

University of Jijel
Faculty of Exact Sciences and Computer Science
Department of Computer Science
L3 – Computer Systems

Semi-Structured Data

Chapter 2

Multimedia Documents and Hyperdocuments

Tarek Boutefara
t_boutefara@univ-jijel.dz
2025/2026

Content

- Documents
 - Introduction
 - Modeling document classes
 - Modeling specific documents
- Hyperdocuments
- Multimedia content

Content

- **Documents**
 - **Introduction**
 - Modeling document classes
 - Modeling specific documents
- Hyperdocuments
- Multimedia content

Documents - Introduction

- A document:
 - Is a representation of thought in written form, drawing, or presentation,
 - Is content (information) persisted (saved) on a medium,
 - Proof, explanation, or description,
 - Primary object of **document engineering**.

Documents - Introduction

- A document:
 - Can be physical or electronic.
 - An electronic document is generally a file on secondary storage (hard drive, CD/DVD, etc.).
 - In this case, the document takes the form of a file in a File System.

Documents - Introduction

- A document:
 - Is part of a hierarchy
 - File System:
 - Drive (partition)
 - Folder
 - File
 - The latter is the only one that has real content.

Documents - Introduction

- A document:
 - The extension indicates the file type.
 - Several types:
 - jpeg, jpg, png, gif
 - doc, docx, odt, txt, rtf
 - mp3, wav, aac, wma
 - bin, exe
 - zip, rar, 7z

Documents - Introduction

- A document:
 - Can be loaded in a specific format into main memory,
 - Depends on the logical structure of the document,
 - Main memory is non-volatile memory: it constitutes a working space where the file is manipulated but not stored.

Documents - Introduction

- A document:
 - This concept emerges as a unit for representing and exchanging data,
 - Unlike file-based exchange (which uses the FTP protocol).

Documents - Introduction

- A document:
 - New requirements:
 - Structure,
 - Open format,
 - Ease of processing.

Content

- **Documents**
 - Introduction
 - **Modeling document classes**
 - Modeling specific documents
- Hyperdocuments
- Multimedia content

Documents - classes

- The same content can be presented in different formats.
- These are called document classes:
 - Book,
 - Article,
 - Web page,
 - Letter,
 - Presentation.

Documents - classes

- Class modeling
 - This amounts to modeling the presentation of content,
 - Unlike document modeling, which focuses on data structuring,
 - Decisions such as:
 - Appearance,
 - Visual structure,
 - Elements to repeat (document title on pages)

Content

- **Documents**
 - Introduction
 - Modeling document classes
 - **Modeling specific documents**
- Hyperdocuments
- Multimedia content

Document – Modeling

- Document modeling refers to the creation of a model to **structure** (**organize**) the document's data.
 - This does not refer to the display model, the visual structure, or the nature of the document.
 - It answers the question: **how is the document's data organized?**

Document – Modeling

- Three types
 - (1) Unstructured
 - "Flat" documents,
 - No explicit marking of structural elements.

Document – Modeling

- Three types
 - (2) Semi-structured
 - "with an implicitly declared, irregular, non-rigid structure, unknown a priori."
 - Document approach:
 - If the purpose is reading
 - Tags define semantic elements,
 - Data approach:
 - The document is a data source or a medium for exchange

Document – Modeling

- Three types
 - (3) Structured
 - Structure explicitly declared and known a priori.

Document – Modeling

- Types of structures:
 - These types derive directly from the different relationships:
 - Hierarchical,
 - Non-hierarchical (temporal, spatial)

Document – Modeling

- Types of structures:
 - (1) List
 - The simplest,
 - An (ordered) sequence of elements.

Document – Modeling

- Structure types:
 - (2) Tree
 - Can support
 - Order,
 - Hierarchy,
 - Traversal:
 - Prefix,
 - Infix (ascending order in the case of a search tree),
 - Postfix.

Document – Modeling

- Structure Types:
 - (3) Forest
 - The existence of several juxtaposed elements that are neither ordered nor hierarchical.
 - Each set of elements (depending on the type) can be represented using a tree.
 - Several trees constitute the document.

Document – Modeling

- Types of structures:
 - (4) Graph
 - Used when reference links exist in the document.
 - A list or tree does not support multiple types of relationships.
 - A paragraph can contain:
 - Text,
 - Link to bibliographic references,
 - And a link to an image

Content

- Documents
 - Introduction
 - Modeling document classes
 - Modeling specific documents
- **Hyperdocuments**
- Multimedia content

Hyperdocument

- Hypertext
 - This is text displayed on a computer screen (or any other computing device) that contains links to other texts that the reader can access directly.
 - Hyperlinks between texts
 - Constitute the basic building block of the Web.

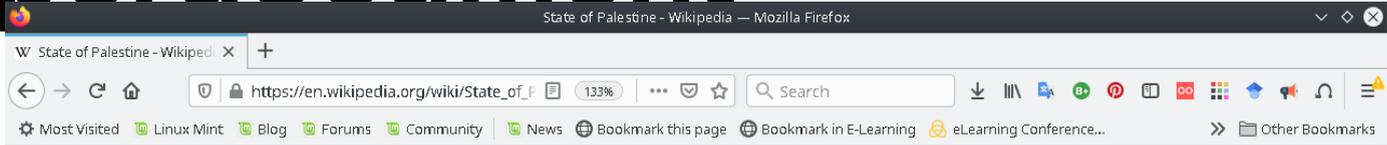
Hyperdocument

- Hypermedia
 - A combination of multimedia and hypertext.
 - Hyperlinks provide links to other texts, but also to multimedia documents.
 - Images, sounds, videos, maps, etc.

