Web Engineering & Design 1

HTML

Markup languages

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Content

- What is markup?
- Markup languages
- SGML
- Encoding

Learning goals

You are able to...

- ...explain markup languages, compare them to programming languages and set examples of both.
- ...evaluate which parts of a document markup and which parts data are.
- ...illustrate what effect the encoding of a document has and set an example.
- ...draw how UTF-8 is structured.
- ...fix a document encoded the wrong way.

Simple text documents

Do you remember text only emails?

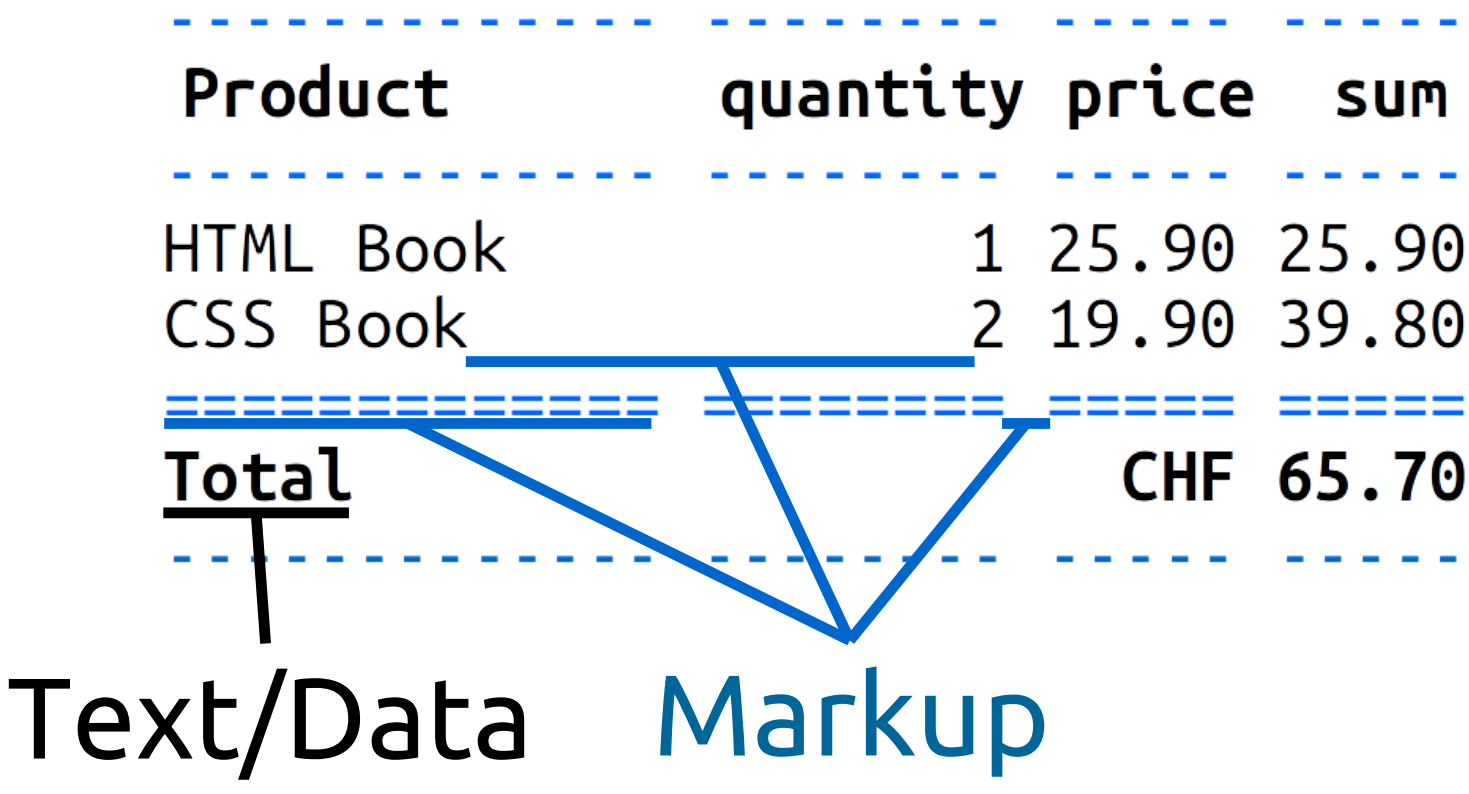
```
Dear Tim Sanders

Thanks for your order. Your order number is 1234-5678.

------------ -------- ----- -----
Product       quantity price  sum
------------ -------- ----- -----
HTML Book            1 25.90 25.90
CSS Book             2 19.90 39.80
============ ======== ===== =====
Total                  CHF 65.70
------------ -------- ----- -----

Best regards

Your Skyshop team
```



«A markup language is a system for annotating a document in a way that is syntactically distinguishable the text.»

