

MySQL and PHP

Oct. 31, 2017

Topics of Discussion

- config.in.php file inside phpMyAdmin directory
- Import and Export Databases using phpMyAdmin
- Managing a MySQL Database
- Command Line Exercises
- Database Index and Efficiency
- Accessing MySQL in PHP

config.in.php File

```
$cfg['blowfish_secret'] = 'xampp'; /* YOU SHOULD CHANGE THIS FOR A  
MORE SECURE COOKIE AUTH! */  
  
/*  
 * Servers configuration  
 */  
$i = 0;  
  
/*  
 * First server  
 */  
$i++;  
  
/* Authentication type and info */  
$cfg['Servers'][$i]['auth_type'] = 'cookie'; //was: 'config'  
$cfg['Servers'][$i]['user'] = 'root';  
$cfg['Servers'][$i]['password'] = '';  
$cfg['Servers'][$i]['extension'] = 'mysqli';  
$cfg['Servers'][$i]['AllowNoPassword'] = true;  
$cfg['Lang'] = '';  
  
/* Bind to the localhost ipv4 address and tcp */  
$cfg['Servers'][$i]['host'] = '127.0.0.1';  
$cfg['Servers'][$i]['connect_type'] = 'tcp';  
  
/* User for advanced features */  
$cfg['Servers'][$i]['controluser'] = 'pma';  
$cfg['Servers'][$i]['controlpass'] = '';  
  
/* Advanced phpMyAdmin features */  
$cfg['Servers'][$i]['pmadb'] = 'phpmyadmin';  
$cfg['Servers'][$i]['bookmarktable'] = 'pma__bookmark';  
$cfg['Servers'][$i]['relation'] = 'pma__relation';  
$cfg['Servers'][$i]['table_info'] = 'pma__table_info';  
$cfg['Servers'][$i]['table_coords'] = 'pma__table_coords';
```

```

$cfg['Servers'][$i]['pdf_pages'] = 'pma__pdf_pages';
$cfg['Servers'][$i]['column_info'] = 'pma__column_info';
$cfg['Servers'][$i]['history'] = 'pma__history';
$cfg['Servers'][$i]['designer_coords'] = 'pma__designer_coords';
$cfg['Servers'][$i]['tracking'] = 'pma__tracking';
$cfg['Servers'][$i]['userconfig'] = 'pma__userconfig';
$cfg['Servers'][$i]['recent'] = 'pma__recent';
$cfg['Servers'][$i]['table_uiprefs'] = 'pma__table_uiprefs';
$cfg['Servers'][$i]['users'] = 'pma__users';
$cfg['Servers'][$i]['usergroups'] = 'pma__usergroups';
$cfg['Servers'][$i]['navigationhiding'] = 'pma__navigationhiding';
$cfg['Servers'][$i]['savedsearches'] = 'pma__savedsearches';
$cfg['Servers'][$i]['central_columns'] = 'pma__central_columns';
$cfg['Servers'][$i]['designer_settings'] = 'pma__designer_settings';
$cfg['Servers'][$i]['export_templates'] = 'pma__export_templates';
$cfg['Servers'][$i]['favorite'] = 'pma__favorite';

/*
 * End of servers configuration
 */

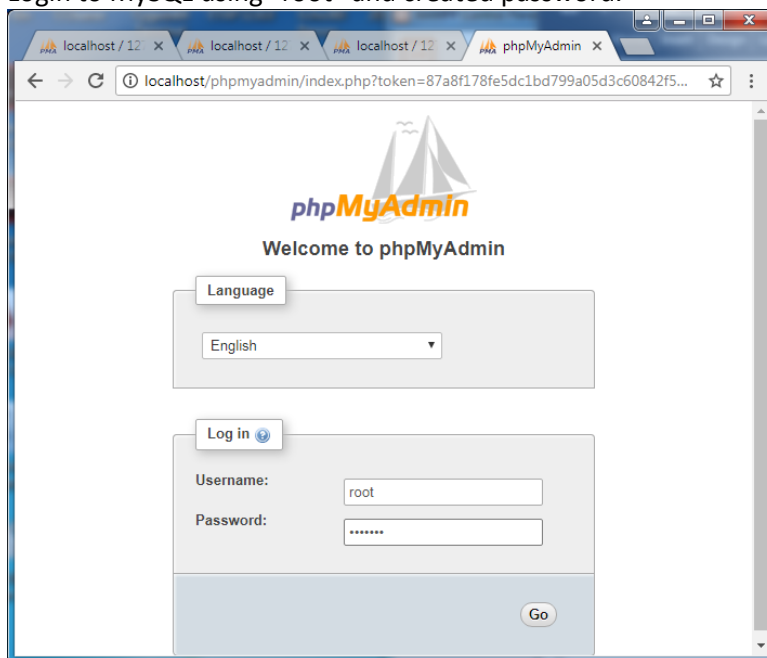
?>

