



WEEK 6

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PERSISTING DATA

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HTML IS STATELESS!

- Every web page/file is an island - ie, information cannot transfer from one page to another without intentionally passing it along
- Mechanisms for persisting data
 - Cookie
 - `$_COOKIE`
 - Can set an expiration date
 - Local storage
 - `localStorage.setItem(key,value)`
 - `localStorage.getItem(key)`
 - sessionStorage object
 - Usage is the same as for localStorage
 - Data expires when the browser closes
 - Hidden field
 - Requires a form
 - `<input type = 'hidden'`
 - Data is passed to next page only
 - Requires server-side processing
- Database
 - Data is stored separately from the website
 - A database is an organized collection of data, generally stored and accessed electronically from a computer system. (Wikipedia)
 - Two popular database technologies today:
 - RDBMS/SQL
 - MySQL, Oracle
 - NoSQL (not only SQL)
 - Mongo, Couchbase, Firebase

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RDBMS

- Entities are placed in separate units called *tables*
- Reduction of *redundancy*
- *Optimized for size and efficiency of data*
- Query using SQL

NOSQL

- Originated in 1998
- Better for massive amount of data
- No schema
 - No tables (documents)
- Key value pairs
- No query language

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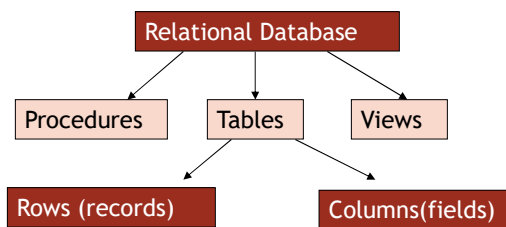
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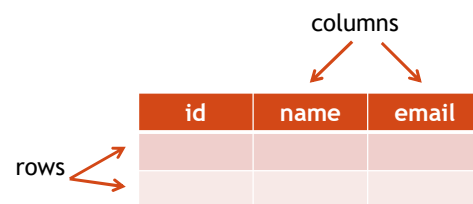
RELATIONAL DATABASE

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RELATIONAL DATABASE MODEL



Tables have columns and rows (records)

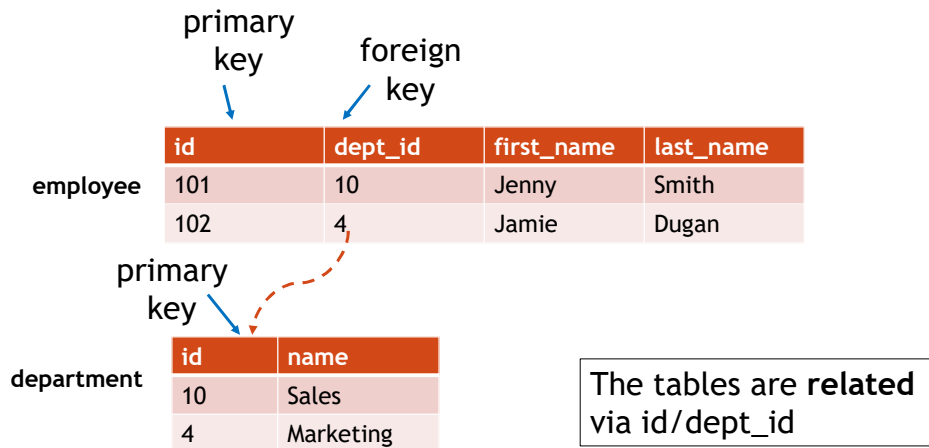


Columns have a name and a data type



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PRIMARY KEY – FOREIGN KEY RELATIONSHIPS

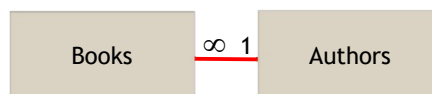


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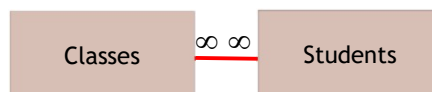
ONE TO MANY

There are three possible relationships between two entities:

