

This Lecture

- HTML
- PHP
 - Variables
 - Arrays
 - IF...ELSE statements
 - Loops
 - Connecting to MySQL
- Further reading
 - W3Schools online tutorials at
 - <http://www.w3schools.com/html>
 - <http://www.w3schools.com/php>

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Learn here

example.zip [files on computer]

- Examples HTML/PHP scripts are available to download from blackboard: example.zip



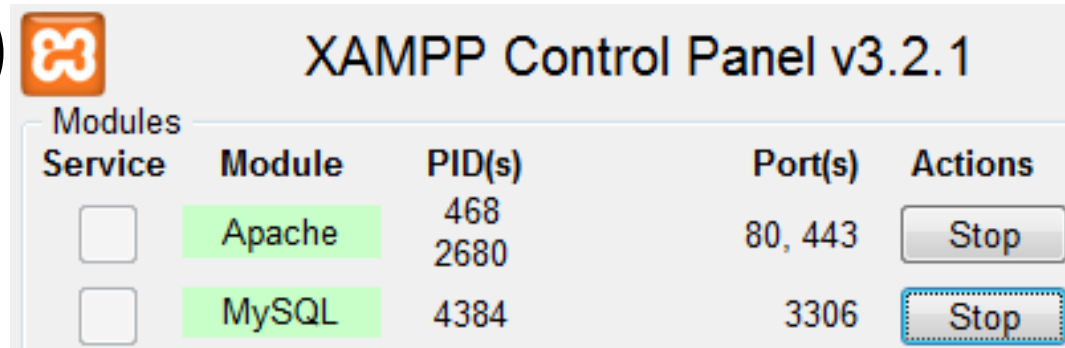
- Unzip it to ~~xampp\htdocs\example~~ ~~Assignment Project Example~~

e.g. c:\xampp\htdocs\example\html1.html (Win7/8)

e.g. /Application/XAMPP/xamppfiles/htdocs/example/html1.html (MacOSX)

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- Switch on both
Apache (webserver)
MySQL



example.zip [files seen on webserver]

- Switch on your browser
- Go to:
<http://localhost/example> or
<https://localhost/example>

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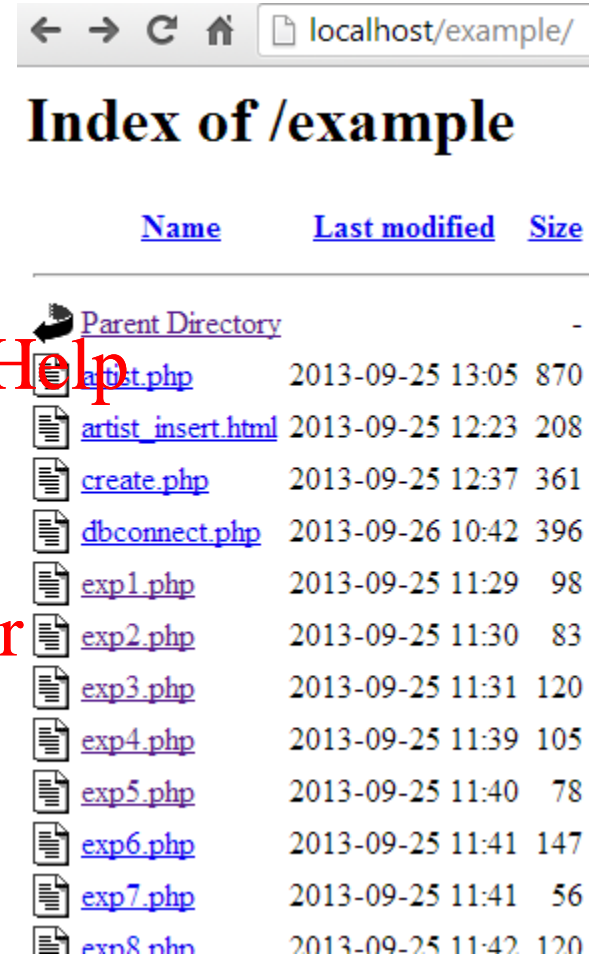
- Click on any file, note the URL
- e.g.