```

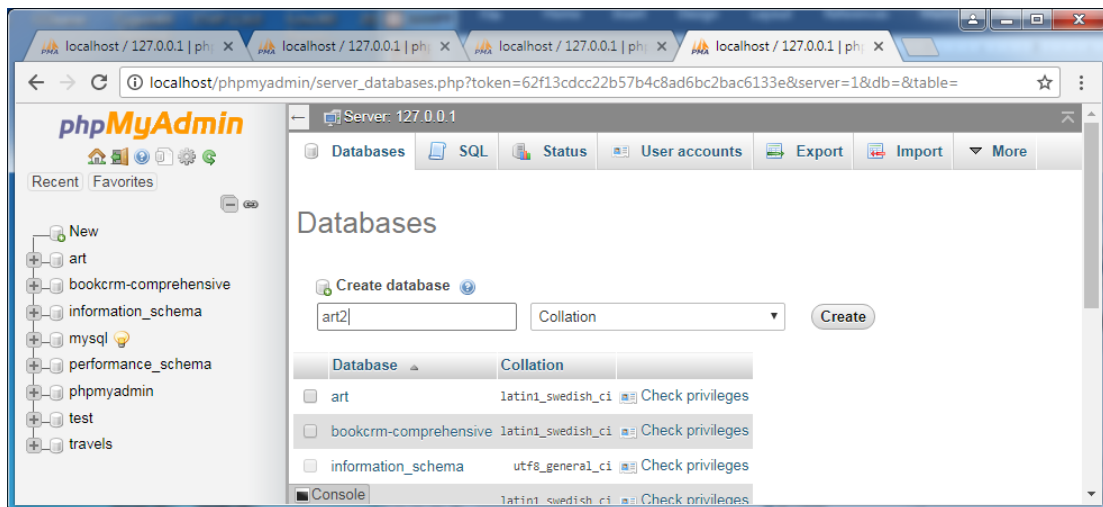
Import and Export MySQL using phpMyAdmin

