Project of Software Development

Lesson 3 - 4Feb
Web Applications

Lisbon School of Economics & Management
Universidade de Lisboa

LISBOA | UNIVERSIDADE DE LISBOA

Midterm test

Location: Classroom

Duration: 45 minutes

Included content: Lessons #2 to #6 (including the bibliography and webliography defined in each lesson)

Excluded content: anything specific to OutSystems and homework. These subjects be for the Live Coding Challenge, not for the mid-term test.

Date: lesson #8 on February 20th (Thursday)

Split the class in 2 shifts

The current class is too big for the practical lessons. From lesson 7 (18 February) you will need to choose one of the 2 shifts

- Tuesdays from 11h30-13h00 or Wednesdays from 14h30 to 16h
- Thursdays from 09h30-11h00 or Thursdays from 13h30 to 15h
- From 18 February to 13 March, the choice of the shift is yours.
- From 18th March until the end of the course, the whole group must be in the same shift.

Lecture Topic

Web Applications:

- World Wide Web
- Client-server Web architecture
- Web-related concepts

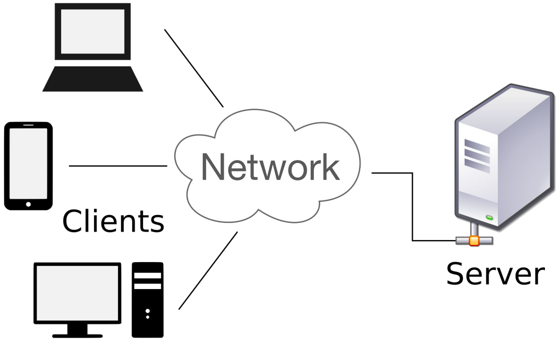
Webgraphy:

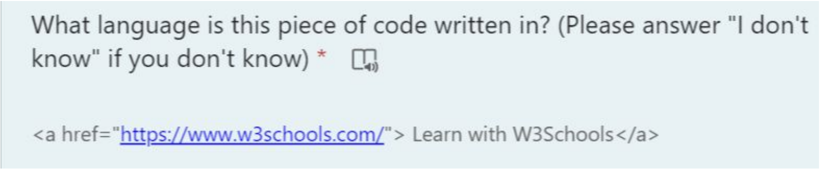
- How Does The Internet Work? (BBC Click) https://youtu.be/eHp1l73ztB8
- How Does the Web Work? (The Odin Project)
  https://www.theodinproject.com/lessons/foundations-how-does-the-web-work
- The Internet vs. The Web (The TechCave) https://www.youtube.com/watch?v=eesqK59rhGA
- 3.2.5 – Client Server n-Tier https://pt.coursera.org/lecture/software-architecture/3-2-5-client-server-n-tier-arPU8
- On premises vs. cloud pros and cons, key differences
  https://www.techtarget.com/searchcloudcomputing/tip/Evaluate-on-premises-vs-cloud-computing-pros-and-cons
- Mozilla
  https://developer.mozilla.org/en-US/docs/Learn/Common_questions/Web_mechanics/Pages_sites_servers_and_search_engines
  https://developer.mozilla.org/en-US/docs/Learn/Getting_started_with_the_web/How_the_Web_works
- Wikipedia
  https://en.wikipedia.org/wiki/Dark_web
- https://en.wikipedia.org/wiki/Deep_web

Web vs. Internet

Internet vs. Web

The **Internet** is a vast global network of connected computers and computer networks that communicate with each other using standardized protocols. This network of networks allows the exchange of information, resources and communication between different devices and users all over the world





What language is this piece of code written in? (Please answer "I don't know" if you don't know) *

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<a href="https://www.w3schools.com/"> Learn with W3Schools</a>
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The **Web** **(World Wide Web)** is an information system enabling documents and other web resources to be accessed over the Internet. It is a client-server application that allows users to obtain documents from Web servers on demand. The Web application consists of many components, including:

