CRUD

Code 301

WHY PERSISTENCE?

- It would be frustrating and disappointing if all your data kept disappearing.
- Web applications need a way to store data. This process is also called persistence.
- Persistence is typically on the server, but can also be in the browser.

WHAT IS A DATABASE?

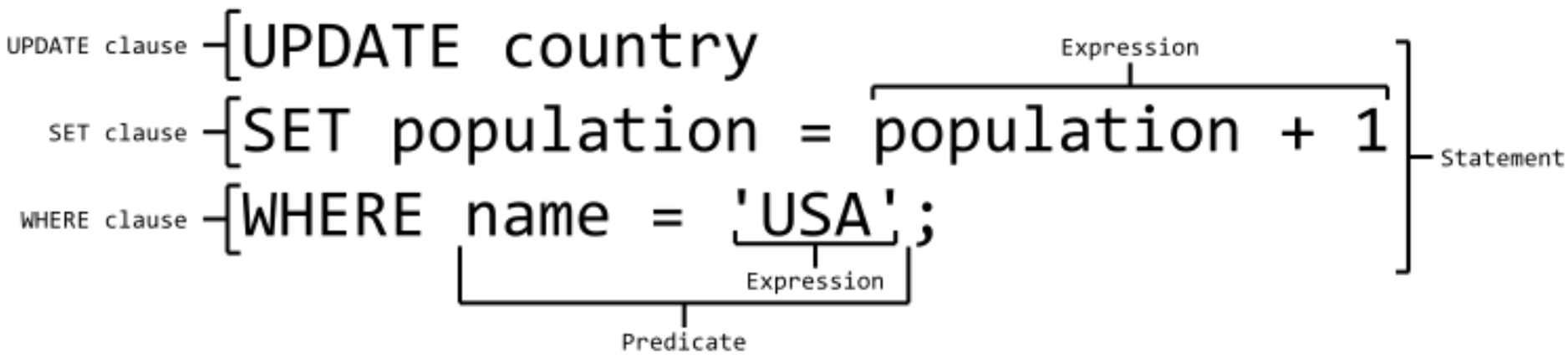
- A database is an organized collection of data.
- Database Management Systems (DBMS) have a wide variety of internal architectures, but typically they are composed of tables of data.
- Another rapidly growing alternative are documents.
- We will stick to table based databases because they are still the most common.

DATABASE TABLES

id	Name	Age	Billing Rate	Hours
01	Keesha	28	75.00	40
02	Mark	42	100.00	20
03	Pam	35	123.35	10

STRUCTURED QUERY LANGUAGE (SQL)

- Structured Query Language (SQL) is a special-purpose programming language designed for managing data. Developers use SQL for inserting new data, retrieving data, updating data, and deleting data.
- SQL statements are made up of clauses, expressions, and predicates as you can see in the image below:



QUERIES

- A query retrieves data from one or more tables, or expressions.

```
SELECT isbn,
       title,
       price,
       price * 0.06 AS sales_tax
FROM  Book
WHERE price > 100.00
ORDER BY title;
```

DATA DEFINITION LANGUAGE

- Data Definition Language (DDL) manages the table and index structure.
- The most basic statements in DDL are:
  - CREATE (http://www.w3schools.com/sql/sql_create_table.asp)
  - ALTER (http://www.w3schools.com/sql/sql_alter.asp)
  - DROP (http://www.w3schools.com/sql/sql_drop.asp)
  - TRUNCATE (http://www.w3schools.com/sql/sql_drop.asp)

DATA DEFINITION LANGUAGE

- Here's an example of create:

```
CREATE TABLE example(
        column1 INTEGER
        column2 VARCHAR(50),
        column3 DATE NOT NULL,
        PRIMARY KEY (column1, column2)
);
```

DATA TYPES

- A data type is a constraint on the kind of data a column can have.
- Having strong types helps you collect accurate and valid data.
- Example types are:
  - Integer
  - Float
  - Char
  - Varchar
  - Text
  - Date
  - Time

WHAT IS A MODEL?