Import Database

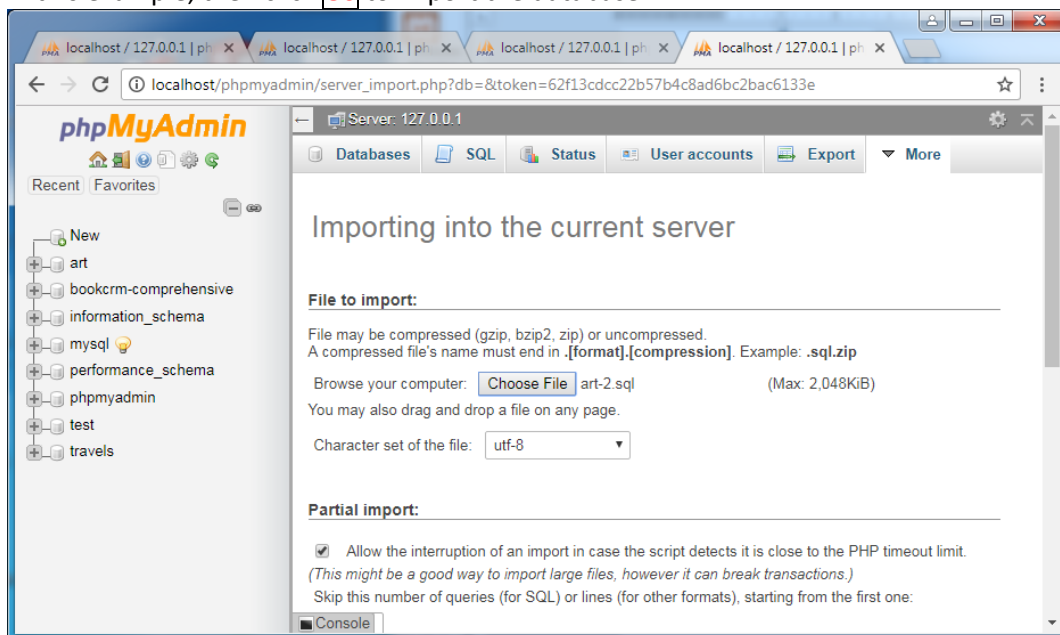
1. Login to MySQL using “root” and created password.



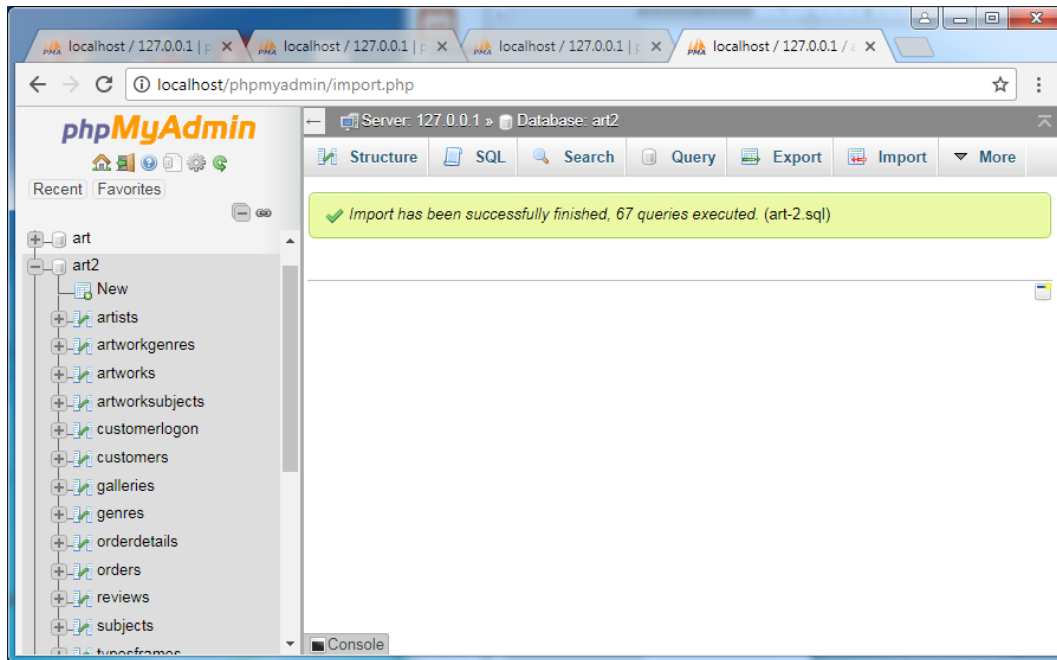
2. Click on “New” to create a new database
3. Enter the database name, in this example **art2**, then click Create button



4. Click on **Import** tab to see the next Window:
5. Click on **Choose File**, then browse to load your database name with the name **art2.sql**, as shown in this example; then click **Go** to import the database.