Wikipedia

Markup

- Data + **Markup** → Information
- Annotate the data → labels or white spaces
- Clarifies the intention:

```
«The **boss** is out of office.»
```

«The **boss** is out of office.»

→ focus on *who*

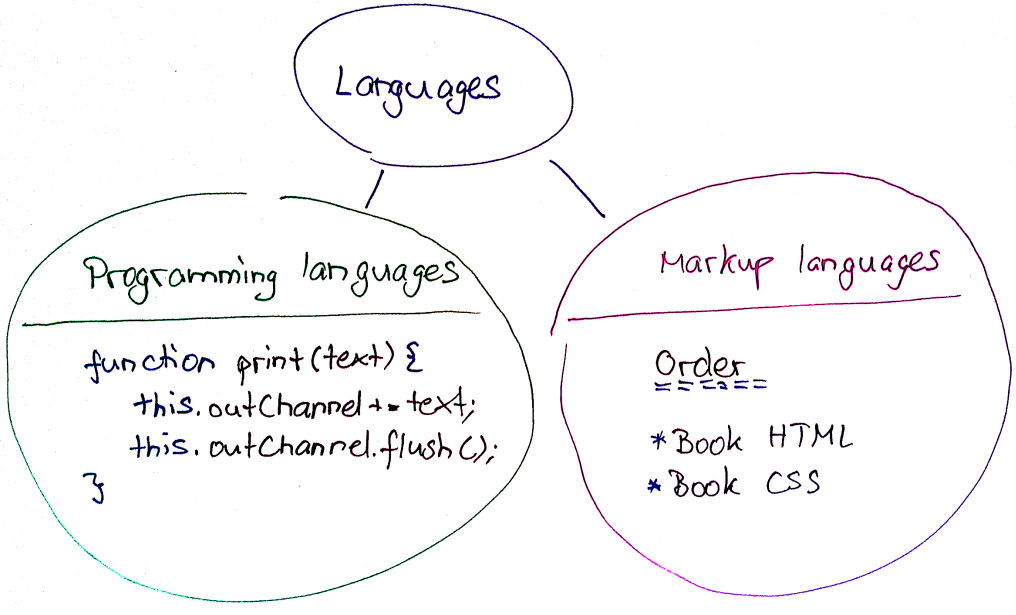
```
«The boss is **out of office**.»
```

«The boss is **out of office**.»

→ focus on *what*

➡ Adds semantics

Markup Languages



Markup Language Types

- Semantic markup
- Presentation markup

Markup languages vs. programming languages

Programming language

- Defines **instructions** for a machine → flow
- Mostly imperative → executed sequentially

Markup language

- Declarative
- Defines a meaning → semantic **annotations**
- May be translated into **different outputs**

  Example *LaTeX*:
  - text document (article/book package)
  - presentation (beamer package)

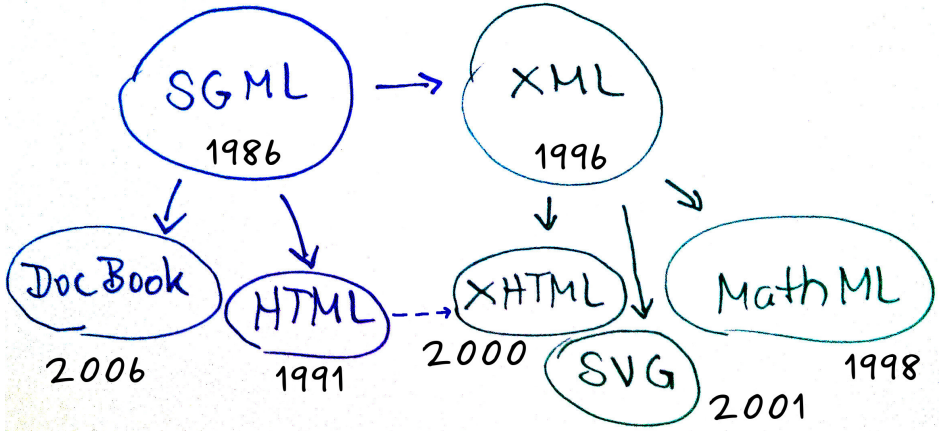
Examples

	Markdown	Latex	HTML
Title	`Title` `=====`	`\section{Title}`	`<h1>Title</h1>`

Item 1
Item 2
	`* Item 1`
	`* Item 2`
		`\begin{itemize}`
		`  \item Item 1`
		`  \item Item 2`
		`\end{itemize}`
			`<ul>`
			`  <li>Item 1</li>`
			`  <li>Item 2</li>`
			`</ul>`