- Models are, in essence, a simplified description of a real world object. A database table is a simple model.
- In object-oriented code, models are objects. The columns correspond to properties. Here's an example constructor in JavaScript:

```
function Employee(name, age, billingRate, hours) {
    this.name        = name;
    this.age         = age;
    this.billingRate = billingRate;
    this.hours       = hours;
}
```

WHAT IS A MODEL?

- Models can also have behavior. In our example, you could have a function (method) that calculates the amount owned per employee. It would be Billing Rate times Hours. In JavaScript it looks like:

```
Employee.prototype.amountOwed = function (billingRate, hours) {
  return billingRate * hours
}
```

MODELING YOUR DATA WITH SQL

- Create tables to model your objects

```
CREATE TABLE employees(
        id INTEGER PRIMARY KEY
        name VARCHAR(50)
        age INTEGER,
        billingRate INTEGER,
        hours INTEGER
);
```

SQL IN BROWSER

CREATING A WEBSQL DATABASE

- Use the Chrome Browser (best supported)
- To create and open a database, use the following code:

```
var db = openDatabase ('blogDb', '1.0', 'Blog Database', 5 * 1024 *
1024);
```

1. Database name
2. Version number
3. Text Description
4. Estimated database size

AN ALTERNATIVE

CREATING A WEBSQL DATABASE WITH HTML5SQL

- Use the Chrome Browser (best supported)
- To create and open a database, use the following code:

```
html5sql.openDatabase (
  'blogDb', 'Blog Database', 5 * 1024 * 1024
);
```

1. Database name
2. Text Description
3. Estimated database size

USING THE HTML5SQL.PROCESS METHOD

- Allows you to execute SQL statements sequentially.
- You can specify a success and error callback function.

```
html5sql.process (
  "SELECT * FROM articles;",
  successCallback,
  errorCallback
);
```

USING THE HTML5SQL.PROCESS METHOD

- The success callback will be passed arguments
- The *transaction*, the *results*, and, optionally, the *resultsArray*
- For example, to select and log all records:

```
html5sql.process (
  "SELECT * FROM articles;",
  function(tx, results, resultsArray) {
    console.log(resultsArray);
  }
);
```

CREATING A WEBSQL TABLE

- Name the table and list the desired columns and data types.

```
html5.process (
  "CREATE TABLE articles (id INTEGER PRIMARY KEY, title
VARCHAR(255), author VARCHAR(255));"
);
```

CREATED TABLE

id	title	author

CREATE

CRUD

INSERTING RECORDS INTO A WEBDB TABLE

- Use INSERT INTO
- Name the columns you wish to affect and list the values for the record.

```
INSERT INTO articles (title, author)
VALUES  ('Bacon Ipsum', 'Kevin Bacon');
```

TABLE WITH NEW RECORD

id	title	author
1	Bacon Ipsum	Kevin Bacon

READ

CRUD

QUERYING DATA IN A WEBDB TABLE

- Use the SELECT clause with optional constraints to build rich queries.

```
SELECT title, author, publishedOn
FROM  articles
WHERE publishedOn BETWEEN '2013-01-01' AND
'2013-12-31'
ORDER BY author;
```

QUERY RESULT (EXCERPT)

title	author	publishedOn
Connecting Auxiliary Online Transmitters	Amara Larkin	2013-05-11
Programming Digital Redundant Interface Systems	Amara Larkin	2013-02-23
Parsing Cross-platform Auxiliary Panels	Amara Larkin	2013-07-11

UPDATE

CRUD

UPDATING RECORDS IN A WEBDB TABLE

- Use the UPDATE clause to alter an existing record.

```
UPDATE articles

SET  author = 'Kevin Bacon'

WHERE author = 'Keven Bacron'
```

