introduction to

SCRIPTING, DATABASES, SYSTEM ARCHITECTURE

Claus Brabrand

(((brabrand@itu.dk)))

Associate Professor, Ph.D.

(((Theoretical Computer Science)))

IT University of Copenhagen

⊢ Agenda for Today

Course Introduction:

- **Welcome**
- **About the Course**
- **Course Schedule and Structure**
- **Web Services**
- **Last Year's Exam: "*La Pizzeria*"**

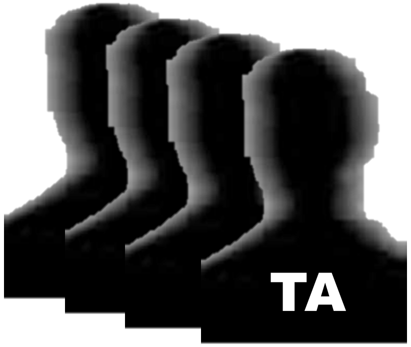
⊢ Teaching

- **Lectures:**
  - FRIDAYS (09:00 – 11:30)
    - Auditorium 2
- **Exercise Classes:**
  - FRIDAYS (11:30 – 14:00)
    - GameLab, 4A56, 4A58

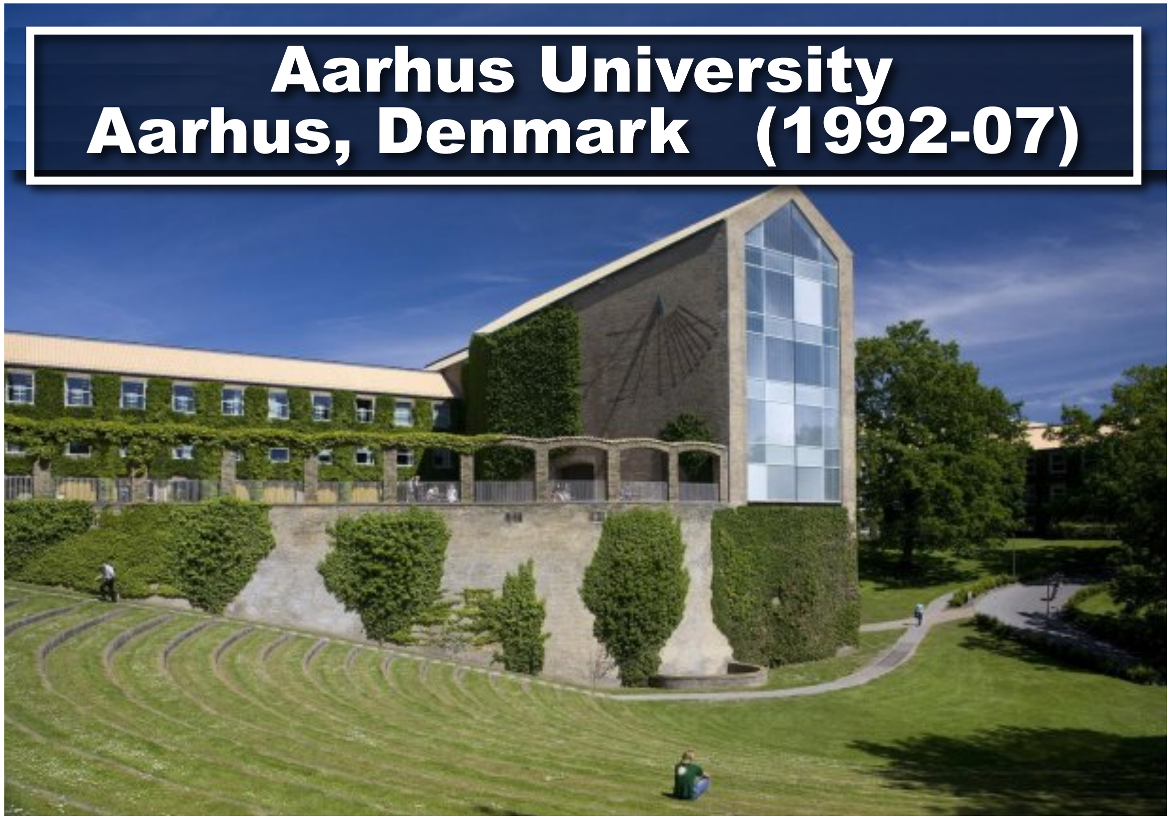
⊢ Teachers

- **Lecturer:**
  - Claus Brabrand

- **Teaching Assistants:**
  - Håkan Lane
  - Jacob Glerup Bachmand Andersen
  - Line Juhler Schmidt
  - Victor Golubei