Hyperdocument

- Usefulness:
 - Reading:
 - Representing information as hyperdocuments facilitates information location and access,
 - Allows the reader to create links between concepts,
 - Allows the reader to follow a sequence of ideas.

Hyperdocument



- U:

State of Palestine

Article [Talk](#) 152 languages

[Read](#) [View source](#) [View history](#) [Tools](#)

From Wikipedia, the free encyclopedia Coordinates: 32°00′N 35°15′E﻿ / ﻿32°00′N 35°15′E﻿ / 32; 35

This article is about the state. For the Fatah-controlled government body, see [Palestinian National Authority](#). For the geographical region, see [Palestine \(region\)](#). For other uses, see [Palestine](#).

Palestine (**Arabic**: فلسطين, romanized: *Filasṭīn*^[d]), officially the **State of Palestine** (دولة فلسطين, *Dawlat Filasṭīn*),^[e] is a state in the [Southern Levant](#) region of [West Asia](#). Founded on 15 November 1988 and officially governed by the [Palestine Liberation Organization](#) (PLO), it claims the [West Bank](#) (including [East Jerusalem](#)) and the [Gaza Strip](#) as its territory, all of which has been [Israeli-occupied territories](#) since the 1967 [Six-Day War](#).^{[6][18]} The West Bank contains 165 [Palestinian enclaves](#) that are under partial [Palestinian rule](#), but the remainder, including 200 [Israeli settlements](#), is under [full Israeli control](#). The Gaza Strip was [governed by Egypt](#) but conquered by Israel in 1967. Israel governed the region until it [withdrew in 2005](#); although it is still considered to occupy Gaza.^{[19][20][21]} [Hamas seized power](#) after winning the [2006 Palestinian legislative election](#). The Gaza Strip has since been [blockaded by Israel and Egypt](#).^[c]

After [World War II](#), in 1947, the [United Nations](#) (UN) adopted a [Partition Plan](#) for [Mandatory Palestine](#), which recommended the creation of independent Arab and Jewish states and an [internationalized Jerusalem](#).^[30] Immediately after the [United Nations General Assembly](#) adopted the plan as [Resolution 181](#), a [civil war](#) broke out in Palestine,^[31] and the plan was not implemented.^[32] The day after the [establishment of the State of Israel](#) on 14 May 1948,^{[33][34][35]} neighboring Arab countries invaded the former British Mandate and engaged Israeli forces in the [1948 Arab-Israeli War](#).^{[36][37]} Later, the [All-Palestine Government](#) was established by the [Arab League](#) on 22 September 1948 to govern the [All-Palestine Protectorate](#) in the [Egyptian-occupied Gaza Strip](#). It was soon recognized by all Arab League members except [Transjordan](#), which

State of Palestine
دولة فلسطين (Arabic)
Dawlat Filasṭīn



Flag

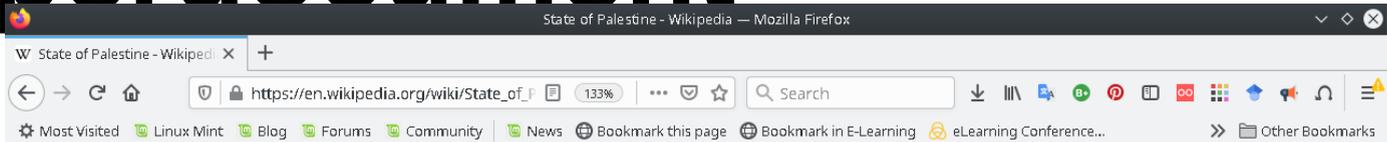


Coat of arms

Anthem: "فدائي"
"Fidai"^[1]
"Fedayeen Warrior"



Hyperdocument



• U:

State of Palestine

152 languages

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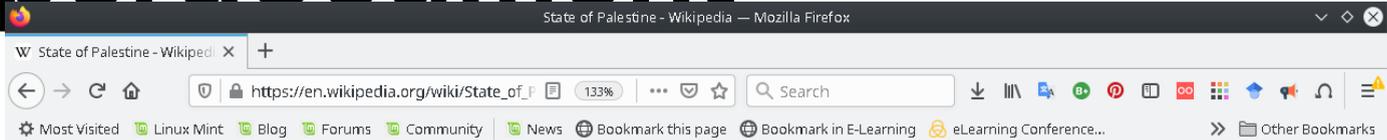
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Hyperdocument



- U:

State of Palestine

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State of Palestine دولة فلسطين (Arabic) <i>Dawlat Filasṭīn</i>	
 Flag	 Coat of arms
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1947-1948 civil war in Mandatory Palestine

Article Talk Read View source View history Tools

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This article is about the initial civil war phase of the 1948 Palestine war. For the subsequent international phase, see 1948 Arab-Israeli War. For the entire conflict, see 1948 Palestine war.