6. The imported database is shown on the screen below.



7. You can remove the created database by
 - a. Click "Operations" tab
 - b. Click on "Drop the database (Drop)"

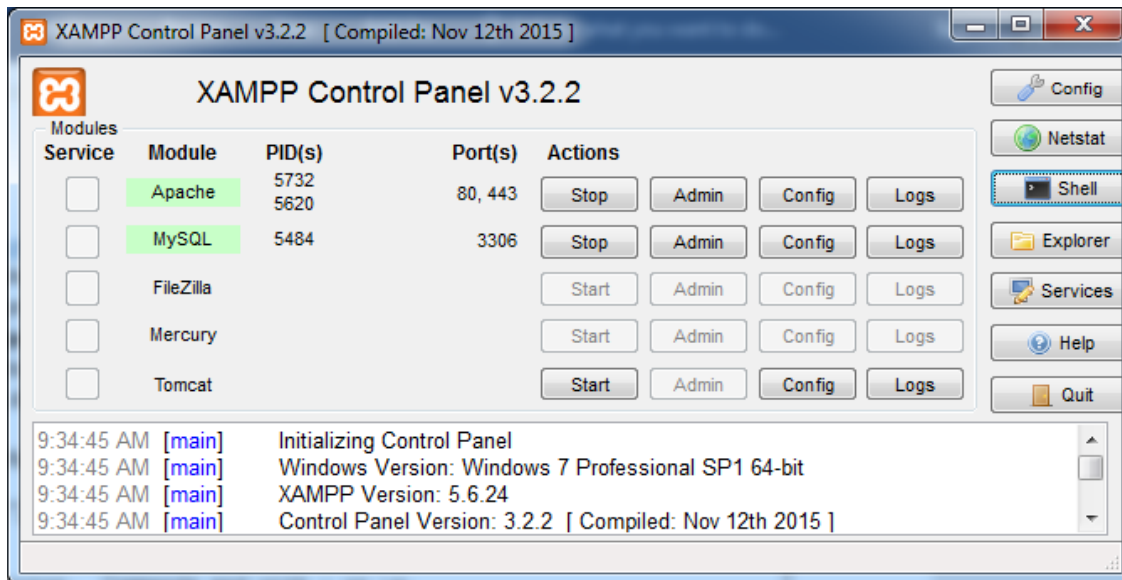
Export Database

1. Click on Export tab
2. Under Export templates:
 - a. New template: **art2-example**
 - b. Click create
3. Click Go

You will see **art2.sql** is created for download, click the up arrow to save the file

MySQL Command-Line Interface

On XAMPP Control Panel, click **Shell** to open Microsoft command line Window.



Setting environment for using XAMPP for Windows.

Lin@LIN-PC c:\xampp

mysql -v

Welcome to the MySQL monitor. Commands end with ; or \g.

Your MySQL connection id is 1

Server version: 5.6.26 MySQL Community Server (GPL)

Copyright (c) 2000, 2015, Oracle and/or its affiliates. All rights reserved.

Oracle is a registered trademark of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>

Lin@LIN-PC c:\xampp

cd mysql

Lin@LIN-PC c:\xampp\mysql

dir

Volume in drive C has no label.