- a standard for document formats (that is, HTML)
- Web browsers (for example, Firefox and Microsoft Internet Explorer)
- Web servers (for example, Apache and Microsoft IIS-Internet Information Services)
- an application-layer protocol (HTTP)

Web

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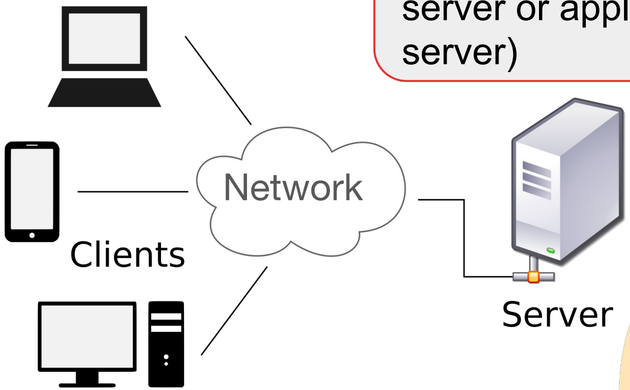
Web 1.0: consisted of a few people creating web pages and content and web pages for a large group of readers, allowing them to access facts, information, and content from the sources.
Main characteristic: static pages for reading

Web 2.0: many people creating even more content for a growing audience. Emphasizes User-Generated Content (UGC), ease of use, interactivity, and improved compatibility with other systems and devices.
Main characteristics: participating and contributing

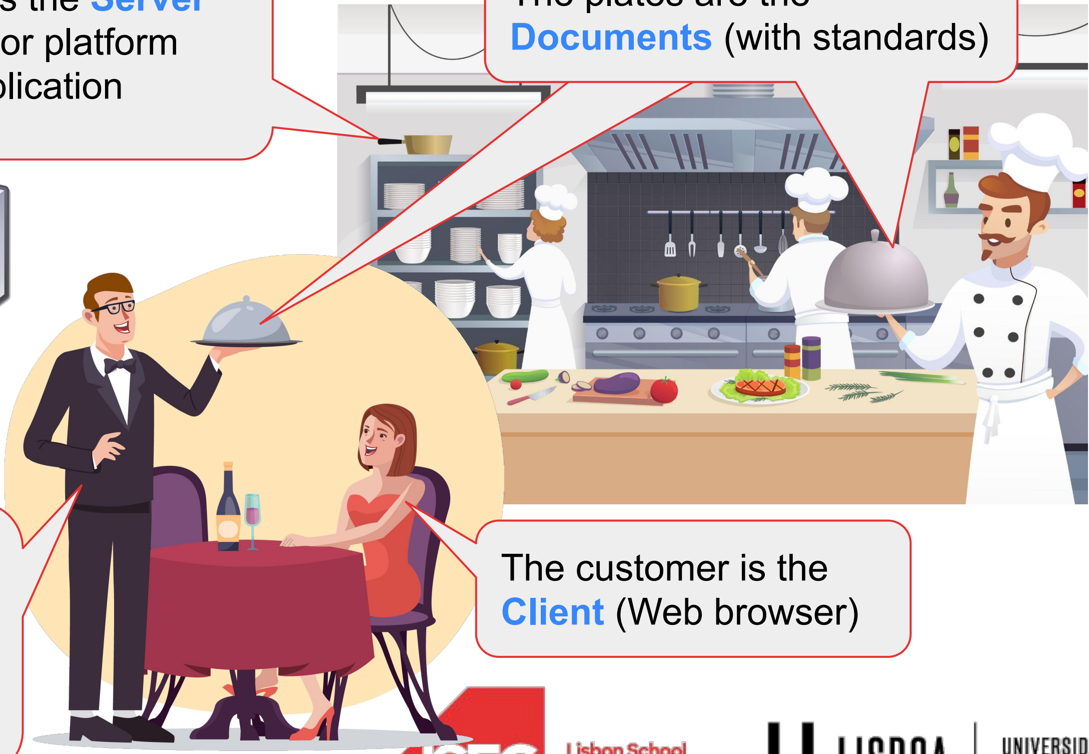
Web 3.0: core ideas of decentralization, openness, and more excellent user utility.
Main characteristics: semantic web, Artificial Intelligence and Machine Learning, permissionless (no governing body)