The **1947-1948 civil war in Mandatory Palestine** was the first phase of the **1947-1949 Palestine war**. It broke out after the **General Assembly of the United Nations** adopted a resolution on 29 November 1947 recommending the adoption of the **Partition Plan for Palestine**.^[5]

During the civil war, the **Jewish** and **Arab communities of Palestine** clashed (the latter supported by the **Arab Liberation Army**) while the British, who had the obligation to maintain order,^{[6][7]} organized their withdrawal and intervened only on an occasional basis.

At the end of the civil war phase of the war, from April 1948 to mid-May, Zionist forces embarked on an offensive later identified as **Plan Dalet**, conquering cities and territories in Palestine allocated to a future Jewish state as well as those allocated to the **corpus separatum of Jerusalem** and a future Arab state according to the **1947 Partition plan for Palestine**.^[8]

When the **British Mandate of Palestine** expired on 14 May 1948, and with the **Declaration of the Establishment of the State of Israel**, the surrounding Arab states—**Egypt**, **Transjordan**, **Iraq** and **Syria**—invaded what had just ceased to be Mandatory Palestine,^[9] and immediately attacked Israeli forces and several Jewish settlements.^[10] The conflict thus escalated and became the **1948 Arab-Israeli War**.

Civil war in Palestine (1947-48)

Part of the **intercommunal conflict in Mandatory Palestine**, the **1948 Palestine War** and the **decolonisation of Asia**

Date 30 November 1947 - 14 May 1948 (5 months and 2 weeks)

Location Mandatory Palestine

Result

- Jewish forces overcome Palestinian Arab forces
- Collapse of the Arab society in Palestine
- Beginning of the 1948 Palestinian expulsion and flight
- Beginning of the Jewish exodus from Muslim countries
- Israeli Declaration of Independence
- Invasion of Israel by the Arab League

Belligerents

Yishuv	Arabs of Palestine	United Kingdom
Haganah		

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Flag



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Hyperdocument

- Usefulness:
 - Annotation:
 - To keep (or preserve) the ideas generated during reading.
 - These ideas can be:
 - Explanations for difficult passages,
 - Summaries, reformulations, summaries,
 - Opinions or evaluations.

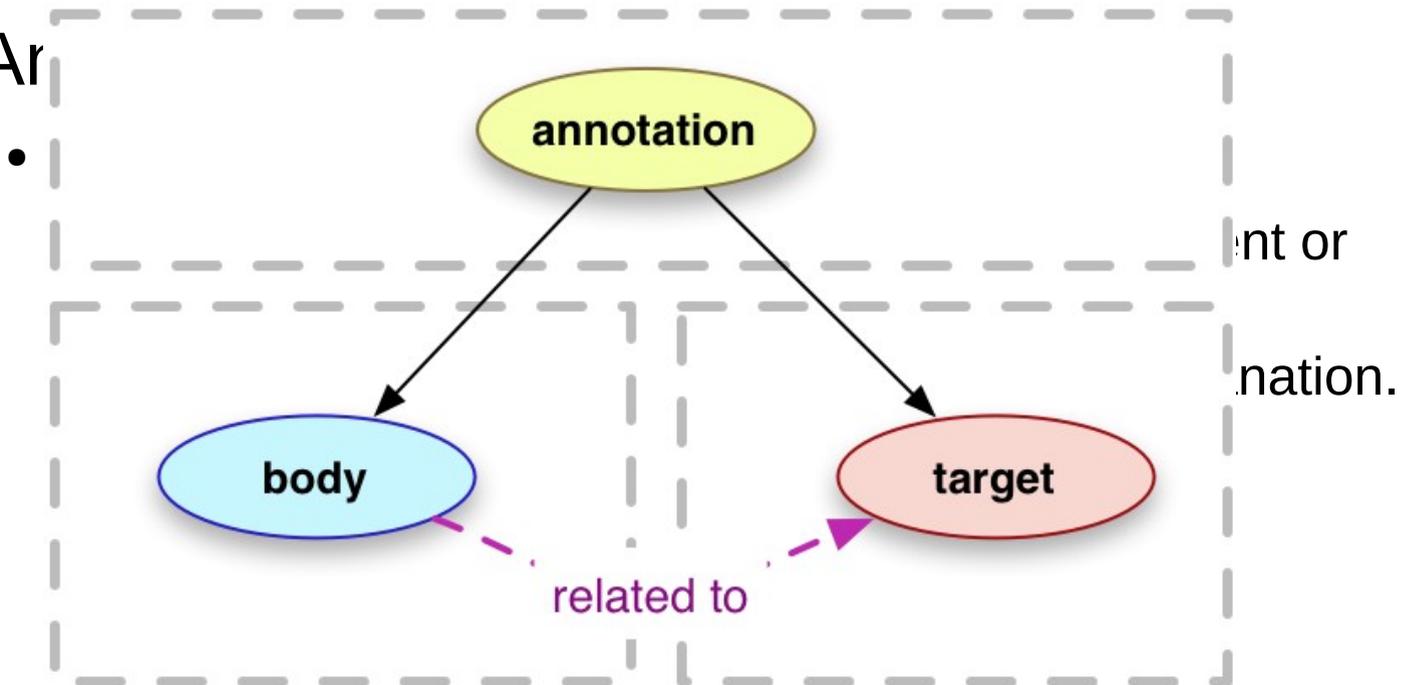
Hyperdocument

- Purpose:
 - Annotation:
 - An annotation is additional information:
 - associated with a particular point in a document or other piece of information.
 - It can be a note including a comment or explanation.