Volume Serial Number is FEA5-C688

Directory of c:\xampp\mysql

```
08/27/2015  11:45 AM  <DIR>          .
08/27/2015  11:45 AM  <DIR>          ..
08/27/2015  11:45 AM  <DIR>          backup
08/27/2015  11:47 AM  <DIR>          bin
07/14/2015  06:34 PM             17,987 COPYING
11/03/2015  12:35 AM  <DIR>          data
08/27/2015  11:45 AM  <DIR>          docs
07/14/2015  06:41 PM             1,141 my-default.ini
03/30/2013  07:29 AM             848 mysql_installservice.bat
03/30/2013  07:29 AM             395 mysql_uninstallservice.bat
07/14/2015  06:34 PM             2,496 README
03/30/2013  07:29 AM             1,105 resetroot.bat
08/27/2015  11:45 AM  <DIR>          scripts
08/27/2015  11:45 AM  <DIR>          share
```

```

        6 File(s)          23,972 bytes
        8 Dir(s)   93,777,928,192 bytes free

Lin@LIN-PC c:\xampp\mysql
# cd data

Lin@LIN-PC c:\xampp\mysql\data
# dir
Volume in drive C has no label.
Volume Serial Number is FEA5-C688

Directory of c:\xampp\mysql\data

11/03/2015  12:35 AM    <DIR>          .
11/03/2015  12:35 AM    <DIR>          ..
08/12/2014  05:47 AM                56 auto.cnf
08/27/2015  11:45 AM    <DIR>          cdcol
11/03/2015  12:35 AM            12,582,912 ibdata1
11/03/2015  12:35 AM            5,242,880 ib_logfile0
08/12/2014  05:47 AM            5,242,880 ib_logfile1
08/27/2015  11:45 AM    <DIR>          mysql
11/03/2015  12:35 AM                5 mysql.pid
11/03/2015  12:40 AM            22,467 mysql_error.log
11/27/2013  01:44 PM                6 mysql_upgrade_info
08/27/2015  11:45 AM    <DIR>          performance_schema
08/27/2015  11:45 AM    <DIR>          phpmyadmin
08/27/2015  11:45 AM    <DIR>          test
08/27/2015  11:45 AM    <DIR>          webauth
        7 File(s)          23,091,206 bytes
        8 Dir(s)   93,777,924,096 bytes free

```

Run MySQL Commands, <http://dev.mysql.com/doc/refman/5.7/en/mysql-commands.html>

```

Administrator@LIN-PC c:\xampp\mysql
# mysql -u root -p
Enter password: *****
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 218
Server version: 10.1.16-MariaDB mariadb.org binary distribution

Copyright (c) 2000, 2016, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> show databases;
+-----+
| Database |
+-----+
| art      |
| art2     |
| bookcrm-comprehensive |
| information_schema |
| mysql    |
| performance_schema |
| phpmyadmin |
| test     |
| travels  |
+-----+
9 rows in set (0.01 sec)

MariaDB [(none)]> use test;
Database changed

```

```

MariaDB [(none)]> show tables;
Empty set (0.00 sec)

MariaDB [test]> ?

General information about MariaDB can be found at
http://mariadb.org

List of all MySQL commands:
Note that all text commands must be first on line and end with ';'
?          (\?) Synonym for `help'.
clear      (\c) Clear the current input statement.
connect    (\r) Reconnect to the server. Optional arguments are db and host.
delimiter  (\d) Set statement delimiter.
ego        (\G) Send command to mysql server, display result vertically.
exit       (\q) Exit mysql. Same as quit.
go         (\g) Send command to mysql server.
help       (\h) Display this help.
notee      (\t) Don't write into outfile.
print      (\p) Print current command.
prompt     (\R) Change your mysql prompt.
quit       (\q) Quit mysql.
rehash     (\#) Rebuild completion hash.
source     (\.) Execute an SQL script file. Takes a file name as an argument.
status     (\s) Get status information from the server.
tee        (\T) Set outfile [to_outfile]. Append everything into given outfile.
use        (\u) Use another database. Takes database name as argument.
charset    (\C) Switch to another charset. Might be needed for processing binlog
with multi-byte charsets.
warnings   (\W) Show warnings after every statement.
nowarning  (\w) Don't show warnings after every statement.

For server side help, type 'help contents'

MariaDB [test]>

MariaDB [(none)]> use art;
Database changed
MariaDB [art]> show tables;
+-----+
| Tables_in_art |
+-----+
| artists        |
| artworkgenres  |
| artworks       |
| artworksubjects|
| customerlogon  |
| customers      |
| galleries      |
| genres         |
| orderdetails   |
| orders         |
| reviews       |
| subjects       |
| typesframes    |
| typesglass     |
| typesmatt      |
| typesshippers  |
| typesstatuscodes|
+-----+
17 rows in set (0.01 sec)
MariaDB [art]> SHOW COLUMNS in artworks;
+-----+

