let's create a DB2 instance; from the DB2 Command Window: **db2icrt db2bkp**
   - That's it, Instance is created! For details on this command see file:
     C:/POT/01 INSTANCE/Instance db2icrt_command.TXT

3. Now let's check what happened in the services window:
   - Go to services window (Windows icon) and click Action ⇨ refresh
   - Find new service **db2bkp**
   - **Start this instance if it is not already started!** (You'll be using it later.)

4. Now let's check the instance directory:

- Windows Explorer ⇨ View ⇨ refresh
- Find C:\Program Files\IBM\SQLLIB folder
  - You should see your new instance folder DB2BKP

5. Now let's check the Windows registry:

- Go to regedit and refresh your view (Start ⇨ Run ⇨ regedit)
- Find your PROFILES folder again
  - You should see your new instance entries here

6. Perform other checks at DB2 Command Window to see you new instance:

- **db2set –L**   (shows available instance profiles)
- **db2ilist**   (shows same thing, but with some options)
- **db2 get instance**   (what is your default instance?)
- **set db2instance=db2bkp**   *
- **db2 get instance**   (you should be pointing to db2bkp instance now)

7. Now let's explore dropping instances:

- **db2icrt db2jnk**   (check to see if it created another instance)
- **db2idrop db2jnk**   (gets rid of this instance… that's it!)
  - This command only has one flag that it so force applications off before dropping, see: **Instance DB2IDROP_Command.txt**
  - Creating and dropping instances in DB2 is just that easy

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*   UNIX Korn Shell is: export db2instance=prod

UNIX C Shell is: setenv db2instance prod

F. CATALOG A NEW DB2 INSTANCE

Now that we know that the instance has been created, we need to catalog it. To catalog the instance manually with a script:

1. Got to a DB2 Command Window

2. Go to directory C:/POT/01 INSTANCE

3. Review script and execute it: **Instance01001.CMD**

    - To review scripts you can use "more [scriptname]" or use the Windows Explorer, click on the file and right click on [edit]

    - To execute a CMD script simply type the name of the file (you can even leave off .CMD)


Catalog an instance using the Control Center (CC):

4. First, exit from the Control Center before starting this (if you are in CC)

5. From a Command Window, create a new instance to practice with: **db2icrt db2jnk**

6. **db2cc**

    - Launches Control Center (CC)

    - You can also do this with: Start ⇨ All Programs ⇨ IBM DB2 ⇨ General Admin Tools ⇨ Control Center

    - Expand "All Systems" tree until you find **"Instances"**, right click on **instances** ⇨ Add…
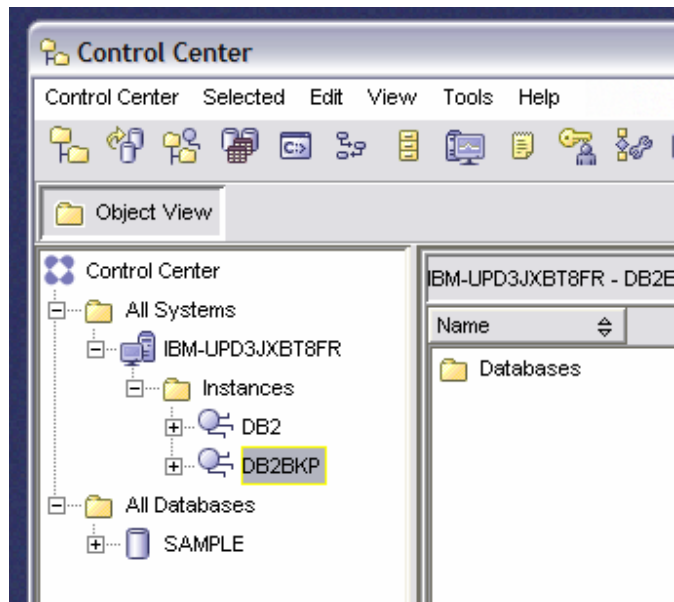
7. To fill in "Instance Name", click on [Discover] ⇨ find db2jnk ⇨ [OK]

8. Fill in instance node name with db2jnk

   • Notice [OK], [Apply] and [Show Command] buttons are now available to use
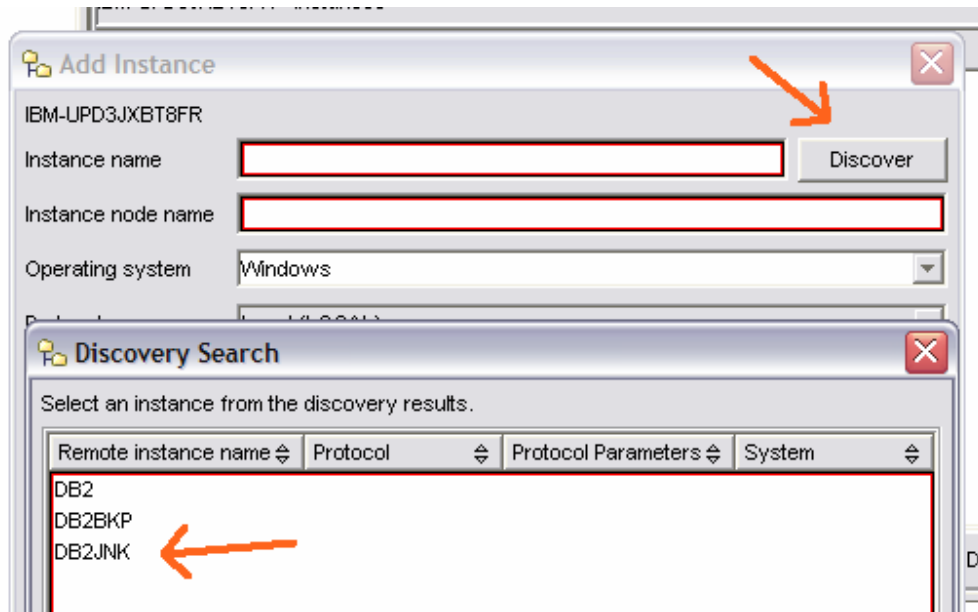
9. Click on [Show Command], review the DDL

   • Notice you can save this script

10. Close show command window [Close]

11. Click [Apply] to perform the instance catalog

12. Instance is now cataloged and should be viewable from CC

   • Right click instance and click [Refresh] button

   • Find cataloged instance

13. Drill down into the instance shown in CC

   • Notice only instance called "DB2" has a database associated with it so far

PREPARE FOR THE REST OF THE LABS

14. Execute this script to do preparation for further labs: **Instance01002.CMD**

G. EXTRA EXERCISES (SEE PRESENTATION SLIDES FOR HINTS ON SOLVING)

1. Change your CLP prompt to: "Your next wish master? "

2. Execute this: **select current date from sysibm.dummy**

   - What sqlcode did you get from this? How can you get more detail on that sqlcode?

3. Execute this: **select current date from sysibm.sysdummy1**

   - What is this similar to in Oracle?

Section Answers:

G1.   db2set db2_clpprompt="Your Wish Master? "

G2.   SQL0204N. DB2 ? SQL0204N. <name> is an undefined name...

G3.   SELECT SYSDATE FROM DUAL;