Hyperdocument

- Purpose:

- Ar



Hyperdocument

Semantic Annotation for Learning Material – Okular

File Edit View Go Bookmarks Tools Settings Help

< Previous > Next Fit Width Zoom Out Zoom In Browse Zoom Selection

Thumbnails

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4

Many uses of annotations and metadata on learning material have been described, in ecological use reports or in research project, in various contexts and various roles [1, 2]. However before people or software agents can use them, such annotations of learning material have to be created, automatically or manually. Currently few tools exist dedicated to this particular task of annotating learning material.

This paper¹ aims at explaining the specificity of annotating learning material and providing specifications for automated and manual annotation tools for e-learning. To come to such specification, we start from two different viewpoints. The first is a list of specific requirements that the e-learning context brings for annotation tools. The second is a review of existing annotation tools, mainly general purpose ones. If some of these tools are quite similar, we analyse their characteristic properties and we reduce them to three most important factors as regard to semantic web and e-learning. We then evaluate the strength and weakness of each category regarding the requirements we have specified for annotating learning material.

We further illustrate on two examples of annotation tools we have developed in France and in Norway. We demonstrate how it is possible to define the functionalities of annotation tools for a specific use taking into account our requirements and the functionalities of general purpose tools of the same category.

Pop-up Note 11/02/2024 00:41:22
Tarek

Une liste des différents outils d'annotation est présente sur plusieurs sites mais elle n'est pas à jour.
TODO :
Elaborer une liste à jour des outils d'annotation.

¹ This work has been partially funded by the Kaleidoscope network of Excellence. EU IST Technology Enhanced Learning (TEL) project 507838.

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210 x 297 mm (portrait DIN/ISO A4)

Hyperdocument

- Usefulness:
 - Collaboration:
 - This structure allows multiple authors to work on complex documents.
 - The hyperlink structure allows for the construction of a basic document structure while authors work on their respective sections.

Hyperdocument

The image displays the Obsidian v0.9.2 interface. On the left is a sidebar with a file explorer and a list of tags. The main area is split into two panes. The left pane shows a document titled 'Habits MOC' with the following content:

links: [Mindsets](#), [Walking through the 3 phases of MOCs](#)

Habits MOC - Unifying Phase

Enjoy and Use - Enjoy the spatial constellation you created. It's certainly meaningful to you. Use it for different purposes: for final products (content creation), as a reference point in the future, or for the inherent joy the ideas provide.

Here's an assembly of the notes in some sort of formalized structure. I have continued adding to this whenever it made sense.

Understanding Habits

- [Defining a habit](#)
- [Habit formation provides an evolutionary advantage](#)
- [Habits carry a ton of hidden inertia](#)
- [The neural formation of habits is additive](#)
 - [The truest habit metaphors are additive](#)

Designing Habits

- [Understanding the habit cycle and habitual cues](#)
 - [How Atomic Habits fit into the conversation on habits](#)
 - [Resiliency Routines help regain a sense of control](#)
 - [Improving Micro Habits at the Point of Contact](#)
- [Small Wins foster a Sense of Control](#)
- [An asymptotic curve models the development of skills, strength, habits, and more](#)
 - [The mechanism for breaking through development plateaus](#)

Example of Habit Design

- [Charting out habit cycles in my life circa 2013](#)

Important Habits

[Important habits preserve mental clarity and a sense of control](#)
[Preparing for the next day is an important habit](#)
[Journaling in the morning is an important habit](#)
[Writing down daily goals in the morning is an important habit](#)

Related Concepts

[Positive Feedback Loop, Like begets like](#)
[Cobwebs into Cables, Bero, Sense of Control](#)

The right pane shows a graph view of the same data, with 'Habits MOC' at the center and various related concepts and notes connected by lines. The graph includes nodes like 'Habits MOC - Colliding Phase', 'Habits MOC - Unifying Phase', 'Habits MOC - Assembling Phase', and 'Habits MOC - Article Example'. It also shows connections to other documents like '010 Mindsets MOC' and '030 Interests MOC'. The right sidebar contains a list of 'Linked mentions' and 'Other' sections.

Hyperdocument

- Usefulness:
 - Learning:
 - Hyper documents allow for the structuring of knowledge and information in various ways.
 - The learner has more freedom when navigating learning materials.

Hyperdocument

- Usefulness:
 - Learning:
 - We speak of adaptive hypermedia if the system automatically adapts to the learner.

Hyperdocument

- Usefulness:
 - Learning:
 - We speak of adaptive hypermedia if the system automatically adapts to the learner.
 - Adaptation based on:
 - The level,

Hyperdocument

- Usefulness:

- Lear

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 - at
 - A



if the system

Hyperdocument

- Usefulness:
 - Learning:
 - We speak of adaptive hypermedia if the system automatically adapts to the learner.
 - Adaptation based on:
 - The level,
 - The learning style

Hyperdocument

- Usefulness:
 - Learning:
 - We speak of adaptive hypermedia if the system adapts to the learner.



sed on:

style

Hyperdocument

- Usefulness:

- Learning:

- We speak of a document as a document if the system



BONJOUR DOBRY DEN BUNA AVE
PAIVAA GODDAG CHAO er.
NAMASTE GODDAG SAWATDI
BUON GIORNO ZDRAVO GUTEN TAG
HOLA GODDAG HELLO
NAMASTE
BUNA SHALOM SAWATDI AVE
ALLEGRA MARHABA ALLEGRA BUNA
DOBRY DEN BUNA HOLA
CHAO AVE PAIVAA BUNA HOLA
HOLA AVE BONJOUR PAIVAA AVE
BUENAS DIAS designed by freepik.com GUTEN TAG