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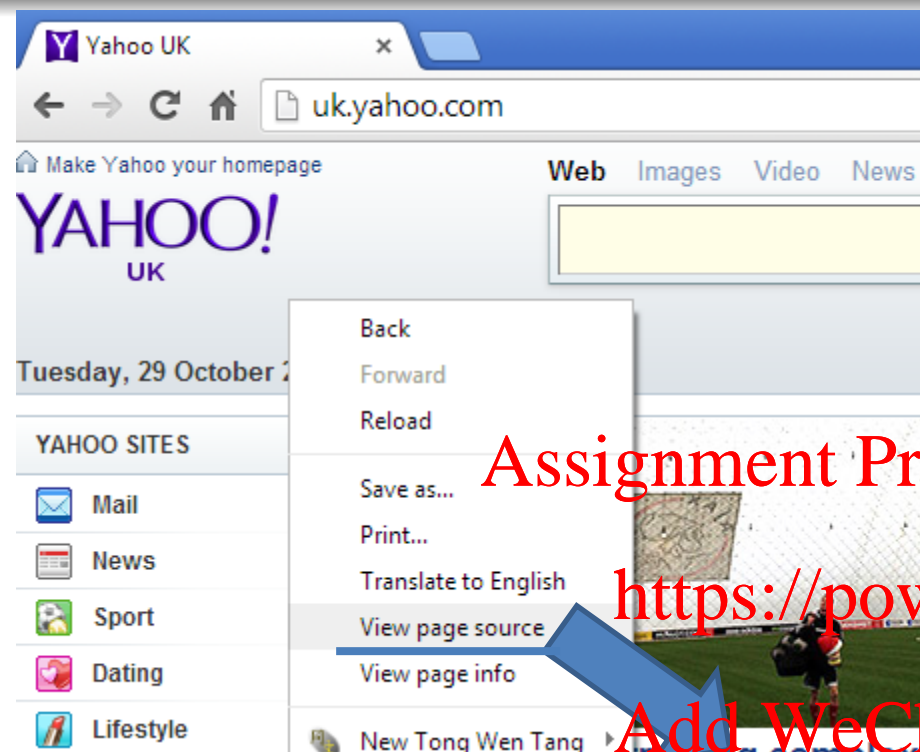
<http://localhost/example/html1.html>
<http://localhost/example/exp6.php>

- We now discuss them one by one



Name	Last modified	Size
Parent Directory	-	-
a10t.php	2013-09-25 13:05	870
artist_insert.html	2013-09-25 12:23	208
create.php	2013-09-25 12:37	361
dbconnect.php	2013-09-26 10:42	396
exp1.php	2013-09-25 11:29	98
exp2.php	2013-09-25 11:30	83
exp3.php	2013-09-25 11:31	120
exp4.php	2013-09-25 11:39	105
exp5.php	2013-09-25 11:40	78
exp6.php	2013-09-25 11:41	147
exp7.php	2013-09-25 11:41	56
exp8.php	2013-09-25 11:42	120

HTML



Readable TEXT

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```
2 <html lang="en-GB" class="y-fp-bg y-fp-pg-grad ua-wk ua-win ua-wk5
3 <!-- m2 template -->
4 <head>
5     <meta http-equiv="Content-Type" content="text/html; charset=utf-8">
6
7     <title>Yahoo UK</title>
8     <meta http-equiv="X-UA-Compatible" content="chrome=1">
9     <meta name="description" content="Welcome to Yahoo, the world's
you're searching for, get in touch with friends and stay in-the-know
10     <meta name="keywords" content="yahoo, yahoo uk, yahoo home page,
yahoo messenger, news, finance, sport, entertainment, games">
11
12
13     <script type="text/javascript">
```

```
<html>
```

```
<body>
```

```
<h1>My First Heading</h1>
```

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```
<p>My first paragraph.</p>
```

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```
</body>
```

```
</html>
```



My First Heading

My first paragraph.

Basic HTML Table

See <html2.html>

```
<html>
<body>
  <table border="1">
    <tr>
      <td>100</td>
      <td>200</td>
      <td>300</td>
    </tr>
    <tr>
      <td>400</td>
      <td>500</td>
      <td>600</td>
    </tr>
  </table>
</body>
</html>
```

tr: table row

td: table data

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100	200	300
400	500	600