Education



Aarhus University
Aarhus, Denmark (1992-07)

- **M.Sc.** (1999)
- **Ph.D.** (2003)

Ph.D. Dissertation:

"Domain Specific Languages for Interactive Web Services"

(2003)

- **Tenure** (2007)
  (→ ITU, Sep '07)

Abroad...

Université Louis Pasteur,
Strasbourg, France (1995-96)

IBM Research Center
New York, USA (2001)

INRIA Research Center
Bordeaux, France (2003)

Federal Uni. of Pernambuco
Recife, Brazil (2010)

⊢ Goal of the Course

- To learn how to use…:
  - *"web development techniques for implementing **interactive web services** that make use of databases to store information"*

- Prerequisites:
  - **HTML** (HyperText Markup Language)
  - **CSS** (Cascading Style Sheets)

- This course:
  - **PHP** (Hypertext Preprocessor)
  - **SQL** (Structured Query Language)
  - **Web Services = PHP + SQL** **+ HTML**

⊢ Intended Learning Outcomes

- After the course, you are expected to be able to…:

Intended Learning Outcomes:

- 1) **plan** and **develop** medium sized web applications using the scripting language, PHP;
- 2) **design** small SQL databases;
- 3) **construct** PHP scripts that interact with databases using SQL;
- 4) **describe** the techniques behind DB-driven web applications;
- 5) **describe** the fundamental system architectural considerations behind web applications so as to be able to communicate and collaborate with programmers and technologists.

⊢ Exam

- Exam will “measure” to what degree you have acquired the **intended learning outcomes**:

- **Individual 48-hour take-home exam:**
    - **WINTER 2012-2013 (Some time in January)**

- **Note:** you may **not** solicit collaboration during the exam period (constitutes exam fraud)!
- **Note:** 20% will be asked to step aside for a short validation discussion (not part of exam)

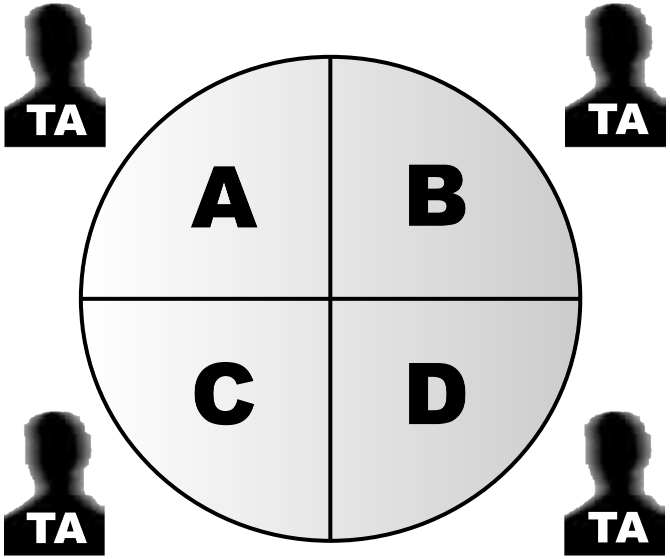
⊢ Assignments

- **11 mandatory assignments**:
  - You need **10 out of 11** approved (by mid December) in order to qualify for the exam

- Idea: work on assignment during exercise classes that follows each week's lecture (individual hand-in, collaboration encouraged)
- Assignments are handed in by placing them in your personal folder on the ITU network (**W:**) according to a naming convention (more later)

⊢ 83 Students in 4 Groups

- You will be divided into 4 groups...:



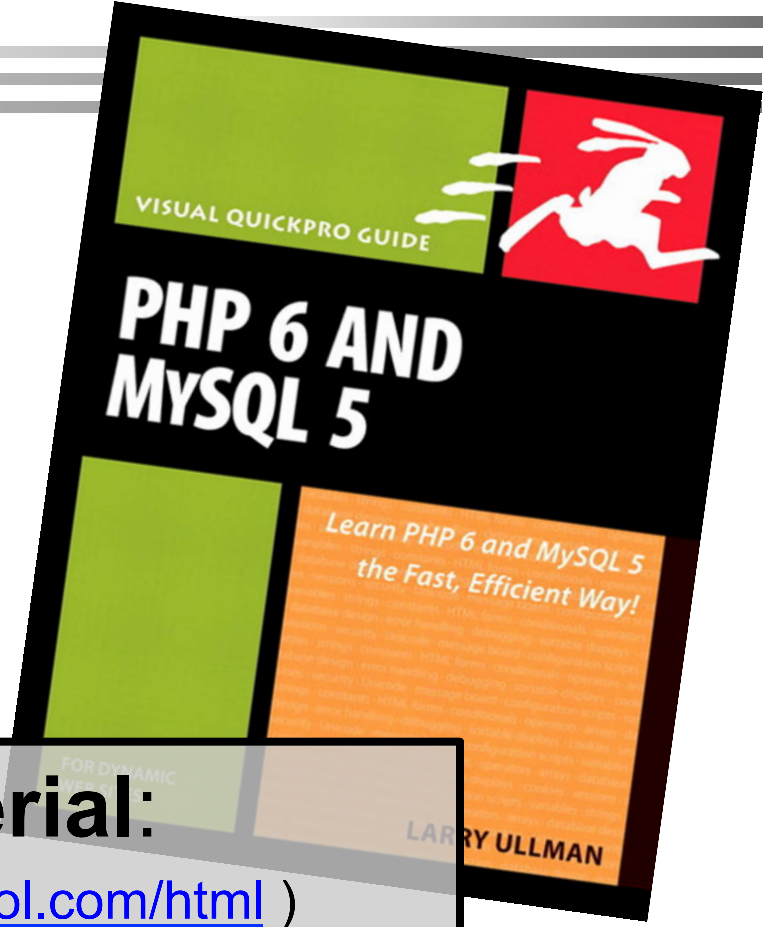
- i.e., each group is assigned a TA who will:
  - be available for help (you can ask the other TAs also)
  - correct and approve your assignments

⊢ Help !

- Questions of **general** interest:
  - Course Blog (blog.itu.dk/DSDS-E2011)
  - Teacher, TA's, or co-students will respond
- Questions about **specific** assignments:
  - Your TA (ask at the exercise class or send email)
  - Please don't post "spoilers" (half solutions) on the blog!
- **Personal** issues:
  - Your mom or dad
  - …or contact teacher, if relevant

⊢ Course Material

- **Optional Book:**
  - **"PHP 6 and MySQL 5"** (by Larry Ullman, 2008)
- **Slides !**



- …and **online material:**
  - **HTML:** (www.w3school.com/html)
  - **PHP:** (www.w3school.com/php)
  - **SQL:** (www.w3school.com/sql)

⊢ Course Schedule + Structure

Structure:

- **PHP** 1+2+3 (scripting)
- **SQL** 1+2+3 (databases)
- **Web Services** 1+2+3 (system architecture)

Schedule on Homepage:

- (blog.itu.dk/DSDS-E2012/schedule/)

⊢ Why take this Course?!?

- *"As graduated DDK student from ITU, you will likely be involved in developing IT solutions that in one way or the other involves web site design."*

- *"Although much of the web development will (probably) be done by software engineers, you need to understand how they build web sites so you can communicate with them."*
  - In particular: **possibilities** and **limitations !**

⊢ Why take this Course?!?

- **HTML** can only be used for **static** pages (in particular: **no** interaction with users)
- **PHP** can process input from the user and generate resulting **dynamically** constructed HTML (using information from a database)
- **SQL** can provide such a database
- **PHP+SQL:** very popular for making web services (e.g., Facebook, YouTube, Wikipedia, …)