Hyperdocument

- Usefulness:
 - Learning:

- We speak of education



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Hyperdocument

- Usefulness:
 - Learning:
 - We speak of adaptive hypermedia if the system automatically adapts to the learner.
 - Adaptation based on:
 - The level,
 - The learning style,
 - Personal preferences

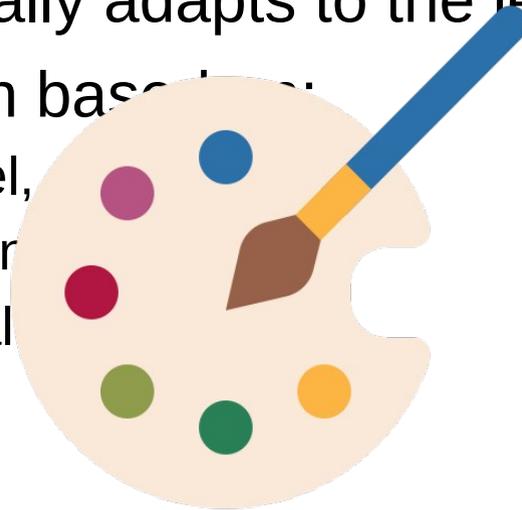
Hyperdocument

- Usefulness:
 - Learning:
 - We speak of adaptive hypermedia if the system automatically adapts to the le

Aa

- Adaptation based on:

- The level,
- The user's
- Personal



Hyperdocument

- Usefulness:
 - Learning:
 - Adaptive media are defined as systems that automatically adapt to the learner.
 - Adaptation through:
 - Navigation structure,
 - Resource type,
 - Representation and formatting.

Hyperdocument

- What if we use a database?
 - We have pages

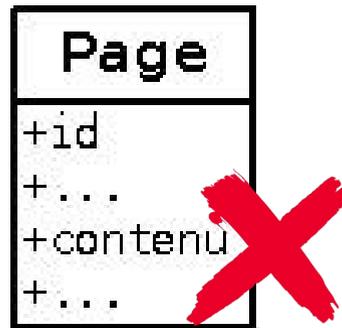
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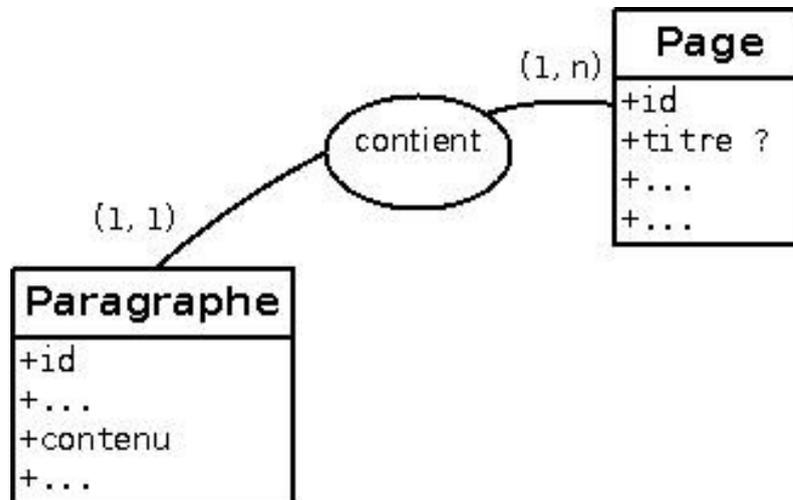
Hyperdocument

- What if we use a database?
 - We have pages.
 - One attribute cannot support all the content.