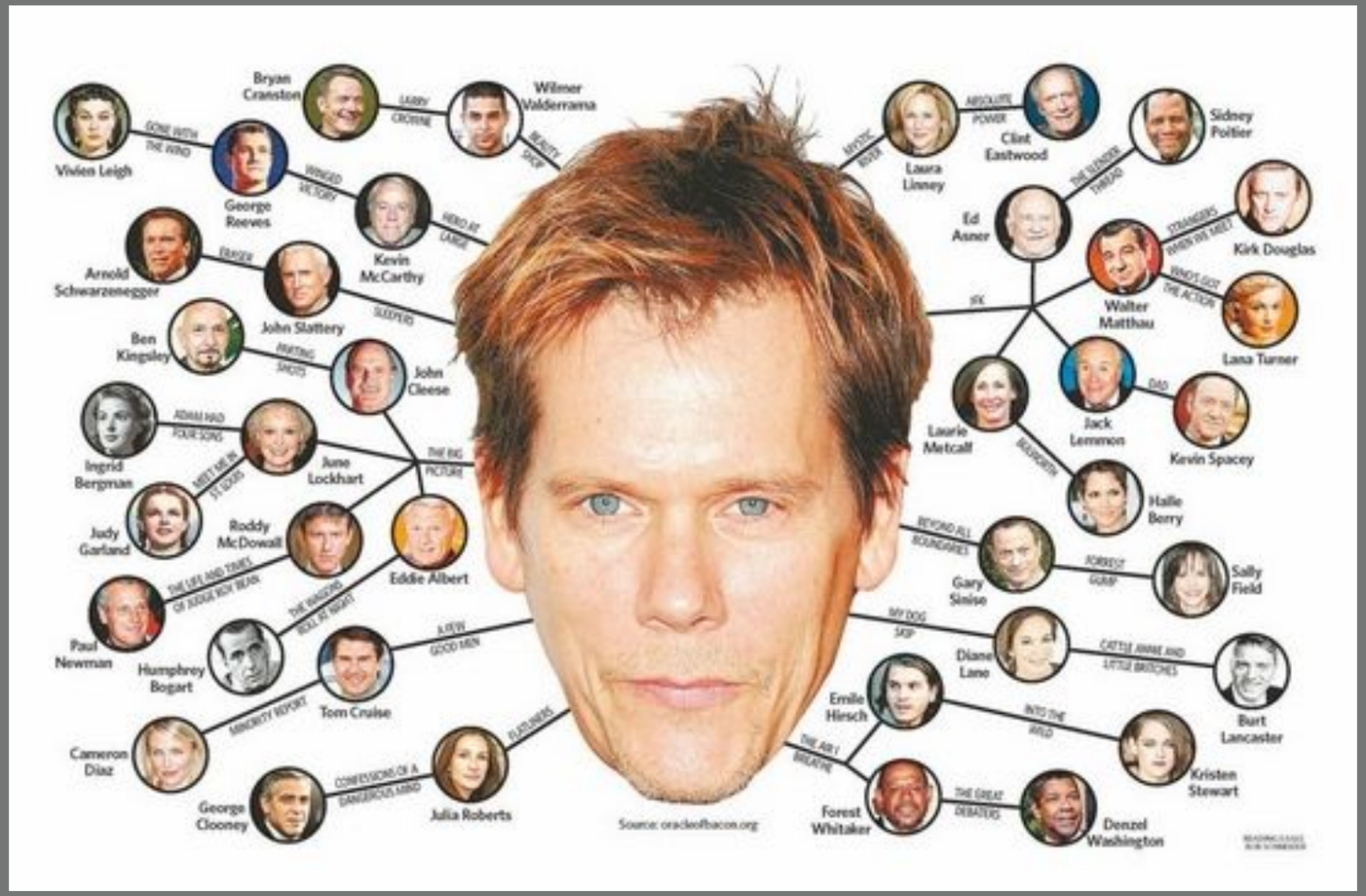
ALWAYS USE A CONDITION WITH UPDATE!