- 1 to 1
 - There is one item in entity A that matches one item in entity B- not useful
- 1 to Many
 - 1 item in entity A relates to several items in entity B



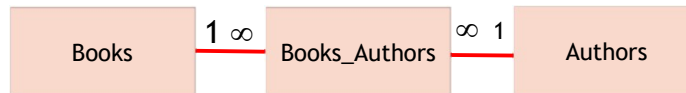
- Many to Many
 - Many items in entity A relate to many items in entity B



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ASSIGNMENT TABLES

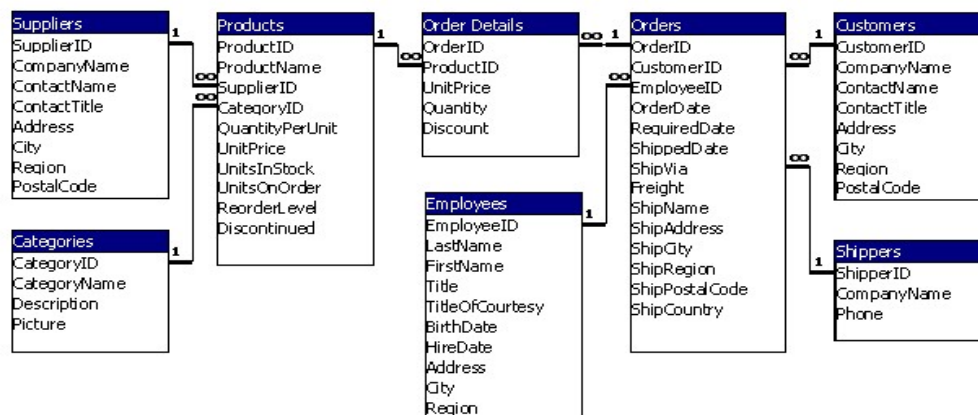
- Many to many relationships are not permitted in a relational database.
- In order to make this work, add a third table as an association or assignment table
- The **assignment table** sits *between* the other two creating two sets of 1-many relationships.



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SAMPLE DB : NORTHWIND

ERD (entity relationship diagram)



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SQL: STRUCTURED QUERY LANGUAGE

- Data retrieval
- Set up structure of the data
- Insert data
- Roles and permissions

- Practice: https://www.w3schools.com/sql/trysql.asp?filename=trysql_asc

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THE SELECT STATEMENT

- Creates database queries
- No special formatting rules
- Case insensitive
- Can involve one or more tables
- Table prefixes - must be used when there is ambiguity. Otherwise, they are optional
 - categories vs. northwind.categories

```
SELECT fields
FROM tables
WHERE conditions
ON join multiple tables
GROUP BY columns
HAVING grouping criteria
ORDER BY columns
```



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FILTERING COLUMNS

- The SELECT statement can be used to display data from one or more columns.
 - Use * as a wildcard to indicate all columns
 - Separate columns with a comma
 - The clause ORDER BY specifies the sort column
-
- select * from table1 *show all columns*
 - select col1 from table1 *show column1 only*
 - select col1, col2 from table1 *show column1 and column2 only*

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DISTINCT

- The **DISTINCT** modifier limits the results to unique values
 - select distinct city from employees
- **List all countries in which there are suppliers - no repeats**
- **How could this be useful?**



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FILTERING ROWS: THE WHERE CLAUSE

```
select lastname, region
from employees
```

lastname	region
Davolio	WA
Fuller	WA
Leverling	WA
Peacock	WA
Buchanan	
Suyama	
King	
Callahan	WA
Dodsworth	

```
select lastname, region
from employees
where region='WA'
```

lastname	region
Davolio	WA
Fuller	WA
Leverling	WA
Peacock	WA
Callahan	WA

Try it: Get all product names and their price

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LOGICAL & COMPARISON OPERATORS USE WITH WHERE CLAUSE

- = equals
- <> not equals
- < less than
- > greater than
- <= less than or equal
- >= greater than or equal