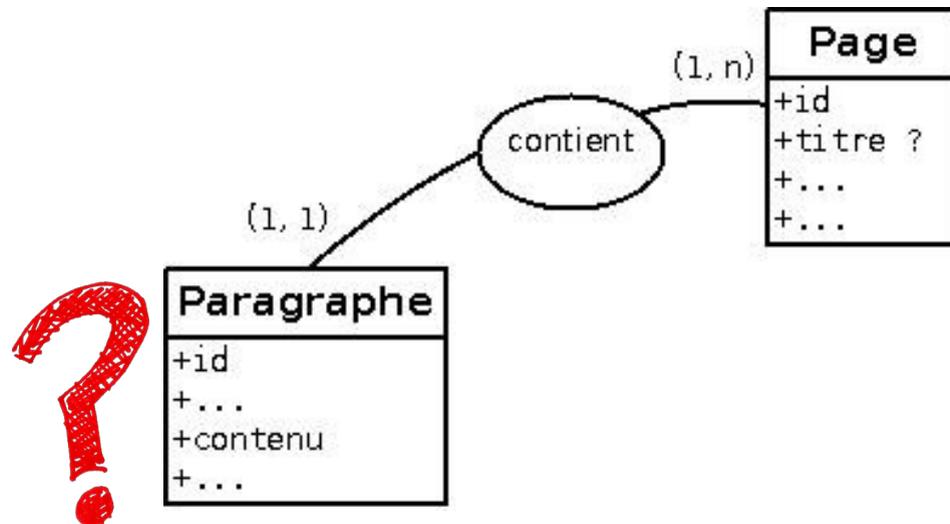
Hyperdocument

- What if we use a database?
 - A page consists of several paragraphs



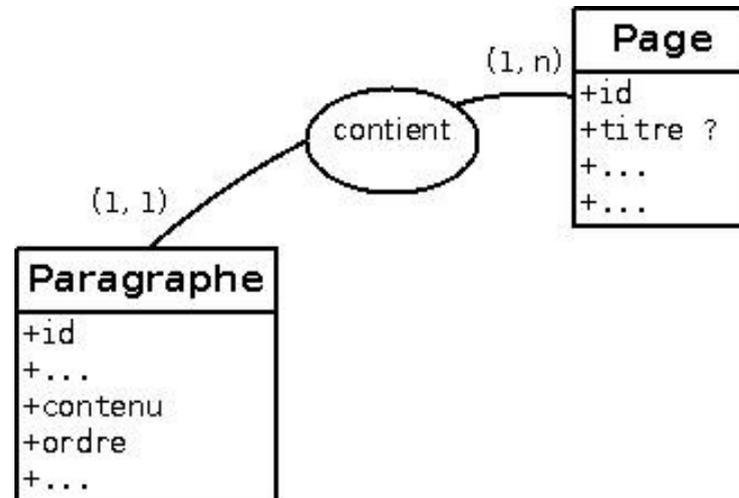
Hyperdocument

- What if we use a database?
 - A page consists of several paragraphs
 - In which order?



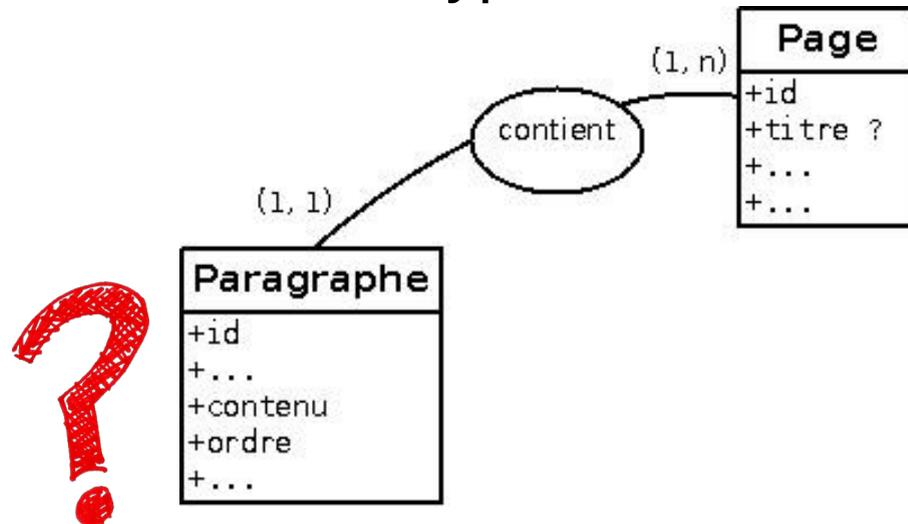
Hyperdocument

- What if we use a database?
 - A page consists of several paragraphs
 - We add the “order” attribut



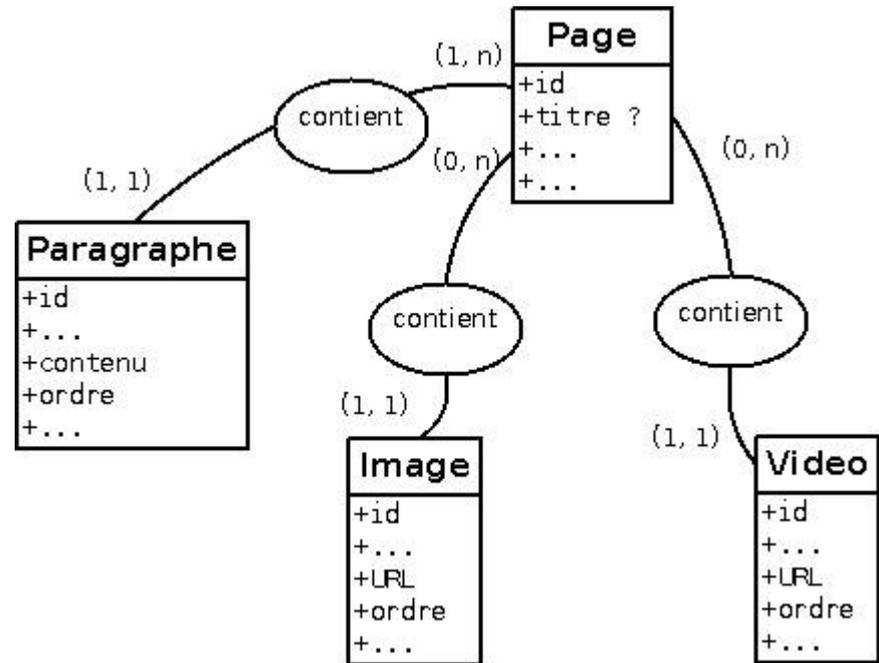
Hyperdocument

- What if we use a database?
 - A page is made up of several paragraphs.
 - And what about other types of content?



