What you should have learned after this lecture ...

- some basic concepts of Oracle
2. Database Management: Handling Tables

Goals:
- rough view on databases as a collection of tables
- enable you to start with Oracle as soon as possible
  - creation of tables
  - insertion and modification of records (so-called *tuples*) in a table
  - show a few simple queries on a single table
- postpone the ‘theoretical’ discussion to a later time

Concept of ‘table’ used in
- books, papers, newspapers, etc.
  - purpose: summarize information, give an overview
- spreadsheet programs
  - purpose: give an overview, make numerical computations (e.g., aggregations)
- databases
  - purpose: allow to retrieve (parts of the) data, make computations, derive new information (e.g., selections, combining information)
What is a table?

Example

<table>
<thead>
<tr>
<th>Employee</th>
<th>EmpId</th>
<th>Name</th>
<th>Birthdate</th>
<th>Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>567</td>
<td>Meyer</td>
<td>03/25/1975</td>
<td>23000</td>
<td></td>
</tr>
<tr>
<td>123</td>
<td>Smith</td>
<td>08/17/1959</td>
<td>41000</td>
<td></td>
</tr>
<tr>
<td>456</td>
<td>Kirby</td>
<td>05/03/1966</td>
<td>37000</td>
<td></td>
</tr>
</tbody>
</table>

How can we create this table (in Oracle)?

- use the DDL (data definition language to create the table)
- remember: the DDL is used to define the structure (i.e., the static part) of a database as part of the database’s meta data information
step 1: create the table header (table schema) by using the DDL

```sql
create table Employee
(EmplId integer,
 Name varchar(25) not null,
 Birthdate date,
 Salary numeric(8,2),
 primary key (EmplId));
```

step 2: create the table body (table instance) by using the DML

```sql
insert into Employee values(567, 'Meyer', 25-MAR-1975, 23000);
insert into Employee values(123, 'Smith', 17-AUG-1959, 41000);
insert into Employee values(456, 'Kirby', 03-MAY-1966, 35000);
```

Error produced

Kirby’s salary is $37000 and not $35000

correction by update command

```sql
update Employee set Salary = 37000 where EmplId = 456
```
Some simple queries

- “Show the employee table.”
  ```sql
  select * from Employee
  ```

<table>
<thead>
<tr>
<th>Employee</th>
<th>EmpId</th>
<th>Name</th>
<th>Birthdate</th>
<th>Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>567</td>
<td>Meyer</td>
<td>25-MAR-1975</td>
<td>23000</td>
</tr>
<tr>
<td></td>
<td>123</td>
<td>Smith</td>
<td>17-AUG-1959</td>
<td>41000</td>
</tr>
<tr>
<td></td>
<td>456</td>
<td>Kirby</td>
<td>03-MAY-1966</td>
<td>37000</td>
</tr>
</tbody>
</table>

- “Show the ids and salaries of all employees whose salary exceeds $27000.”
  ```sql
  select EmplId, Salary from Employee where Salary > 27000
  ```

<table>
<thead>
<tr>
<th>EmplId</th>
<th>Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>123</td>
<td>41000</td>
</tr>
<tr>
<td>456</td>
<td>37000</td>
</tr>
</tbody>
</table>
Show only the employee ids and their salaries.

```
select EmplId, Salary from Employee
```

<table>
<thead>
<tr>
<th>EmplId</th>
<th>Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>567</td>
<td>23000</td>
</tr>
<tr>
<td>123</td>
<td>41000</td>
</tr>
<tr>
<td>456</td>
<td>37000</td>
</tr>
</tbody>
</table>

How many employees are in the company.

```
select count (*) as total from Employee
```

<table>
<thead>
<tr>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
</tr>
</tbody>
</table>
Introduction to Oracle and SQL

01.11.2011

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Oracle Database @CISE

• First connect to a CISE server using
  – *Putty* from Windows
  – *Terminal* from Unix or Mac

• Available CISE linux servers for secure login (ssh):
  – storm.cise.ufl.edu
  – thunder.cise.ufl.edu

