IBM DB2 at UW
(a mini-tutorial)

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DB2: what is it?

DB2 is a relational DBMS and a set of tools:
- a command-line interface to SQL
- an ESQL preprocessor for C language

This tutorial covers (briefly):
- How do I run it?
- Useful hints
- What if something goes wrong?

DB2 documentation:
⇒ will be available on-line from the course web page
First Steps

- **DB2 is only** available on
  ubuntu1604-000.student.cs.uwaterloo.ca and
  ubuntu1604-006.student.cs.uwaterloo.ca

- **your environment** should be set up correctly:
  <sh, bash, et al:>
  $ source ~db2inst2/sqllib/db2profile
  <csh, tcsh, et al:>
  $ source ~db2inst2/sqllib/db2cshrc

- you don’t need any DB2 password

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**Every CS348 student must have a UNIX account on** student.cs.
First Steps (example)

softbase.cs$ ssh ubuntu1604-000.student.cs.uwaterloo.ca
[...]
$ source ~db2inst2/sql/lib/db2profile
$ db2
(c) Copyright IBM Corporation 1993, 2007
Command Line Processor for DB2 Client 11.1.1.1

[...]

For more detailed help, refer to the Online Reference Manual.

db2 =>
db2 => connect to cs348

Database Connection Information

Database server = DB2/SUN 7.2.0
SQL authorization ID = DAVID
Local database alias = CS348

db2 =>

cs348 is the name of a database managed by DB2 for this class
Executing Queries

SQL statements can be entered directly at the db2 => prompt.

```
db2 => select aid, name 
```

```
db2 (cont.) => from david.author
```

<table>
<thead>
<tr>
<th>AID</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Toman, David</td>
</tr>
<tr>
<td>2</td>
<td>Chomicki, Jan</td>
</tr>
<tr>
<td>3</td>
<td>Saake, Gunter</td>
</tr>
</tbody>
</table>

3 record(s) selected.

ending line with \ allows entering long queries
ending with (<cr>) executes the query.

****** you will need this for your Assignments ******
What tables are there?

db2 => list tables

<table>
<thead>
<tr>
<th>Table/View</th>
<th>Schema</th>
<th>Type</th>
<th>Creation time</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTICLE</td>
<td>DAVID</td>
<td>T</td>
<td>2008-05-08-15.53.39</td>
</tr>
<tr>
<td>AUTHOR</td>
<td>DAVID</td>
<td>T</td>
<td>2008-05-08-15.53.36</td>
</tr>
<tr>
<td>BOOK</td>
<td>DAVID</td>
<td>T</td>
<td>2008-05-08-15.53.37</td>
</tr>
<tr>
<td>JOURNAL</td>
<td>DAVID</td>
<td>T</td>
<td>2008-05-08-15.53.38</td>
</tr>
<tr>
<td>PROCEEDINGS</td>
<td>DAVID</td>
<td>T</td>
<td>2008-05-08-15.53.38</td>
</tr>
<tr>
<td>PUBLICATION</td>
<td>DAVID</td>
<td>T</td>
<td>2008-05-08-15.53.36</td>
</tr>
<tr>
<td>WROTE</td>
<td>DAVID</td>
<td>T</td>
<td>2008-05-08-15.53.37</td>
</tr>
</tbody>
</table>

7 record(s) selected.
### Is that all?

```
db2 => list tables for all
```

<table>
<thead>
<tr>
<th>Table/View</th>
<th>Schema</th>
<th>Type</th>
<th>Creation time</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTICLE</td>
<td>DAVID</td>
<td>T</td>
<td>2008-05-08-15.53.39</td>
</tr>
<tr>
<td>AUTHOR</td>
<td>DAVID</td>
<td>T</td>
<td>2008-05-08-15.53.36</td>
</tr>
<tr>
<td>COLCHECKS</td>
<td>SYSCAT</td>
<td>V</td>
<td>1999-09-10-10.55.30</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SYSTABLES</td>
<td>SYSIBM</td>
<td>T</td>
<td>1999-09-10-10.55.12</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SYSVIEWS</td>
<td>SYSIBM</td>
<td>T</td>
<td>1999-09-10-10.55.12</td>
</tr>
<tr>
<td>COLDIST</td>
<td>SYSSTAT</td>
<td>V</td>
<td>1999-09-10-10.55.39</td>
</tr>
<tr>
<td>COLUMNS</td>
<td>SYSSTAT</td>
<td>V</td>
<td>1999-09-10-10.55.39</td>
</tr>
<tr>
<td>FUNCTIONS</td>
<td>SYSSTAT</td>
<td>V</td>
<td>1999-09-10-10.55.39</td>
</tr>
<tr>
<td>INDEXES</td>
<td>SYSSTAT</td>
<td>V</td>
<td>1999-09-10-10.55.40</td>
</tr>
<tr>
<td>TABLES</td>
<td>SYSSTAT</td>
<td>V</td>
<td>1999-09-10-10.55.40</td>
</tr>
</tbody>
</table>

146 record(s) selected.
HELP (built in)

db2 => ?