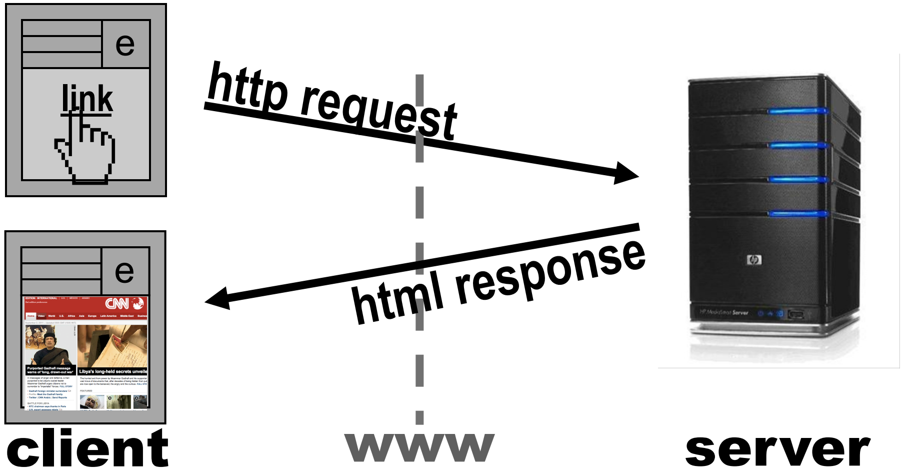
⊢ What this course will give u!

- Basic **understanding** of different aspects and technologies related to web development
- Ability to **develop** interactive web services
- An understanding of **possibilities** and **limitations** of interactive web services

Questions?

Questions?
Comments?
Complaints?

⊢ Static Web Pages

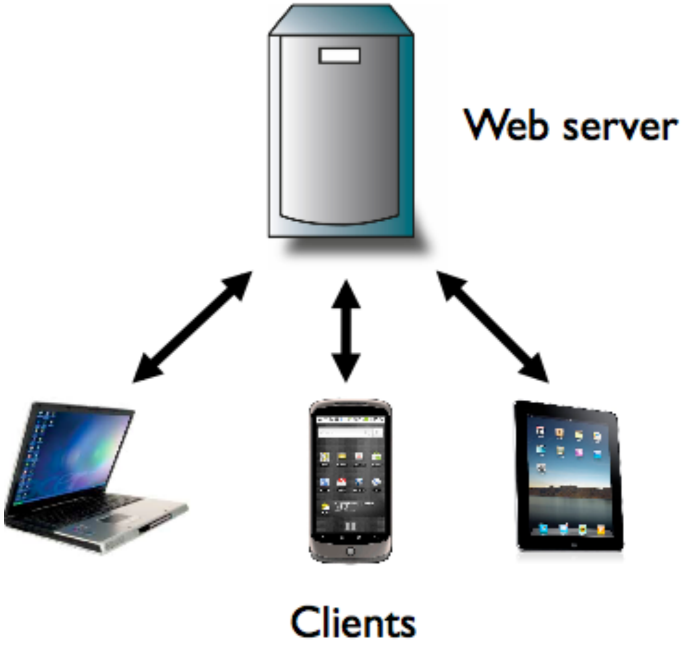


- A client (browser) asks server for an HTML document
  (using the HTTP protocol)
- The server sends back a (static) HTML document
  (possibly including a CSS stylesheet)
- The client displays the document by formatting it
  (according to the HTML)

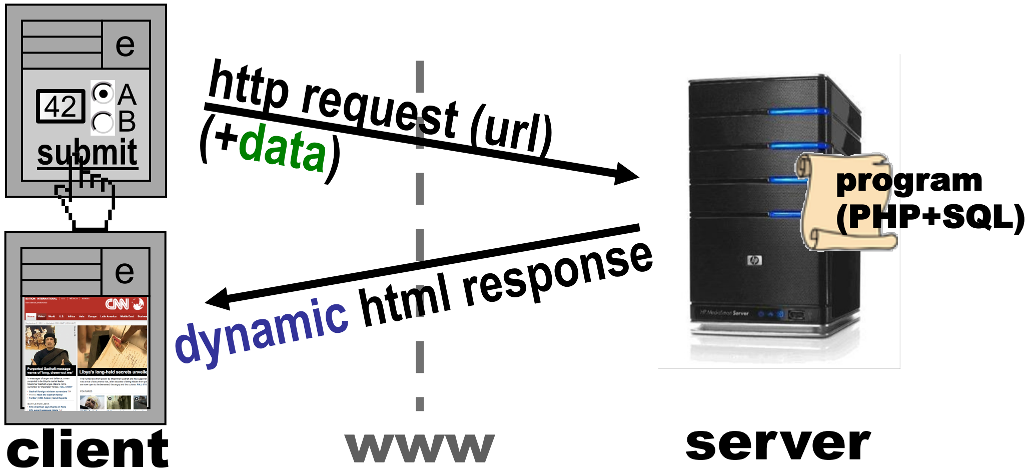
⊢ Client-Server Architecture

- The documents that belong to a web site are "stored" in a **web server** (e.g., HTML, CSS, pictures, videos, …)