```

Field	Type	Null	Key	Default	Extra
ArtWorkID	int(11)	NO	PRI	NULL	auto_increment
ArtistID	int(11)	YES	MUL	0	
ImageFileName	varchar(50)	NO	UNI	NULL	
Title	varchar(255)	NO	MUL	NULL	
Description	longtext	YES		NULL	
Excerpt	longtext	YES		NULL	
ArtWorkType	int(11)	YES		1	
YearOfWork	int(11)	YES	MUL	0	
Width	int(11)	YES		NULL	
Height	int(11)	YES		NULL	
Medium	varchar(255)	YES		NULL	
OriginalHome	varchar(255)	YES		NULL	
GalleryID	int(11)	YES	MUL	NULL	
Cost	decimal(19,4)	YES		0.0000	
MSRP	decimal(19,4)	YES		0.0000	
ArtWorkLink	varchar(255)	YES		NULL	
GoogleLink	varchar(255)	YES		NULL	

17 rows in set (0.00 sec)

MariaDB [art]>

MariaDB [art]> SELECT artworkid, title, yearofwork from artworks where yearofwork < 1600;		
artworkid	title	yearofwork
440	Lamentation of Christ	1305
441	Madonna Enthroned	1310
362	Expulsion from the Garden of Eden	1425
363	Tribute Money	1425
365	Madonna and Child	1426
364	Holy Trinity	1428
442	Arnolfini Portrait	1434
368	Coronation of the Virgin	1447
367	Annunciation	1450
370	Baptism of Christ	1450
371	Flagellation of Christ	1455
375	Presentation at the Temple	1455
374	St. Sebastian	1457
369	Adoration in the Forest	1459
372	The Resurrection	1460
366	Madonna and Child	1465
386	Annunciation	1472
387	Ginevra de' Benci	1474
380	Adoration of the Magi	1475
373	Lamentation of Christ	1480
381	Delivery of the Keys	1481
376	Primavera	1482
378	Venus and Mars	1483
377	The Birth of Venus	1486
445	The Garden of Earthly Delights	1490
443	Portrait of the Artist Holding a Thistle	1493
383	Portrait of Francesco delle Opere	1494
379	The Mystical Nativity	1500
382	Madonna in Glory with the Child and Saints	1500
389	Mona Lisa	1503
384	Virgin of the Rocks	1505
394	Madonna in the Meadow	1505
398	Madonna of the Goldfinch	1505

397	Portrait of Maddalena Doni	1506
391	Doni Tondo	1507
395	The Deposition	1507
396	Portrait of a Young Woman	1507
388	The Virgin and Child with St. Anne	1508
406	A Man with a Quilted Sleeve	1509
393	Libyan Sibyl	1510
399	Alba Madonna	1510
400	The School of Athens	1510
392	The Creation of Adam	1512
401	Sistine Madonna	1512
402	The Triumph of Galatea	1514
403	Madonna of the Chair	1514
444	Melencolia I	1514
404	The Veiled Woman	1515
405	Portrait of Bindo Altoviti	1515
407	Flora	1515
390	St. John the Baptist	1518
408	Bacchus and Ariadne	1520
409	Venus of Urbino	1538
449	Madonna with the Long Neck	1540
450	Portrait of Eleanor of Toledo	1545
451	Venus, Cupid, Folly and Time	1545
446	Landscape with the Fall of Icarus	1558
447	Netherlandish Proverbs	1559
448	The Peasant Wedding	1567
452	The Burial of the Count of Orgaz	1586
410	The Cardsharps	1594
411	The Calling of St Matthew	1599

-----+-----+-----

62 rows in set (0.00 sec)

MariaDB [art]>

Database Index and Efficiency

Computer Algorithm – Complexity

- $O(n)$ -- Order n
- $O(\log_2 n)$ -- balanced binary tree
- $O(1)$ -- Hash table data structure

Database Index

MySQL Optimization and Indexes, <https://dev.mysql.com/doc/refman/5.5/en/optimization-indexes.html>