▪ select * from table1 where col = 4

Sometimes you will want to apply two or more criteria

In this case use OR or AND to combine logical comparisons

where abc < 10 or def = 'x'



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SPECIAL CLAUSES

- Checking for Values in a Range
 - Use BETWEEN clause
 - WHERE salary **BETWEEN** 10 **AND** 20
 - WHERE salary **NOT BETWEEN** 10 **AND** 20
- Checking for Missing Values - IS NULL
 - `select * from employees
where region is null`
- IN clause
 - Allows multiple values for value criteria
 - WHERE state IN ('ma', 'ct', 'vt', 'me')

LIKE: Pattern Matching

- Allows criteria similar to regular expression
 - % any number of chars
 - _ any single char
- *Example: Get employees whose last names begin with "D"*

```
select lastname from employees  
where lastname like 'd%'
```



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WORKING WITH DATES

- To reference a date, use quotes

```
select lastName, birthdate from employees  
where birthdate= '1948-12-11'
```
- Date functions: month(), day(), year()

```
select lastName, birthdate from employees  
where year(birthdate)= 1948
```



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WORKING WITH MULTIPLE TABLES: JOINS

- Example: Show all products and the company name of the supplier for all products that cost less than \$10

```
select products.productname, suppliers.companyname  
FROM products INNER JOIN suppliers  
ON products.supplierid = suppliers.supplierid  
where products.unitprice < 10
```

```
select p.productname, s.companyname  
FROM products p, suppliers s  
WHERE products.supplierid = suppliers.supplierid  
AND p.unitprice < 10
```

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PHP

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INTRODUCING PHP

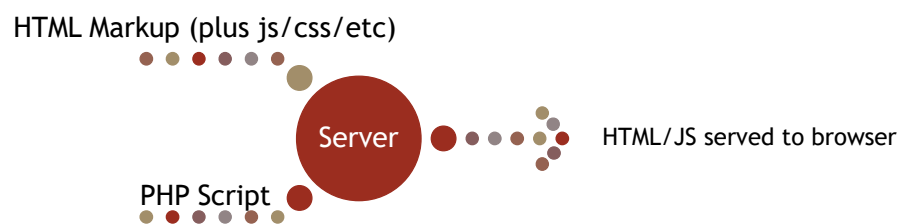
- PHP Hypertext Preprocessor
- Allows execution at the server
 - Browser independent
 - Easy access to server resources (files, database)
 - Forms processing
- .php is the extension that most Web servers use to recognize PHP scripts
- Deploying PHP: Must execute on a server!
 - cPanel hosting
 - default.php is often the designated default page (analogous to index.html)
 - WAMP/MAMP
 - Local - eventually will need to be deployed online
 - Needs to be installed and “started up”
 - Other local server



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PHP SCRIPT FITS IN WITH HTML

- PHP script code is embedded within the web page
- .php is the default extension that most Web servers use to recognize PHP scripts



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ECHO – DISPLAYS TO THE PAGE

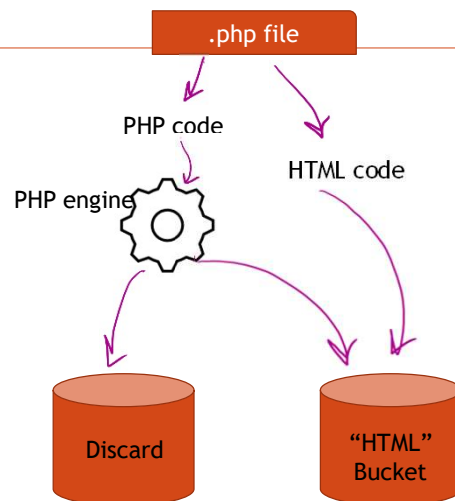
```
<html>
<head><title>My first PHP Page</title></head>
<body>
<!-- The following is a php "code island" -->
<?php
    echo "<p>Hello World!</p>";
?>
</body>
</html>
```



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THREE “VIEWS”

1. Original code - i.e, .php file
 2. What it looks like in the browser
 3. The browser “source”
- Bottom line: only someone with access to the server can see or modify php code.