```
<html>
```

```
<body>
```

```
<h2>Norwegian Mountain Trip</h2>
```

```

```

```
</body>
```

```
</html>
```

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Norwegian Mountain Trip

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http://www.w3schools.com/html/tryit.asp?filename=tryhtml_pulpitimage



The Limitations of SQL

- SQL is not a general purpose language
 - It is designed to create, modify and query databases
 - Based on set theory (relational algebra)
 - Not much normal programming constructs available
 - Cannot handle platform-specific challenges such as formatting output

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Extending SQL

- Some DBMSs add programming structures such as variables and loops to SQL.
 - Very specific to a DBMS
 - Essentially a new language that includes SQL
 - Not hugely flexible
- Connect to SQL from another language
 - Access SQL to run the relevant queries
 - All other work can be done using procedural code

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- Connections to databases from programs are often handled using **Open DB Connectivity**
 - Provides a standard interface for communication with a **DBMS**
 - Can run queries, updates etc.
 - Results of queries can be used inside the program code

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- PHP is a free, server-side scripting language
 - Often embedded into web pages to produce dynamic content
 - Can connect to most modern DBMSs and those implementing ODBC.
 - Contains specialised functions for connecting to MySQL

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New to Programming?

- Don't worry!
 - We will not be introducing too much PHP in this course
 - We will teach just enough to connect to MySQL and produce web pages.
 - There will be plenty of examples to use

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- PHP is procedural code that can be embedded into html documents inside php tags. Like this:

```
<html>                                example/exp1.php
<body>
<?php
// This is a comment
// Some php code goes in here
?>
</body>
</html>
```

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PHP Basics

- You can have any number of php blocks, separated by html. All php blocks will be connected when the file is run
- Code you write in an earlier block can be seen by code you write in later blocks. This will be important later
- Anything outside a php block is HTML text

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- Inside a PHP block, you can output text using the echo command. Like SQL, commands end with a semicolon:

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```
<html>
```

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```
<body>
```

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```
<?php
```

```
echo "This will be output as text!";
```

```
?>
```

```
</body>
```

```
</html>
```

example/exp2.php

← → ↻ 🏠 📄 localhost/example/exp2.php

This will be output as text!

- Remember, you're working in an HTML document, so anything you output will be read by the browser as HTML:

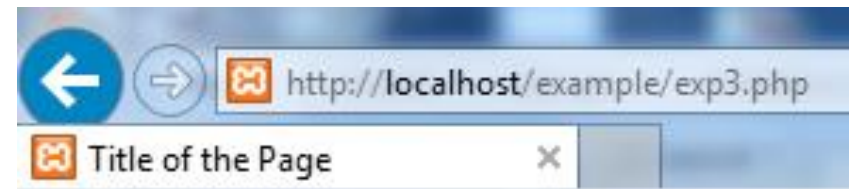
```
<html>
<?php
echo "<head>";
echo "<title>Title of the Page</title>";
echo "</head>";
?>
<body>
</body>
</html>
```

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example/exp3.php



Variables

- All programming languages use variables as a means to store values using names. For example, to create a number, called "num1" that has a value of 5:

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```
$num1 = 5;
```

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- PHP is a weakly typed language, which means you don't need to specify that num1 is of type "integer", because it works it out.

- We use variables to keep track of the values in our program. For example:

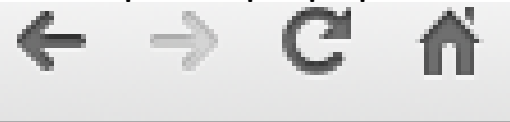
```
<?php
$var1 = 5;
$var1 = $var1 + 10;
?>
```

```
<?php echo "Good Day!</br>"; ?>
```

- Then later:

```
<?php
echo $var1;
?>
```

example/exp4.php



Good Day!

15

- Strings are lists of characters
 - Similar to varchar(n) in SQL
 - Can be declared using 'single' or "double" quotes
 - Can be appended together using :

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```
<?php
$var1 = "Hello";
$var2 = "everybody";
echo $var1 . " " .
$var2;
?>
```

example/exp5.php



Hello everybody

- Sometimes it is more helpful to store variables in lists rather than as individual names. For example:

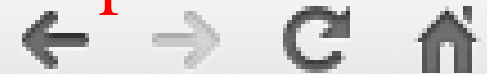
```
<?php
$var1 = 2;
$var2 = 4;
$var3 = 8;
$var4 = 16;
$var5 = 32;
echo $var1 . ", " . $var2 . ", " .
$var3 . ", " . $var4 . ", " .
$var5;
?>
```