• More info at:
  [http://www.cise.ufl.edu/help/access/remote/](http://www.cise.ufl.edu/help/access/remote/)
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• Command line SQL*Plus client:
  – From within a CISE secure shell connect to the Oracle Database instance `orcl` by running these two commands:
    
    ```
    % source /usr/local/etc/ora11.csh
    % sqlplus <username>@orcl
    ```

• For a graphical client, download *Oracle SQL Developer* from (signup for Oracle store account for free to activate download, and have Java JDK installed):
  
Oracle Database @CISE

• In *SQL Developer*, to add a connection:
• Right-click on the *Connections* tab in the left window panel, and choose *+New Connection*
• Enter the following parameters:
  – Hostname: *oracle.cise.ufl.edu*
  – Port: **1521**
  – SID: *orcl*
• Click *Save* and then *Connect*
Oracle 11gR1

- The version of Oracle DBMS running on CISE servers is:
  
  *Oracle Database11g Enterprise Edition Release 11.1.0.7.0*

- The official documentation for this version is available at:
  
  *http://www.oracle.com/pls/db111/homepage*

- Two useful items on this page are:
  
  *Supporting Documentation* and the *Search* bar (top left)
Structured Query Language (SQL)

- Some of the DDL, DML and other statements available in Oracle SQL are listed here:

Structured Query Language (SQL)

• We will now create, manipulate and query a sample student table using the SQL query language in Oracle DBMS.

• Try out the following commands in the SQL prompt (command line - SQL*Plus) or in the SQL worksheet (GUI - SQL Developer)
SQL exercise

- DDL:

```sql
create table student (  
    ufid       number(8) primary key,  
    sname      varchar2(20) not null,  
    major      varchar2(20),  
    address    varchar2(50),  
    gpa        number(3,2),  
    joindate   date  
);  
```
SQL exercise

DML:

```sql
insert into table student values (33330001, 'Tom', 'CSE', '1111 NW 6th Ave Gainesville FL 32601', NULL, to_date('01/03/2011','mm/dd/yyyy') );
insert into table student values (22220001, 'Jane', 'DAS', '2222 NW 16th Ave Gainesville FL 32601', 3.97, to_date('07/17/2010','mm/dd/yyyy') );
insert into table student values (11110001, 'Kristine', 'MIS', '33 SW 3rd St Micanopy FL 32667', 4.0, to_date('01/05/2010','mm/dd/yyyy') );
insert into table student values (11110002, 'Bill', 'CSE', '4444 NW 26th Ave Gainesville FL 32601', 3.85, to_date('01/15/2010','mm/dd/yyyy') );
insert into table student values (22220002, 'Glenn', 'CSE', '1111 NW 21st Ave Gainesville FL 32601', 3.95, to_date('07/17/2010','mm/dd/yyyy') );
```

Note: String input should be enclosed in single quotes
Table Information

• To view all the tables in your namespace using:
  
  select table_name from user_tables;

• To view the schema of the newly created table:
  
  desc student;

• To view the rows (tuples/records) in the student table using:
  
  select * from student;
  select rownum, id, name from student;

  --notice the use of the pseudocolumn rownum to display row numbers
  /* comments in SQL start with double dashes or can be enclosed like this */
SQL exercise

alter table student add (comments varchar2(100));
desc student;

insert into student (ufid,gpa,sname,comments)
values (44440001, 4.0, 'Indra', 'Honors student');

select * from student where sname like 'I%';
select * from student where (ufid >= 22220000 and sname < 'J');
delete from student where sname like 'Bill';

select count(*) from student;
SQL exercise

savepoint student_sp1;
update student set major = 'CSE' where ufid = 44440001;
select * from student where ufid = 44440001;
rollback to student_sp1;
select * from student where ufid = 44440001;

Note: Do not include any DDL statements between a savepoint and its corresponding rollback. This is because DDL statements will commit (save the database state) automatically.

Use quit to leave SQL*Plus.