- **Clients** (computers, laptops, cell phones, iPads, …) ask the server for documents they want



⊢ Dynamic Web Pages

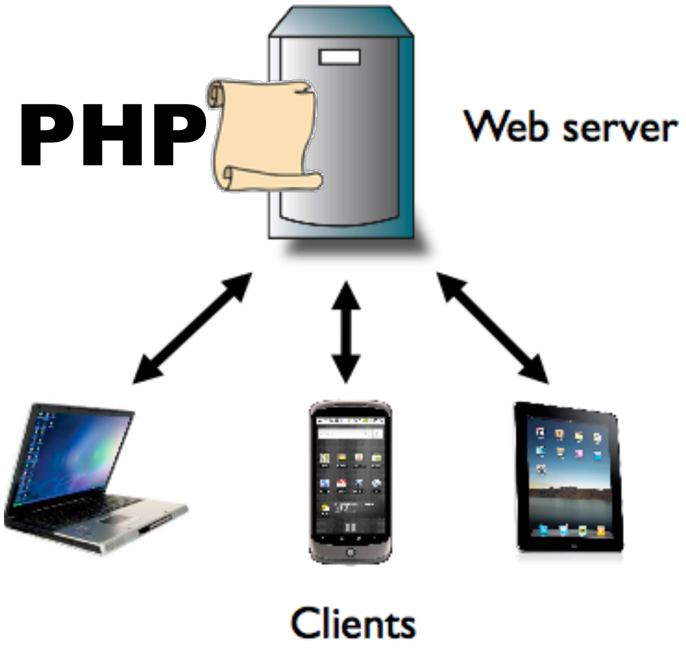


- The user **fills out the form and clicks “submit”** (which sends the **data** back to the server)
- The server **runs a PHP program** that treats the data (e.g., reading and writing info in the database)
- The server sends back the **dynamically constructed HTML** document (which is displayed by the client)