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example/exp6.php



2, 4, 8, 16, 32

- For even a few variables, this will become messy. An alternative is to store them in a list structure, called an Array
- Arrays act like normal variables, but hold much more data:
- Arrays are lists, and individual elements are accessed by the [] operator

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```
<?php
$var1 = array(2, 4, 8, 16, 32);
echo $var1[3];
?>
```

example/exp7.php



16

- Arrays are usually accessed by a number that represents the position of the variable we want
- Arrays can also be created and accessed by a keyword:

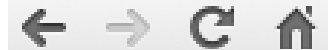
```
<?php
$courses = array("DBS"=>"Database Systems",
                 "PRG"=>"Programming");
echo $courses["DBS"];
?>
```

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example/exp8.php



Database Systems

- Arrays are important because MySQL will give us an array of data when we write a query.

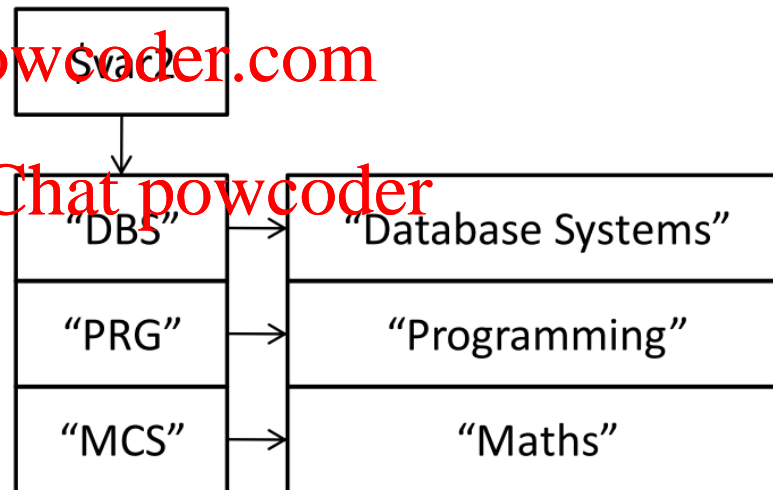
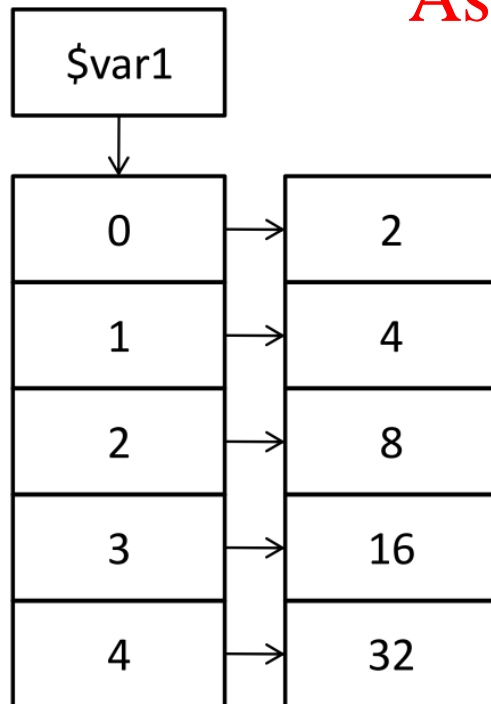
```
$var1 =  
array(2, 4, 8, 16, 32);
```

```
$var2 = array(  
    "DBS" => "Database Systems",  
    "PRG" => "Programming",  
    "MCS" => "Maths");
```

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See example/exp9.php

IF...ELSE

- Sometimes we might want to choose what code to run depending on our variables:

```
if (condition)
{
    // Code to run if
    // condition is true;
}
```

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IF...ELSE

- Conditions can be boolean variables, or other expressions.
- Conditions will include a single IF, any number of ELSE IFs, and then an optional ELSE
- Conditional operators are similar to those in MySQL.
- E.g. <, >, ==, !=, <>, etc.

```
$var1 = true;  
$var2 = 15;  
if ($var1)  
{  
    // Code  
}  
else if ($var2 < 5)  
{  
    // Code  
}
```

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- Be careful when using IF statements with or without ELSE.

```
$x = 15;  
if ($x > 10)  
{  
    echo "Out";  
}  
else if ($x > 5)  
{  
    echo "put";  
}
```



Out

- These two IF...ELSE statements are not the same!