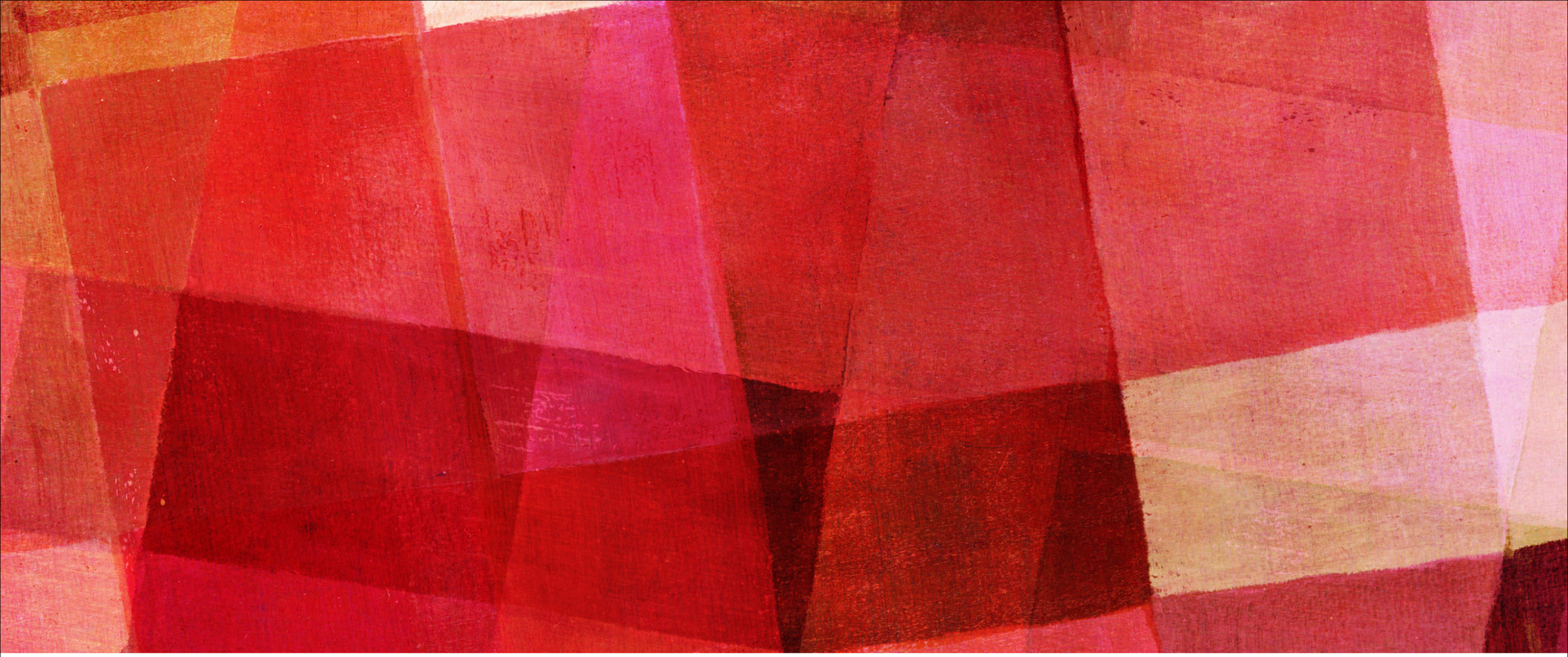
- You must remember to use a condition when you using update to avoid affecting ALL records.

```
UPDATE articles

SET  author = 'Kevin Bacon'

WHERE author = 'Keven Bacron'
```


Bryan Cranston
Wilmer Valderrama
Vivien Leigh
George Reeves
Kevin McCarthy
Arnold Schwarzenegger
John Slattery
Ben Kingsley
John Cleese
Ingrid Bergman
June Lockhart
Judy Garland
Roddy McDowall
Eddie Albert
Paul Newman
Humphrey Bogart
Tom Cruise
Cameron Diaz
George Clooney
Julia Roberts
Laura Linney
Clint Eastwood
Sidney Poitier
Ed Asner
Kirk Douglas
Walter Matthau
Lana Turner
Laurie Metcalf
Jack Lemmon
Kevin Spacey
Halle Berry
Gary Sinise
Sally Field
Diane Lane
Burt Lancaster
Emile Hirsch
Kristen Stewart
Forest Whitaker
Denzel Washington
Source: oracleofbacon.org



DESTROY!

CRUD

DELETING RECORDS IN A WEBDB TABLE

- Use the DELETE FROM clause to remove an existing record.

```
DELETE FROM articles

WHERE author = 'Keven Bacron'
```

CRUD

Code 301