Loud	`**Loud**`	`\important{Loud}`	`<strong>Loud</strong>`

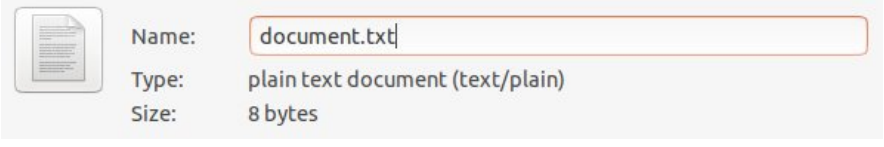
SGML



- Markup language definition language
- Brackets: `< >`
- Tags: `<item></item>`
- Entities: `&lt;   &amp;`

Encoding

What contains the following document ?




```
hexdump -x "document.txt"
```

```
0000000 c35a 72bc 6369 0068 0000007
```

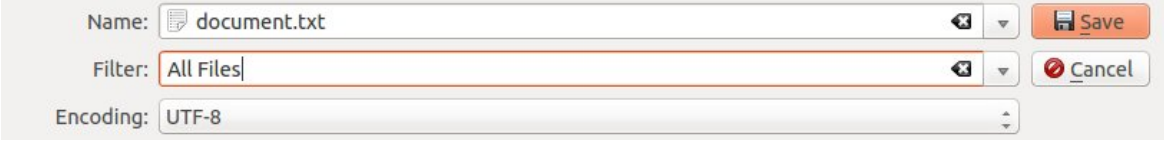
→ We don't know even we know **how to interprete** it!

Encoding = How to interprete the bytes of a document

Content	Encoding	Bytes (Hex)
"Zuerich"	ISO 8859-1	`0000000 755a 7265 6369 0a68 0000008`
"Zuerich"	UTF-8	`0000000 755a 7265 6369 0068 0000007`
"Zuerich"	UTF-16	`0000000 005a 0075 0065 0072 0069 0063  0068 000a 0000010`
"Zürich"	ISO 8859-1	`0000000 fc5a 6972 6863 0000006`
"Zürich"	UTF-8	`0000000 c35a 72bc 6863 0000006`
"Zürich"	UTF-16	`0000000 005a 00fc 0072 0069 0063 0068 000000c`

- **UTF-8**: most commong encoding

➡ Use whenever possible **UTF-8**



UTF-8

Universal Coded Character Set + Transformation Format

- variable-length

Character		Binary UTF-8	Hexadecimal UTF-8
$	U+0024	00100100	24
¢	U+00A2	11000010 10100010	C2 A2
€	U+20AC	11100010 10000010 10101100	E2 82 AC

Source: en.wikipedia.org/wiki/UTF-8

- 8-bit code units
- ASCII-backward compatible → first 128 characters

Wrong encoding

What happens, if the characters are decoded the wrong way?

```
0000000 c35a 72bc 6369 0068 0000007
UTF-8 Big endian:
|Z |ü   |r |i |c |h |
|5a|c3bc|72|69|63|68|

ISO 8859-1:
|5a|c3|bc|72|69|63|68|
|Z |Ã |¼ |r |i |c |h |
```

- Example UTF-8/ISO 8859-1
- 2-byte UTF-8 characters will be interpreted as 2 different characters
- ü → c3bc → c3 bc → Ã¼

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Self Check

1. What's the goal of markup?
2. What's the difference between "data" and "information"?
3. What's the difference between a markup language and a programming language?
4. What is SGML?
5. Why should you use UTF-8 instead of ASCII to encode your documents?
6. UFT-8 is "variable-length". How does this affect on byte level?

Solutions

1. Add a meaning to data
2. Data: mud of characters, Information: data + meaning
3. markup language: declarative, content meaning
programming language: iterative, programm flow
4. Markup definition language
5. ASCII contains 256 characters but no european language characters (→ ISO 8859-1). UTF-8 contains most of the characters of the world.
6. Early defined chars are short encoded (one or two bytes), later added characters are encoded by multiple bytes.

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