```
$x = 15;  
if ($x > 10)  
{  
    echo "Out";  
}  
if ($x > 5)  
{  
    echo "put";  
}
```



Output

example/ex10.php

Loops

- Sometimes we need to run similar code multiple times
- We can use a loop to run the same code repeatedly
- Three types of loops (We only need WHILE for this course though)
 - WHILE
 - DO...WHILE
 - FOR

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While Loops

- While loops are structured like this:

```
while (condition)
{
    // Code a
}
```

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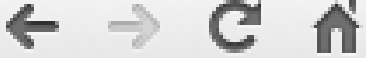
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- Code a will be run repeatedly until that condition is false

- Let's echo the contents of the array we created earlier, using loops:

```
$index = 0;  
$var1 = array(2, 4, 8, 16, 32);  
while ($index < count($var1))  
{  
    echo $var1[$index] . ", ";  
    $index = $index + 1;  
}
```

example/exp11.php



2, 4, 8, 16, 32,

Functions

- If you wish to reuse code, you can put it in a function to access it later.
- We won't go into creating functions now, but sometimes it's helpful to make use of functions that already exist. For example:

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```
count($array);  
mysqli_close($connection);  
print_r($array);
```

Connection to MySQL

- PHP includes various functions for communicating with a MySQL server

```
mysqli_connect("server", "username", "password");
```

- Connects to the database and returns a connection resource
- Host will usually be "localhost" if you're running at home

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```
mysqli_select_db(connection resource, "dbname");
```

- Will change the server to required database
- Will return a boolean stating whether this action was successful

Connecting to MySQL

- In both the previous commands, if anything goes wrong, we should stop processing the PHP file

- You can terminate a PHP script using the die keyword: <https://powcoder.com>

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```
die ("A problem has occurred!");
```



```
$conn = mysqli_connect("localhost", "username", "password");

if(!$conn)
{
    die ("Error connecting to MySQL: " . mysqli_error($conn));
}

// // database cdcol likely does not exist, and so die
$db_select_success = mysqli_select_db($conn, "cdcol");

if(!$db_select_success)
{
    die ("Error selecting database: " . mysqli_error($conn));
}
else
{
    echo "MySQL database: cdcol selected.";
}
```

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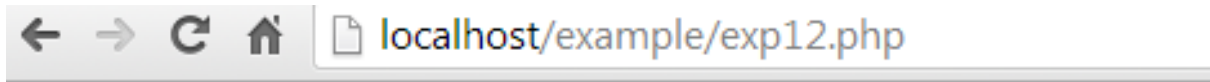
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See exp12.php

Connecting to MySQL

- Cannot connect to DB

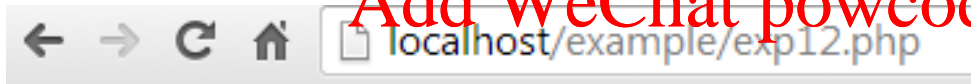


Warning: mysql_connect(): Access denied for user 'username'@'localhost' (u:
Error connecting to MySQL: Access denied for user 'username'@'localhost' (1

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Change username/password

- Cannot select DB (not exist)

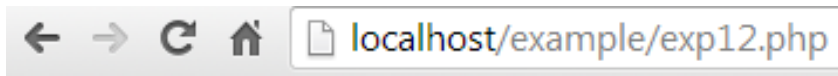


Error selecting database: Unknown database 'testdb'

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Change "testdb" to "cs250"

- Success!



MySQL database: cdcol selected.

If database "cdcol" exists

Includes

- Keeping our password in plain text inside our PHP document isn't very secure
- In PHP you can include code from other files for reuse later
- In this case, we can separate out our connection code for security. It also makes our code more concise.

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Includes

- There are 4 commands that can include files:

```
include("file.php")
```

- Includes all code from file.php at this location in the current php script

```
include_once("file.php")
```

- As above, but only once. If you include_once a second time, nothing will happen

```
require("file.php") /  
require_once("file.php")
```

- As above, but if any errors occur in the included file, the php scripting will stop immediately

- See mainfile.php

```
<html>
<head>
<title>Title</title>
</head>
<?php
require_once("dbconnect.php");
// Some code that uses our
// database connection goes
// here
?>
</body>
</html>
```

See full content in dbconnect.php
it will create database cdcol if necessary.