Client-server Web architecture: the restaurant metaphor



The kitchen is the **Server** (Web server or platform server or application server)

The plates are the **Documents** (with standards)



The waiter is the device, who facilitates the communication between the customer and the kitchen (client and server) using a language (**protocol**)

The customer is the **Client** (Web browser)

designed by freepik.com

How does the internet work? (@BBC Click - 2019)

(remind: show captions)

Web-related concepts

Web page: A document which can be displayed in a web browser such as Firefox, Google Chrome, Opera, Microsoft Edge, or Apple Safari.

Website: A collection of web pages which are grouped together and usually connected together in various ways. Often called a "site."

Web server: A computer that hosts a website on the Internet.

Search engine: A web service that helps you find other web pages, such as Google, Bing, Yahoo, or DuckDuckGo. Search engines are normally accessed through a web browser (e.g. you can perform search engine searches directly in the address bar of Firefox, Chrome, etc.) or through a web page (e.g. bing.com or duckduckgo.com)

Clients and servers: Computers connected to the internet

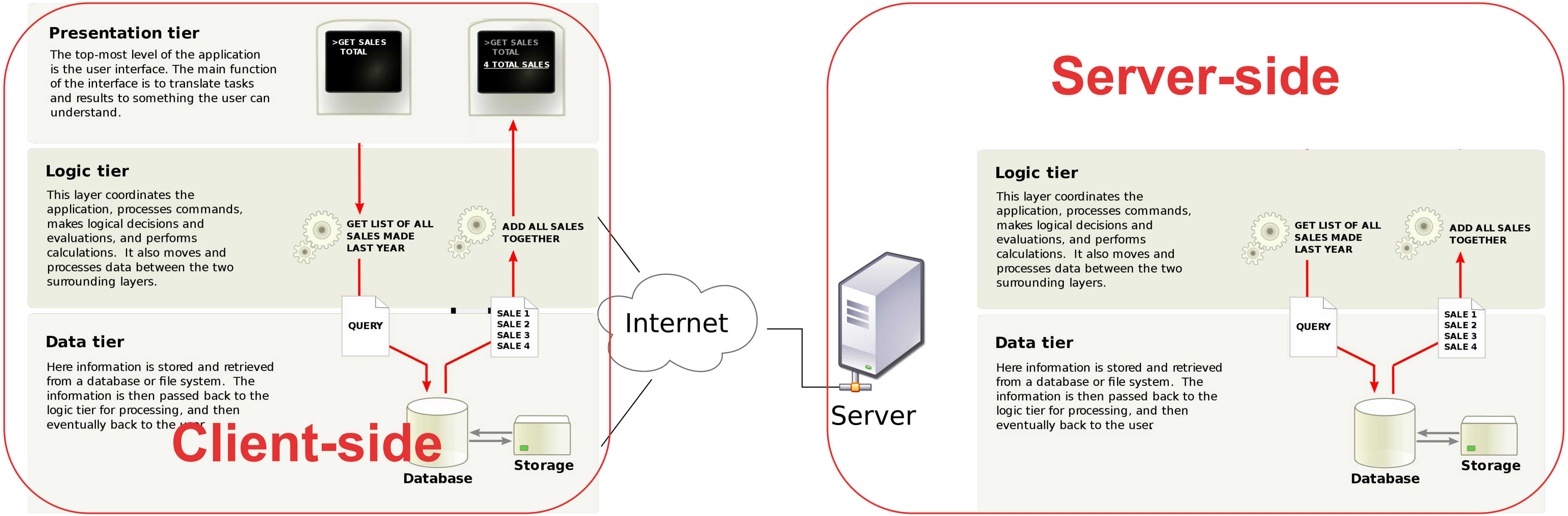
HTTP: Hypertext Transfer Protocol is an application protocol that defines a language for clients and servers to speak to each other