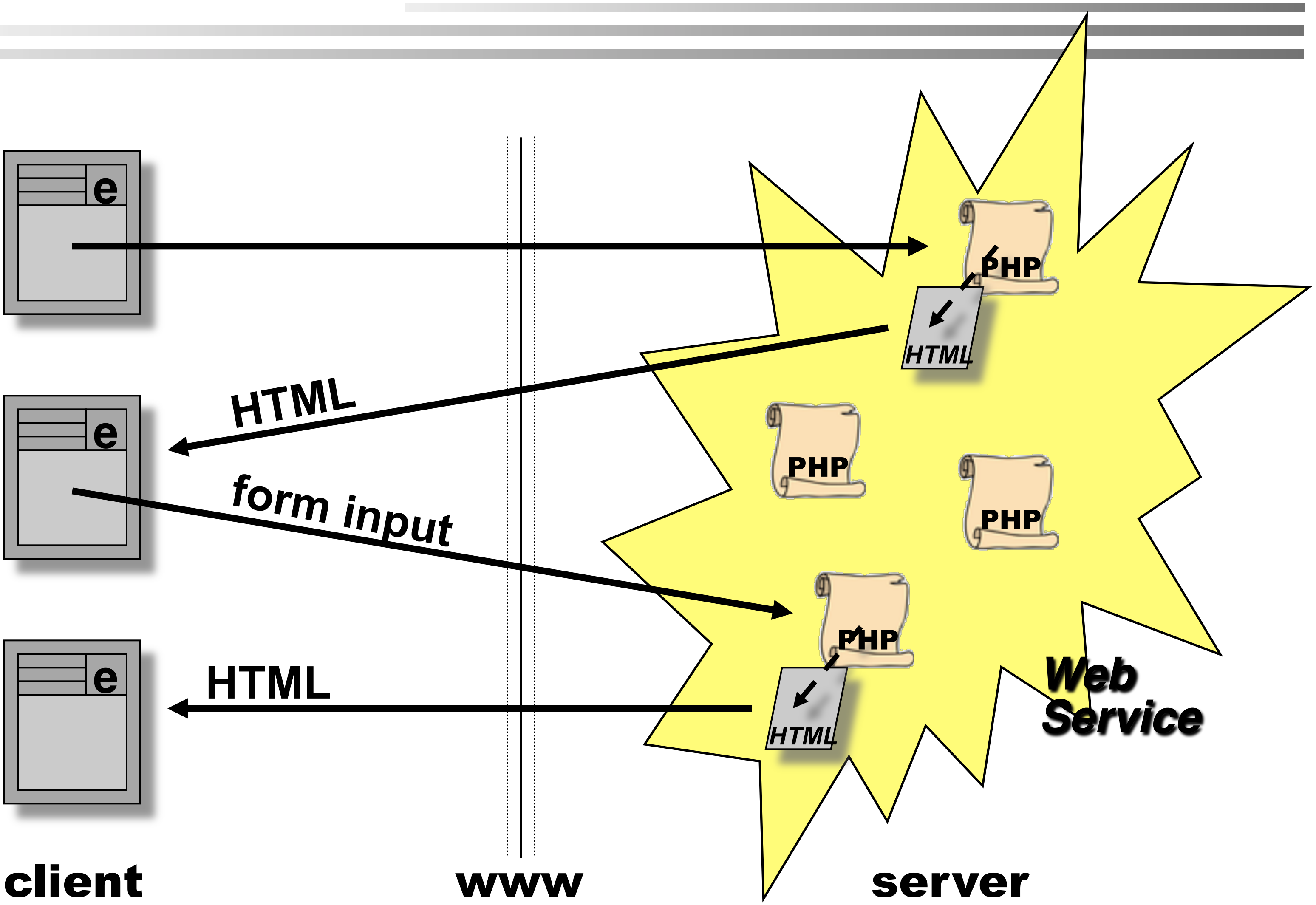
⊢ Client-Server Architecture

- The documents that belong to a web site are “stored” in a **web server** (e.g., HTML, CSS, pictures, videos, …)

- **Clients** (computers, laptops, cell phones, iPads, …) ask the server for documents they want