8.3.1 How MySQL Uses Indexes

8.3.2 Using Primary Keys

8.3.3 Using Foreign Keys

8.3.4 Column Indexes

8.3.5 Multiple-Column Indexes

8.3.6 Verifying Index Usage

8.3.7 InnoDB and MyISAM Index Statistics Collection

8.3.8 Comparison of B-Tree and Hash Indexes

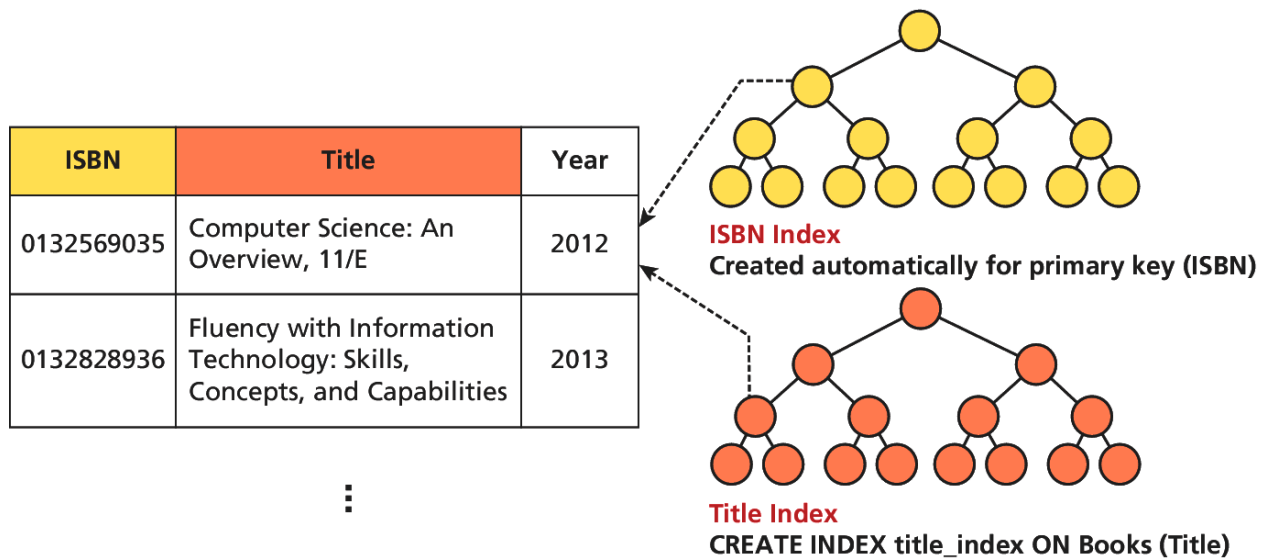


Figure 11.16 Visualization of a database index for our Book Table

Database APIs

PHP MySQL APIs

Choosing an API, <http://php.net/manual/en/mysqlinfo.api.choosing.php>

- **mysql Extension** – should only be used with versions of MySQL older than 4.1.3
- **mysqli Extension** – provides both a procedure and object-oriented approach
- **PDOs (PHP Data Objects)** – the object-oriented API has been available since PHP 5.1 and provides an abstraction layer that with the appropriate drivers can be used with any databases, and not just MySQL databases.

Accessing MySQL in PHP

Basic Steps

1. Connect to the database
2. Handle connection errors
3. Execute the SQL query
4. Process the results
5. Free resources and close connection

//Listing 11.2 Excerpt from a config.inc.php file for a phpMyAdmin installation

```
$cfg['Servers'][$i]['host'] = 'localhost';
$cfg['Servers'][$i]['controluser'] = 'DBUsername';
$cfg['Servers'][$i]['controlpass'] = 'DBPassword';
$cfg['Servers'][$i]['extension'] = 'mysqli';
// use the mysqli extension
?>
```

```
<?php
```