- See dbconnect.php

```
$conn = mysqli_connect(
    "localhost",
    "username", "password");
if (!$conn)
{
    die ("Error connecting to
    MySQL:" .
    mysqli_error($conn));
}

$db_select_success =
    mysqli_select_db($conn,
        "cdcol");

if (!$db_select_success)
{
    die ("Error selecting
    database:" .
    mysqli_error($conn));
}
```

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Using a MySQL Connection

- All SQL commands are sent to the server using the following commands:

```
mysqli_query($conn, "SQL Statement");
```

- Sends the SQL statement to the database at the given connection

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- You can use any SQL command via the `mysqli_query()` function. For example:

```
$query = "CREATE TABLE Artist(  
    artID INT NOT NULL,  
    artName VARCHAR(255) NOT NULL,  
    PRIMARY KEY (artID) )";
```

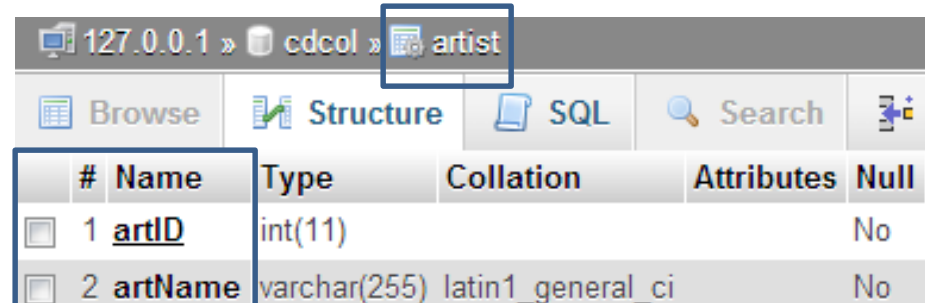
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```
$success = mysqli_query($query);  
// success will be true if the table was  
// created
```

example/create.php
MySQL database: cdcol selected.
Create table Success!



#	Name	Type	Collation	Attributes	Null
1	artID	int(11)			No
2	artName	varchar(255)	latin1_general_ci		No

HTML form and PHP insert

See artist_insert.html

- PHP can interact with HTML form

```
<html>
<body>
```

The PHP that handles
the form

PHP use these names to
retrieve submitted data

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Give me an artist:

```
<form action="insert.php" method="post">
```

```
ID: <input type="text" name="aid">
```

```
Name: <input type="text" name="aname">
```

```
<input type="submit">
```

```
</form>
```

See artist_insert.html

```
</body>
```

```
</html>
```

← → ↻ 🏠 📄 localhost/example/artist_insert.html

Give me an artist:

ID: Name:

Press

PHP handling form

See insert.php

```
<?php
require_once("dbconnect.php");
?>
</br>
```

Attribute names
and SQL statements

```
<?php
$sql="INSERT INTO aname (aid,aname)
VALUES ('$_POST[aid]', '$_POST[aname]')";
```

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```
if (!mysqli_query($conn, $sql))
{
    die('Error: ' . mysqli_error($conn));
}
else
{
    echo "1 record added";
}
mysqli_close($conn);
?>
```

Must match HTML
form element name

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See insert.php

← → ↻ 🏠 📄 localhost/example/insert.php

MySQL database: cdcol selected.

1 record added

SELECT in PHP

- For SELECT, SHOW and DESCRIBE commands, `mysqli_query()` will return a set of results:

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```
$query = "SELECT * FROM Artist";  
$result = https://powcoder.commysqli_query($conn, $query);
```

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- `$result` will now hold all our returned rows

Using SELECT Results

- To use the values in `$result`, we use the following command:

```
$row = mysqli_fetch_array($result);
```

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- `$row` will be an array containing all the data from one row of our result set
- Each time we use the above statement the next row will be returned
- When no rows are left, `$row` will be false

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Using SELECT Results

- Because `mysqli_fetch_array()` will return false when no rows remain, we can use a while loop to make things easier:

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```
while($row = mysqli_fetch_array($result))  
{  
    // Use the data in $row  
}  
// We reach this point when we have  
// used every row
```

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- Once we have each row individually, we can use the data like any regular array:

```
<?php
while ($row = mysqli_fetch_array($result))
{
    echo "Artist ID: " . $row["artID"];
    echo "</br>";
    echo "Artist Name: " . $row["artName"];
    echo "</br></br>";
}
?>
```

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← → ↺ 🏠 📄 localhost/example/view.php

MySQL database: cdcol selected.