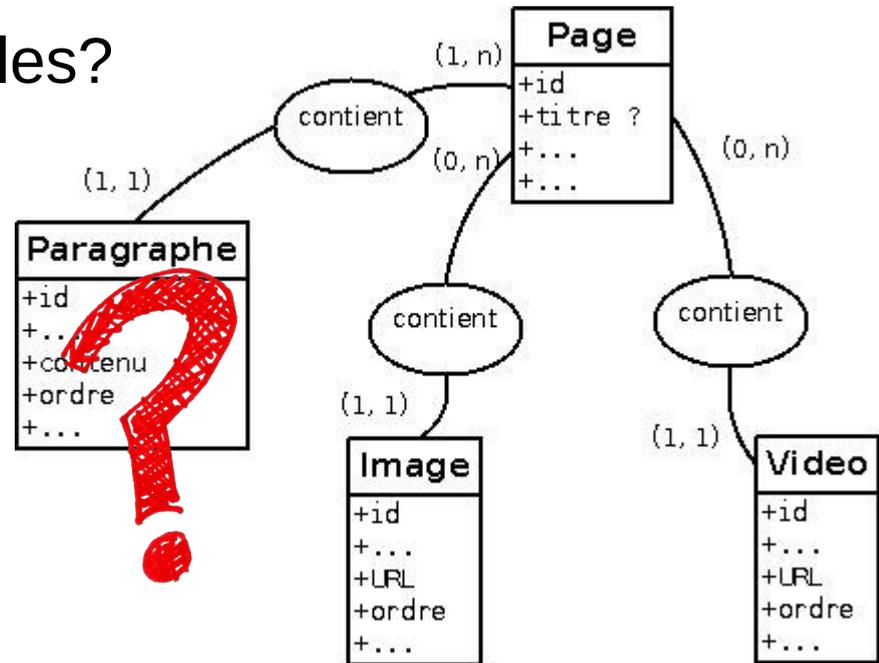
Hyperdocument

- What if we use a database?
 - We enrich the model.



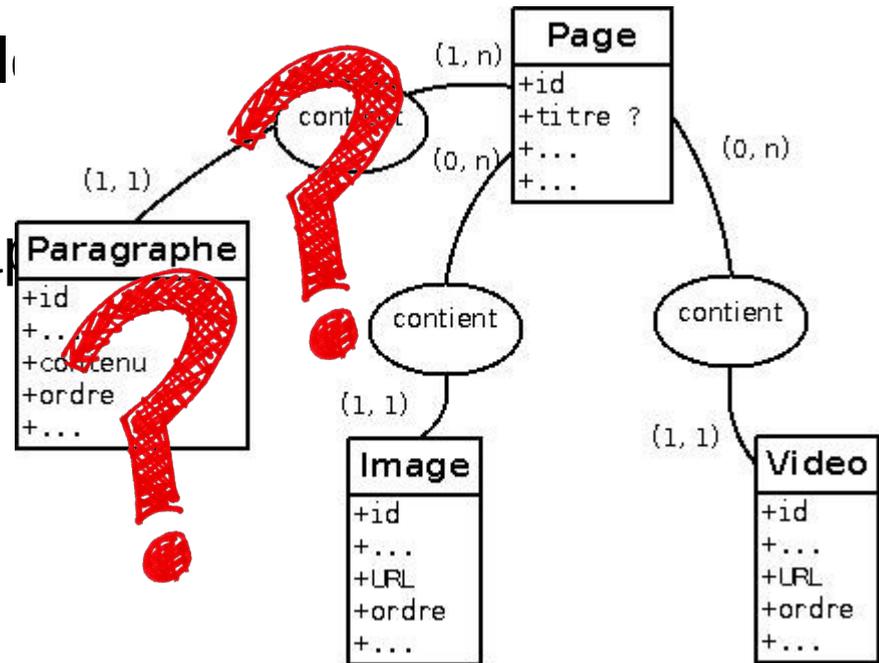
Hyperdocument

- What if we use a database?
 - We enrich the model.
 - What about tables?



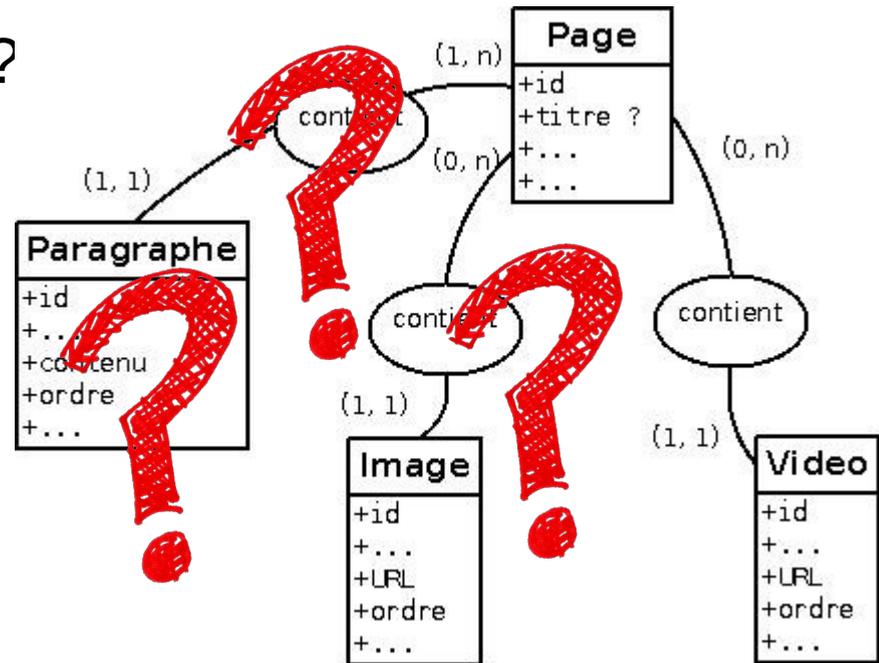
Hyperdocument

- What if we use a database?
 - We enrich the model.
 - What about tables?
 - Nested tables?
 - Nested paragraphs?