Deep web: parts of the World Wide Web whose contents are not indexed by search engines. Can be accessed by a direct URL or IP address, but may require entering a password or other security information to access actual content. Uses of deep web sites include webmail, online banking, etc. that require registration for viewing content

Dark web: part of deep web which requires custom software in order to access its content. Identities and locations of dark web users stay anonymous and cannot be tracked due to the layered encryption system. Communication between darknet users is highly encrypted thus allowing users to talk, blog, and share files confidentially

https://developer.mozilla.org/en-US/docs/Learn/Common_questions/Web_mechanics/Pages_sites_servers_and_search_engines
https://developer.mozilla.org/en-US/docs/Learn/Getting_started_with_the_web/How_the_Web_works
https://en.wikipedia.org/wiki/Dark_web and https://en.wikipedia.org/wiki/Deep_web

Web Architecture (previous lesson: Layered Architecture)



Presentation tier

The top-most level of the application is the user interface. The main function of the interface is to translate tasks and results to something the user can understand.

>GET SALES TOTAL

>GET SALES TOTAL

4 TOTAL SALES

Logic tier

This layer coordinates the application, processes commands, makes logical decisions and evaluations, and performs calculations. It also moves and processes data between the two surrounding layers.

GET LIST OF ALL SALES MADE LAST YEAR

ADD ALL SALES TOGETHER

QUERY

SALE 1
SALE 2
SALE 3
SALE 4

Data tier

Here information is stored and retrieved from a database or file system. The information is then passed back to the logic tier for processing, and then eventually back to the user

Database

Storage

Client-side

Internet

Server

Server-side

Logic tier

This layer coordinates the application, processes commands, makes logical decisions and evaluations, and performs calculations. It also moves and processes data between the two surrounding layers.

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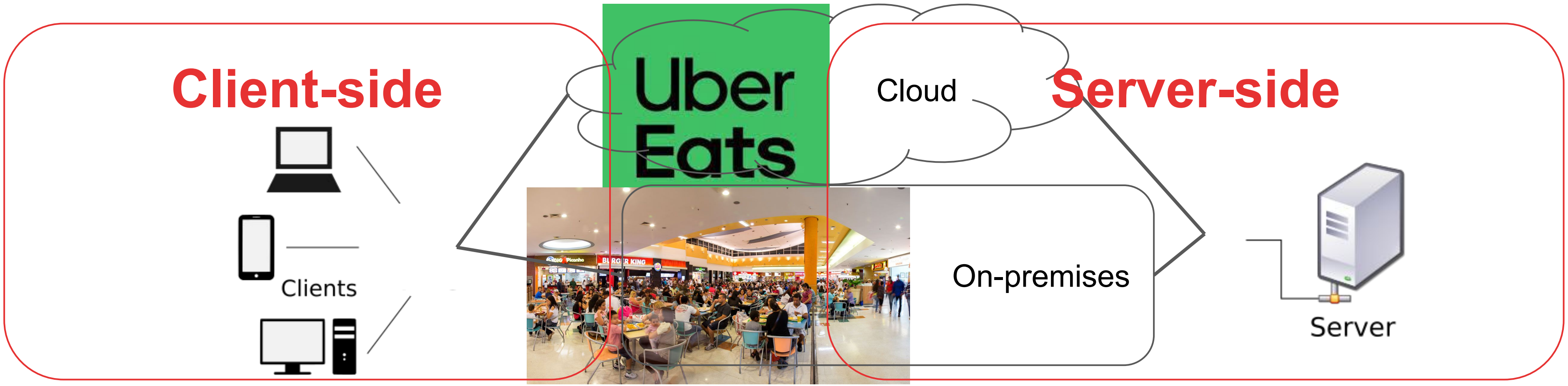
Web Architecture: cloud vs. on-premises



Cloud or Software-as-a-Service (SaaS): the network of remote servers that are accessed over the internet to store, process, and manage data and applications. Third parties such as Amazon Web Services (AWS), Microsoft Azure, or Google Cloud. are responsible for managing and securing the infrastructure that houses the data stored on their servers. These are frequently considered for their potential cost savings that result from reduced expenses related to staffing, power consumption, maintenance and security. The responsibility is on the third-party provider.