Artist ID: 0

Artist Name: Gary

[See view.php](#)

Artist ID: 12

Artist Name: Tam

Artist ID: 16

Artist Name: Me

Attribute names in the returned table

HTML Tables (revisit)

- Sometimes it might be useful to output our results into an HTML Table. A table takes the following form:

```
<table>  
<tr>  
<td>Row 1 Col 1</td>  
<td>Row 1 Col 2</td>  
</tr>  
<tr>  
<td>Row 2 Col 1</td>  
<td>Row 2 Col 2</td>  
</tr>  
</table>
```

HTML Tables (revisit)

```
<table>
```

```
<tr>
```

```
<td>Row 1 Col 1</td>
```

```
<td>Row 1 Col 2</td>
```

```
</tr>
```

```
<tr>
```

```
<td>Row 2 Col 1</td>
```

```
<td>Row 2 Col 2</td>
```

```
</tr>
```

```
</table>
```

Row 1 Col 1	Row 1 Col 2
Row 2 Col 1	Row 2 Col 2

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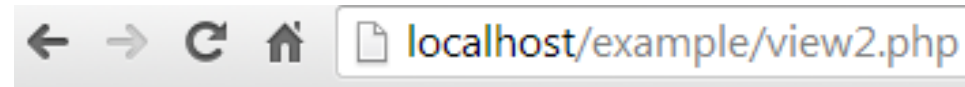
- Creating a table in php is simply a case of using ECHO to output the necessary tags.

```
echo "<table width='100' border='1'>";
while ($row = mysqli_fetch_array($result))
{
    echo "<tr>";
    echo "<td>" . $row["artID"] . "</td>";
    echo "<td>" . $row["artName"] . "</td>";
    echo "</tr>";
}
echo "</table>";
```

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MySQL database: cdcol selected.

0	Gary
12	Tam
16	Me

[See view2.php](#)

Putting all together

See artist.php

- See artist.php
- Understand this will help you on CW2
- = artist_insert.html + insert.php + view2.php

MySQL database: cdcol selected.

0	Gary
12	Tam
16	Me
21	What
32	Dave
123	hello

Add an artist:

ID:

Name:

MySQL database: cdcol selected.

1 record added

0	Gary
12	Tam
16	Me
21	What
32	Dave
60	Dave
90	Neal
123	hello

Add an artist:

ID:

Name:

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HTML Tables (revisit 2)

```
<table border="1">
  <tr>
    <td>Row 1 Col 1</td>
    <td>Row 1 Col 2</td>
  </tr>
  <tr>
    <td>Row 2 Col 1</td>
    <td>Row 2 Col 2</td>
  </tr>
</table>
```

Row 1 Col 1	Row 1 Col 2
Row 2 Col 1	Row 2 Col 2

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Nested Tables for Layout

```
<table border="1">
  <tr>
    <td>Row 1 Col 1</td>
    <td>Row 1 Col 2</td>
  </tr>
  <tr>
    <td>Row 2 Col 1</td>
    <td>
```

Row 1 Col 1	Row 1 Col 2		
Row 2 Col 1	<table><tr><td>Row 2 Col 2 Row A</td></tr><tr><td>Row 2 Col 2 Row B</td></tr></table>	Row 2 Col 2 Row A	Row 2 Col 2 Row B
Row 2 Col 2 Row A			
Row 2 Col 2 Row B			

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```

    <table border="1">
      <tr>
        <td>Row 2 Col 2 Row A</td>
      </tr>
      <tr>
        <td>Row 2 Col 2 Row B</td>
      </tr>
    </table>
  </td>
</tr>
</table>
```

CW2 don't need CSS style
for layout.

Don't waste time on it.

https://www.tutorialspoint.com/html/html_tables.htm

More PHP?

- This is a database course, **NOT** web programming.
- These slides are enough for your CW2 :)
- If you want to learn more, you can try these:



- Remember:
 - We are **NOT** code monkey
 - We are computer scientists
 - learn the theory and adapt
 - through lifelong self-learning

References

- XAMPP installation procedure

<http://www.youtube.com/watch?v=92OrtkZZStg>

- Accessing MySQL data from PHP

<http://www.youtube.com/watch?v=UFbHWTkeB-I>

<https://powcoder.com>

- PhpMyAdmin [Add WeChat powcoder](#)

<http://localhost/phpmyadmin>

- PHP manual

<http://php.net/manual/en/index.php>