ACTIVATE DATABASE ECHO PREP/PRECOMPIL
ADD DATALINKS MANAGER EXPORT PRUNE HISTORY/LOGFILE
ADD NODE FORCE APPLICATION QUERY CLIENT
ATTACH GET/RESET/UPDATE ADMIN CFG QUIESCE TABLESPACES
ATTACH TO GET AUTHORIZATIONS QUIT
BACKUP DATABASE GET CONNECTION STATE REBIND
BIND GET INSTANCE RECONCILE
CATALOG APPC NODE GET MONITOR SWITCHES REDISTRIBUTE NODEGROUP
CATALOG APPCLU NODE GET SNAPSHOT REFRESH LDAP
CATALOG APPN NODE GET/RESET/UPDATE CLI CFG REGISTER
CATALOG DATABASE GET/RESET/UPDATE DBM CFG RELEASE
CATALOG DCS DATABASE GET/RESET/UPDATE DBM CFG REORG TABLE
CATALOG GLOBAL DATABASE HELP REORGCHK
CATALOG IPXSPX NODE IMPORT RESET MONITOR
CATALOG LDAP DATABASE INITIALIZE TAPE RESTART DATABASE
CATALOG LDAP NODE INVOKE RESTORE DATABASE

[...]

Note: Some commands are operating system specific and may not be available.

For further help: ? db2-command - help for specified command
    ? OPTIONS - help for all command options
    ? HELP - help for reading help screens
The preceding three options can be run as DB2 <option> from an OS prompt.

Scary, but very comprehensive help system
More HELP

What do these funny error codes (e.g., DB21034E) mean??

```
db2 => blah blah
DB21034E The command was processed as an SQL statement because it was not a valid Command Line Processor command. During SQL processing it returned: SQL0104N An unexpected token "blah" was found following "BEGIN-OF-STATEMENT". Expected tokens may include: "<values>". SQLSTATE=42601

db2 => ? DB21034E

DB21034E The command was processed as an SQL statement because it was not a valid Command Line Processor command. During SQL processing it returned:

Explanation: This message is displayed before the SQL error message. The error may be caused by a syntax error in a non-SQL command.

User Response: Correct the error and resubmit the command.
```
Command Line Usage

Syntax: `db2 <command>`

```bash
$ db2 list tables

<table>
<thead>
<tr>
<th>Table/View</th>
<th>Schema</th>
<th>Type</th>
<th>Creation time</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTICLE</td>
<td>DAVID</td>
<td>T</td>
<td>2000-05-08-15.53.39</td>
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<tr>
<td>AUTHOR</td>
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<td>T</td>
<td>2000-05-08-15.53.36</td>
</tr>
<tr>
<td>BOOK</td>
<td>DAVID</td>
<td>T</td>
<td>2000-05-08-15.53.37</td>
</tr>
<tr>
<td>JOURNAL</td>
<td>DAVID</td>
<td>T</td>
<td>2000-05-08-15.53.38</td>
</tr>
<tr>
<td>PROCEEDINGS</td>
<td>DAVID</td>
<td>T</td>
<td>2000-05-08-15.53.38</td>
</tr>
<tr>
<td>PUBLICATION</td>
<td>DAVID</td>
<td>T</td>
<td>2000-05-08-15.53.36</td>
</tr>
<tr>
<td>WROTE</td>
<td>DAVID</td>
<td>T</td>
<td>2000-05-08-15.53.37</td>
</tr>
</tbody>
</table>

7 record(s) selected.
```

special characters (e.g., `*`) have to be quoted
Scripts

To run code from a file `batch.file` use:

```
$ db2 -f batch.file

<DB2 messages here; input is NOT echoed>
```

Sample SQL from classes `samples<n>.db2`
Results `results<n>.db2`  ⇒ all from the “lectures” web page

This will be necessary for submitting your SQL assignments: you’ll have to submit an `a<n>.sql` file which will then be tested by the TAs using the above.
Problems

Look if DB2 is running (this is how a healthy DB2 looks like):

```
$ ps -ef | grep db2
```

<table>
<thead>
<tr>
<th>Process</th>
<th>PID</th>
<th>PPID</th>
<th>User</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>db2inst2</td>
<td>4896</td>
<td>1</td>
<td>0</td>
<td>May18</td>
</tr>
<tr>
<td>db2inst2</td>
<td>4897</td>
<td>4896</td>
<td>0</td>
<td>May18</td>
</tr>
<tr>
<td>root</td>
<td>5110</td>
<td>1</td>
<td>0</td>
<td>May18</td>
</tr>
<tr>
<td>db2inst2</td>
<td>5112</td>
<td>5110</td>
<td>0</td>
<td>May18</td>
</tr>
<tr>
<td>root</td>
<td>5118</td>
<td>5110</td>
<td>0</td>
<td>May18</td>
</tr>
<tr>
<td>root</td>
<td>5119</td>
<td>5110</td>
<td>0</td>
<td>May18</td>
</tr>
<tr>
<td>root</td>
<td>5120</td>
<td>5110</td>
<td>0</td>
<td>May18</td>
</tr>
<tr>
<td>db2inst2</td>
<td>5122</td>
<td>5110</td>
<td>0</td>
<td>May18</td>
</tr>
<tr>
<td>db2inst2</td>
<td>5131</td>
<td>5110</td>
<td>0</td>
<td>May18</td>
</tr>
<tr>
<td>db2fenc2</td>
<td>14139</td>
<td>5110</td>
<td>0</td>
<td>May18</td>
</tr>
<tr>
<td>david</td>
<td>23997</td>
<td>1</td>
<td>0</td>
<td>15:06 pts/125</td>
</tr>
<tr>
<td>david</td>
<td>26239</td>
<td>22796</td>
<td>0</td>
<td>15:09 pts/125</td>
</tr>
</tbody>
</table>

If you can’t access DB2 for contact the TAs of CFCF consultants.