On-premises: computing resources and applications are located and managed directly within an organization's physical premises, typically on local servers or on personal computers. By installing and running software on hardware located within the premises of the company, internet technology (IT) staff has physical access to the data and can directly control the configuration, management and security of the computing infrastructure and data. So the responsibility for the data and its maintenance is on the organization.

Web Architecture: cloud vs. on-premises

Advantages of on-premises infrastructure: Infrastructure control, One-time costs, Security can be based on physical access

Disadvantages of on-premises infrastructure: Reliability, Scalability, Ownership costs, Maintenance, Security (if incorrectly secured), Technical skills

Advantages of cloud computing infrastructure: Abstraction, Scalability and storage, Pay-as-you-go pricing, Easier and faster deployment

Disadvantages of cloud computing infrastructure: Reliability, Complexity, Vendor lock-in, Cost management, Confidentiality

[TECHTARGET https://www.techtarget.com/searchcloudcomputing/tip/Evaluate-on-premises-vs-cloud-computing-pros-and-cons]

Learning goals

To understand the main Web Applications' related jargon:

- Web and Web 1.0, 2.0, 3.0, internet, HTML, HTTP, document, web browser, web server
- Client-server Web architecture, infrastructure at the cloud and on-premises
- Web-related concepts: Web page, Website, Web server, Search engine, Clients and servers, HTTP, Deep web, Dark web

outsystems

Previous homework (your first Web App)

- Questions, challenges?
- Non-Portuguese speaking students: was it difficult to follow Léo Andrade?
- Did you spend more time than the expected effort?

When you launch a software in market..
this is what people see...
But, Nobody knows the efforts behind it.

Homework outsystems

OutSystems Online Training: Becoming a Web Developer
https://www.outsystems.com/training/paths/18/becoming-a-reactive-web-developer/

1. OutSystems Overview (15 minutes)
   - https://www.outsystems.com/training/courses/173/outsystems-overview/?LearningPathId=18
2. Service Studio Overview (15 minutes)
   - https://www.outsystems.com/training/courses/174/service-studio-overview/?LearningPathId=18
   - **CAUTION:** use the account you created at EduLab02, do not create a new one!
3. Intro to OutSystems Development (15 minutes)
   - https://www.outsystems.com/training/courses/122/intro-to-outsystems-development/?LearningPathId=18

Homework YouTube

Alternative 1 (Portuguese 🇵🇹) Léo Andrade [Aprenda a programar]
https://www.youtube.com/playlist?list=PLY-9oEzuBhdfzxLxLeTr56YG8Vqu-Y0dl

- Aprenda a programar - #01 Introdução: 12 minutes
- Aprenda a programar - #02 Variáveis: 14 minutes
- Aprenda a programar - #03 Operadores Aritméticos: 11 minutes
- Aprenda a Programar - #04 Operadores Relacionais: 8 minutes
- Aprenda a Programar - #05 Operadores Lógicos: 15 minutes

Expected total effort: 120 minutes

Homework YouTube

Alternative 2 (English 🇬🇧) CodeWithPraveen [Fundamentals of Programming Languages]

https://www.youtube.com/watch?v=F7CWjuaC6gw&list=PLb__S-rkKhexdiJomXSGeqQ46c_MUTPaj

- Fundamentals of Programming Languages #1 | Introduction to Programming Fundamentals (22 minutes)
- Fundamentals of Programming Languages #2 | Understanding Variables (20 minutes)
- Fundamentals of Programming Languages #3 | Understanding Operators (9 minutes)

Expected total effort: 120 minutes