//Listing 11.3 modify these variables for your installation

```
// Connecting to a database with mysqli (procedural)
$host = "localhost";
$database = "bookcrm";
$user = "testuser";
$pass = "mypassword";
$connection = mysqli_connect($host, $user, $pass, $database);
?>
```

```
<?php
//Listing 11.5 Defining connection details via constants in a separate file (config.php)
define('DBHOST', 'localhost');
define('DBNAME', 'bookcrm');
define('DBUSER', 'testuser');
define('DBPASS', 'mypassword');
?>
```

```
<?php
//Listing 11.6 Using the connection constants
require_once('Listing10.05.php'); //equivalent for this distribution
//require_once('protected/config.php'); //original from text
$connection = mysqli_connect(DBHOST, DBUSER, DBPASS, DBNAME);
?>
```

```
<?php
//Listing 11.7 Handling connection errors with mysqli (version 1)
$connection = mysqli_connect(DBHOST, DBUSER, DBPASS, DBNAME);
// mysqli_connect_error returns string description of the last
// connect error
$error = mysqli_connect_error();
if ($error != null) {
    $output = "<p>Unable to connect to database<p>" . $error;
    // Outputs a message and terminates the current script
    exit($output);
}
?>
```

```
<?php
//Listing 11.8 Handling connection errors with mysqli (version 2)
$connection = mysqli_connect(DBHOST, DBUSER, DBPASS, DBNAME);
// mysqli_connect_errno returns the last error code
if ( mysqli_connect_errno() ) {
    die( mysqli_connect_error() ); // die() is equivalent to exit()
}
?>
```

Execution the Query

```
<?php
```

//Listing 11.11 Executing a SELECT query (mysqli)

```
$sql = "SELECT * FROM Categories ORDER BY CategoryName";  
// returns a mysqli_result object  
$result = mysqli_query($connection, $sql);  
?>
```

```
<?php
```

//Listing 11.13 Executing a query that doesn't return data (mysqli)

```
$sql = "UPDATE Categories SET CategoryName='Web' WHERE CategoryName='Business';"  
if ( mysqli_query($connection, $sql) ) {  
    $count = mysqli_affected_rows($connection);  
    echo "<p>Updated " . $count . " rows</p>";  
}  
?>
```

Process the Query Results

```
<?php
```

//Listing 11.17 Using a prepared statement (mysqli)

```
// retrieve parameter value from query string  
$id = $_GET['id'];  
// construct parameterized query – notice the ? parameter  
$sql = "SELECT Title, CopyrightYear FROM Books WHERE ID=?";  
// create a prepared statement  
if ($statement = mysqli_prepare($connection, $sql)) {  
    // Bind parameters s - string, b - blob, i - int, etc  
    mysqli_stmt_bindm($statement, 'i', $id);  
    // execute query  
    mysqli_stmt_execute($statement);  
    // learn in next section how to access the returned data  
    //...  
}  
?>
```

```
<?php
```

//Listing 11.20 Looping through the result set (mysqli—not prepared statements)

```
$sql = "select * from Categories order by CategoryName";  
// run the query  
if ($result = mysqli_query($connection, $sql)) {  
    // fetch a record from result set into an associative array  
    while($row = mysqli_fetch_assoc($result))  
    {  
        // the keys match the field names from the table  
        echo $row['ID'] . " - " . $row['CategoryName'] ;  
        echo "<br/>";  
    }  
} ?>
```

```
<?php
```

//Listing 11.21 Looping through the result set (mysqli—using prepared statements)

```

$sql = "SELECT Title, CopyrightYear FROM Books WHERE ID=?";
if ($statement = mysqli_prepare($connection, $sql)) {
    mysqli_stmt_bindm($statement, 'i', $id);
    mysqli_stmt_execute($statement);
    // bind result variables
    mysqli_stmt_bind_result($statement, $title, $year);
    // loop through the data
    while (mysqli_stmt_fetch($statement)) {
        echo $title . ' ' . $year . '<br/>';
    }
}
?>

```

Free Resources and Closing Connection

```

<?php
//Listing 11.25 Closing the connection
// mysqli approach
$connection = mysqli_connect($host, $user, $pass, $database);
//...
// release the memory used by the result set. This is necessary if
// you are going to run another query on this connection
mysqli_free_result($result);
//...
// close the database connection
mysqli_close($connection);
?>

```