

Perl CGI & Databases

Using MS Access

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Issues

- Databases
 - Access, MS SQL, Oracle, MySQL
 - Tables and Rows
 - Connectivity (Win ODBC)
- Perl Database Access
 - Win32::ODBC module
 - There are other modules...

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Using MS Access

- Great for developing User Interfaces to databases: forms, reports, etc.
- Windows Only
- Not the best database engine
 - complex queries can take a while...
- Great for learning and for small projects.
- You probably need something better if you have thousands of database records.

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Access Databases

- Multiple *tables*.
- Each *table* is associated with a list of *fields*.
- Each *field (column)* has a name, and type.
- Each *table* is made up of a number of *records (rows)*.
- Each *row* contains the values for each field.

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Sample Database

- Login Account Database
 - Single Table: **password**
 - Fields:
 - **Name**: user id (text string)
 - **Password**: password (text string).

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Adding data to an Access Table

- Open the table - get a view of the database that looks like a spreadsheet.
- Type in whatever values you want.
- Close the table.

- More details (and pictures) in the HTML lecture notes...

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Using ODBC

- Open Database Connectivity
 - Microsoft technology
 - Single mechanism used to access databases from programs
 - The program doesn't care what kind of database you are using, could be Access, MySQL, MS SQL, ...
 - Register a "Data Source Name" with a database.

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Windows ODBC

- Create an ODBC Data Source using the "ODBC Manager" control panel.
- Create a new DSN (Data Source Name).
 - System DSNs for Win2000/XP!
- Details in the HTML notes...

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Perl and ODBC

- There is a Perl module named Win32::ODBC that supports access to any ODBC data source from Perl (on a Windows machine).
- This module is already installed as part of ActiveState Perl.

```
use Win32::ODBC;
```

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Win32::ODBC

- This module is a Perl Object.
 - The subroutine names are funny looking, but we can treat them just like regular subroutines.
- Usage:
 - Create a Win32::ODBC object (need to specify an ODBC *Data Source Name*).
 - Call some methods of the resulting object.

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Creating a Win32::ODBC Object

```
use Win32::ODBC;
# Create a database object and make sure
# the database was found
$db = new Win32::ODBC("eiw");
if (! $db) {
    print "Error - the eiw database could not be
found\n";
    ...
}
```

↖ DSN

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Getting a list of tables

```
# get list of table names
@tables = $db->TableList();

# print the table names
printf("I found these tables: %s\n",
    join(" ", @tables));
```

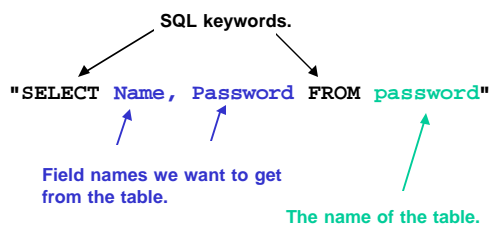
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Extracting Data From a Table

- Need to use SQL:
 - Structured Query Language
 - Language use to communicate with database systems.
 - There are lots of fancy things you can do with SQL, we will just look at simple stuff...

SQL **SELECT** statement



General **SELECT** statement

```
SELECT column1, column2, ..., columnN  
FROM table1, table2, ..., tableN  
[WHERE clause]
```

- column# are the field names,
- table# are table named
- The clause can restrict the rows used to determine the result.

Issuing an SQL command

```
$db->Sql ("SELECT Name,Password FROM password");
```

- Doesn't return the data! Just tells the database we want it to collect the requested data, later we will ask for it.
- Returns 1 (true) if there was an error, 0 means everything was OK.

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FetchRow ()

- The method `$db->FetchRow ()` tells the database to get the next *row* of the result of the last SQL statement.
 - Still doesn't give us the actual data!
 - Returns 0 (false) if there is no more data.

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Getting the Data

- `$db->Data ()` will return a list that contains the data from one row of the result.
- The order of values in this list is the same as the order we gave in the SQL SELECT statement.

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General Approach - PseudoCode

Issue SELECT statement

While data remains

grab the next record and process

EndWhile

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Real Code

```
if ($db->Sql("SELECT Name, Password FROM password")){
    printf("Error reading from database\n"); exit;
}

# loop through all the rows in the database
while ($db->FetchRow()) {
    # for each row (record) grab the name and password
    # we know the order - it matches our SELECT command!
    ($n,$p)=$db->Data();

    # print out the name and password
    printf("Name is %s\n");
    printf("Password is %s\n");
}
```

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Another Example

```
$name = param('username'); $pass = param('password');

if ($db->Sql("SELECT Password FROM password WHERE Name =
 '$name'")){
    printf("Error reading from database\n"); exit;
}

# loop through all the rows in the database
while ($db->FetchRow()) {
    ($p)=$db->Data();
    if ($p eq $pass) {
        # Valid user!
    }
}
```

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Creating New Records

```
"INSERT INTO table (col1, col2, ... colN)
VALUES (value1, value2, ..., valueN)"
```

String type values must be inside quotes

```
"INSERT INTO password (Name, Password)
VALUES ('Dave', 'blah')"
```

Sample Application

- Login System
 - user enters name and password
- Account Creation
 - user enters desired name and password
 - to make this realistic we also insist that the user enter some personal information...
- Both systems use the same database

Password Table

- Fields (columns):
 - Name: text string
 - Password: text string
- Need to create DSN
 - ODBC control panel

HTML Forms

- Need a form that allows the user to login.
 - name, pw
- Account Creation form
 - name, pw, fullname, cc

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Hidden Field

- We can include a hidden field in each form that tells the CGI which form is being submitted.

```
<INPUT TYPE=HIDDEN NAME=Operation  
VALUE>Login>
```

```
<INPUT TYPE=HIDDEN NAME=Operation  
VALUE=Create>
```

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CGI Overview

Open the database DSN
read in all name/password records.
if Operation is "Login"
 make sure name, pw match a real record.
if Operation is "Create"
 make sure name is new, and create new database
 record.

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