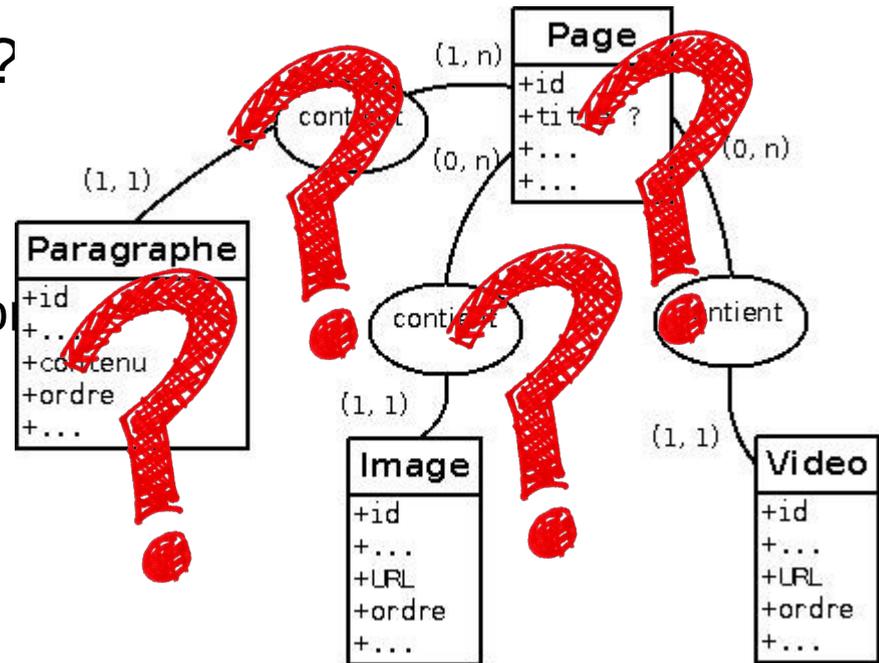
Hyperdocument

- What if we use a database?
 - We enrich the model.
 - And navigation?



Hyperdocument

- What if we use a database?
 - We enrich the model.
 - And navigation?
 - Structure
 - Subtitles
 - Intro/Conclusion
 - Header/Footer



Hyperdocument

- What if we use a database?
 - Is it really effective to use a database to model this data?

Content

- Documents
 - Introduction
 - Modeling document classes
 - Modeling specific documents
- Hyperdocuments
- **Multimedia content**

Multimedia content

- A multimedia document:
 - This is a document that integrates several digital resources:
 - Text,
 - Audio,
 - Video,
 - Presentation

Multimedia content

- A multimedia document:
 - Can be:
 - On paper
 - Integrates text and images,
 - Presentation (slideshow)
 - A series of slides,
 - Each slide can contain text, images, sounds, videos, graphs, and tables.
 - Website:
 - A collection of web pages linked by hyperlinks,
 - Can contain all digital formats

Multimedia content

- A multimedia document:
 - The choice is made according to:
 - The target audience,
 - The type of event (in which the communication will take place),
 - The objective of the communication.

Multimedia content

- A multimedia document:
 - Another example where the use of relational databases can negatively affect system performance:
 - Consider using semi-structured data:
 - Different nature,
 - Different process.

Multimedia content

- Multimedia resources:
 - Creation:
 - Can be created using only computer tools,
 - Can be obtained through digitization:
 - Acquisition (camera, microphone, etc.)
 - Processing (using dedicated software)
 - Noise removal,
 - Color correction,
 - Format conversion,
 - ...

Multimedia content

- Multimedia document production
 - Complex objects requiring a well-defined approach
 - Generally speaking:
 - Specifications,
 - Action plan,
 - Planning,
 - Implementation.

Multimedia content

- Multimedia document production
 - Specifications:
 - Target audience
 - Document objective,
 - Expected functionalities,
 - Constraints to be respected.

Multimedia content

- Multimedia Document Production
 - Action Plan:
 - It defines the main stages of creation.
 - These stages vary depending on the type of document and the nature of the resources used.

Multimedia content

- Multimedia document production
 - Planning:
 - Specifies the sequence (order, duration, responsible party) of tasks defined in the action plan.

Multimedia content

- Multimedia document production
 - Implementation:
 - Concrete construction of the document.

Multimedia content

- Multimedia Document Production
 - Example: Website
 - Review of specifications
 - Content preparation (text, images, and other digital resources)
 - Planning a site structure (site map or navigation plan)
 - Creation of the various pages (content and hyperlinks)
 - Design of a mockup (prototype) to define the graphic charter
 - Page formatting
 - Publication (on a local server or on the Internet)

Semi-Structured Data

Chapter 2

Multimedia Documents and Hyperdocuments

Tarek Boutefara
t_boutefara@univ-jijel.dz
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