⊢ Web Services

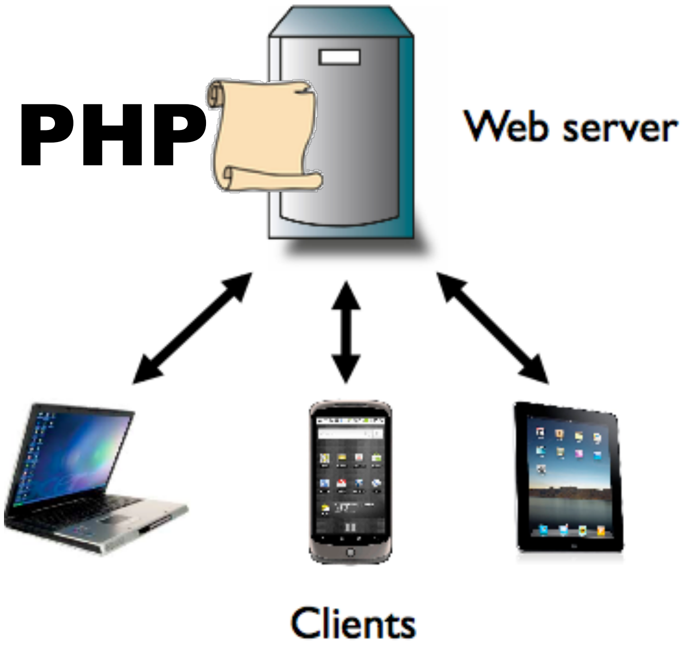


⊢ Client-Server Architecture

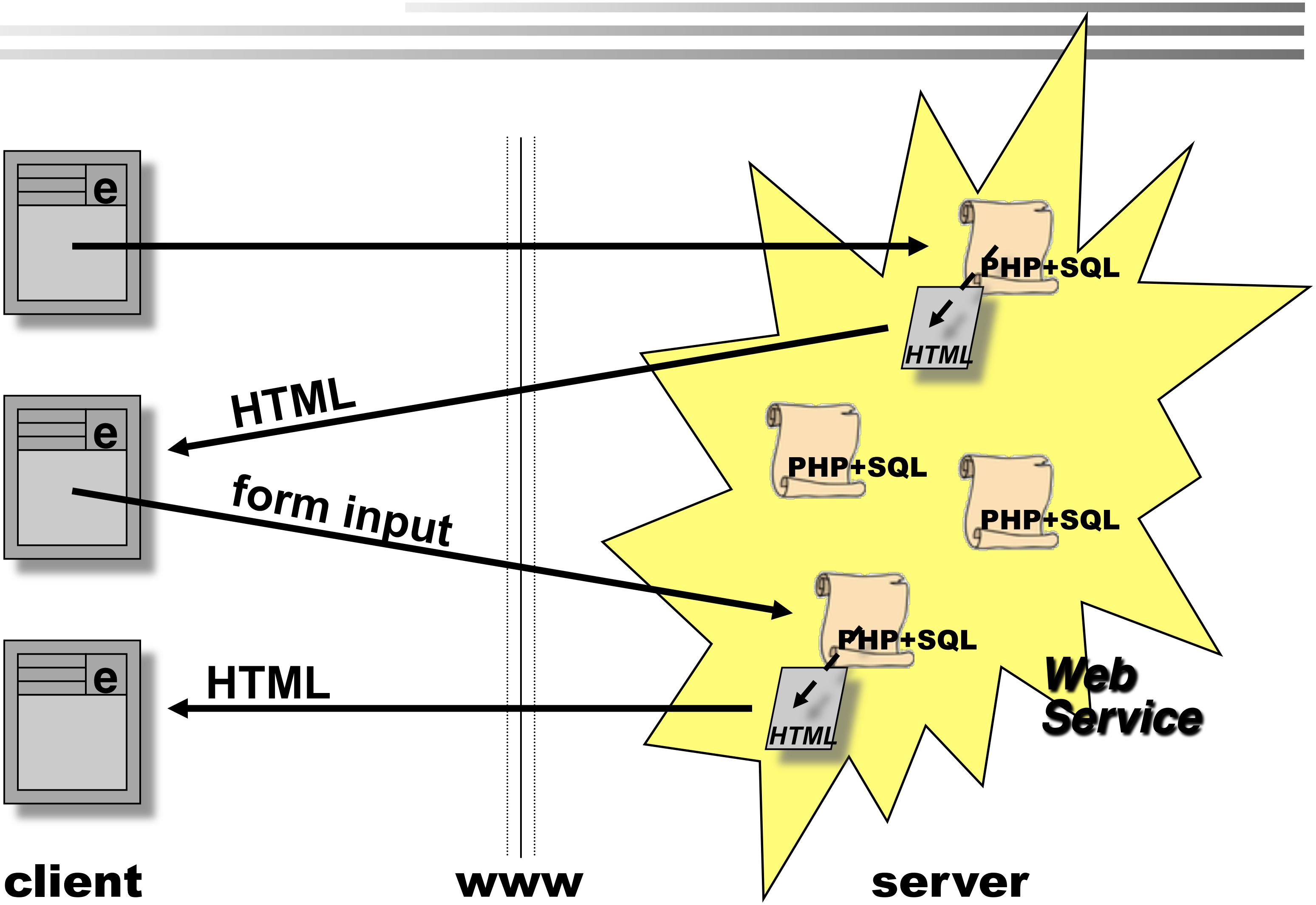
- Data that belong to a database is stored in a **database server**

SQL

- The documents that belong to a web site are “stored” in a **web server** (e.g., HTML, CSS, pictures, videos, …)
- **Clients** (computers, laptops, cell phones, iPads, …) ask the server for documents they want



⊢ Web Services



⊢ Web Service Development

- Separation of concerns:
  - Content (**HTML**)
  - ~~Presentation (**CSS**)~~
  - Functionality (**PHP+SQL**)

- Design on paper; only then start programming (this applies to all software development)

⊢ Last Year's Exam

La Pizzeria

--- Web Shop ---

Last Year's Exam: "*La Pizzeria*"

- (http://itu.dk/people/brabrand/DSDS/lapizzeria/)

Another Web Service Example: "todo list"

- (http://itu.dk/people/brabrand/DSDS/todo/)

Questions?

See you next week for...:

Adding PHP to your HTML!

(09:00 in Aud. 2)