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PHP BASICS & VARIABLES

- Comments
 - `/*` this is a comment `*/`
 - `//` this comment ends at the end of the line
 - Statements
 - End with semicolon (`;`)
 - Identifiers
 - Letters, numbers,underscores
 - MUST start with a dollar sign (`$`)
 - Can't have a number right after the `$`
 - Case sensitive
 - Variables are loosely typed
 - No separate variable declaration needed
- `"."` for concatenation
 - Single or double quotes for strings
 - No concatenation needed with double quotes with a variable.
This does not work with an expression
 - `$y = 10;`
 - `echo "The answer is $y ";`
 - `echo "The answer is ".$y;`
 - `echo 'The answer is ' . $y;`
 - `echo "The answer is ($y*2)"; //no!`



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FIGURE IT OUT

Which identifier/names
are NOT valid?

1. `abcabc`
2. `$Name`
3. `$_Age`
4. `maxValue`
5. `$max value`
6. `$1Name`
7. `$_Name91`
8. `$Name's`
9. `$oneName91`



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FYI: TYPE CASTING

- May be needed when you have an expression with different types- for example, a floating point and an integer
- PHP will use implicit conversion whenever possible - conversion occurs, but it is transparent to the developer. Usually, this does what you would want - but not always. you have a string when you wanted a number or vice versa. At other times explicit conversion using casting is needed
- To cast, preface the expression by the desired type in parenthesis. Casting does not permanently change the variable
 - `$amt = (int)($amt * 1.15);`
- Be careful: `(int)($amt * 1.15);`
is not the same as ...
`(int)$amt * 1.15;`
- Use `gettype()` to determine the type of a variable.
- Concatenate a number with a string and it is a string.
- Explicit type declarations can be added to function parameters, function return values, and class properties:
`function foo(int $x){}`

See: <https://www.php.net/manual/en/language.types.type-juggling.php>



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OPERATORS

- All the “usual” operators you know from Javascript
- “strict” comparison
 - data type must match as well as the value

`===`
`!==`

```
$x = 10; $y = "10"; $z = 15;
```

```
$x == $y;    // true  
$x === $y;   // false  
$x > $y;     // false  
$x < $z;     // true
```



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CONDITIONALS AND LOOPS

```
if ( )  
{  
}
```

Alternate form of if statement (and others)

```
if ( ) :  
endif;
```

- *Constructs:* *if, while, do - while, for, foreach, and switch*



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PHP FUNCTION LIBRARY

- rand(start, end);
- isset / empty
- count
- header
 - header("Location:http://my.url.com");
- max/min
- ceil/floor
- mail
- Many string and array functions
 - strpos
 - in_array
- Date and time functions
 - Be careful about the local time!

More at:
<https://www.exakat.io/en/the-100-php-functions-in-2022/>
<https://php.net>
<https://www.php.net/manual/en/function.date.php>



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MAIL- SEND EMAIL FROM YOUR APPLICATION

- `mail ($to , $subject , $message);`
- `mail("bobjones@yahoo.com",
"Inquiry Response",
"Thank you for your interest in My App");`

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FUNCTION SYNTAX

```
// randomly select a message
function randomMessage()
{
    $n = rand(1,3);
    switch($n)
    {
        case (1):$msg = "Have a great day!";
            break;

        case (2):$msg = "Check our Daily Specials";
            break;

        case (3):$msg = "Welcome Back!";
    }
    return $msg;
}
```

```
function myFunction ($p1, $p2)
{
    // code here
    return $myVal;
}
$p = myFunction(1,2);    //call the function
```



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FYI: VARIABLE SCOPE

- Local variables are defined within a function
 - Scoped to the function. Do not persist beyond the function.
- Global variables are defined outside of a function
 - Scoped to functions that use the global declaration.

```
$x = 1;  
function foo()  
{  
    global $x;  
}
```

- Static variables (declared as static) are scoped within a function but- they persist beyond the function.
 - They must be initialized in the function when they are declared.

