

S. Rinzivillo – [rinzivillo@isti.cnr.it](mailto:rinzivillo@isti.cnr.it)

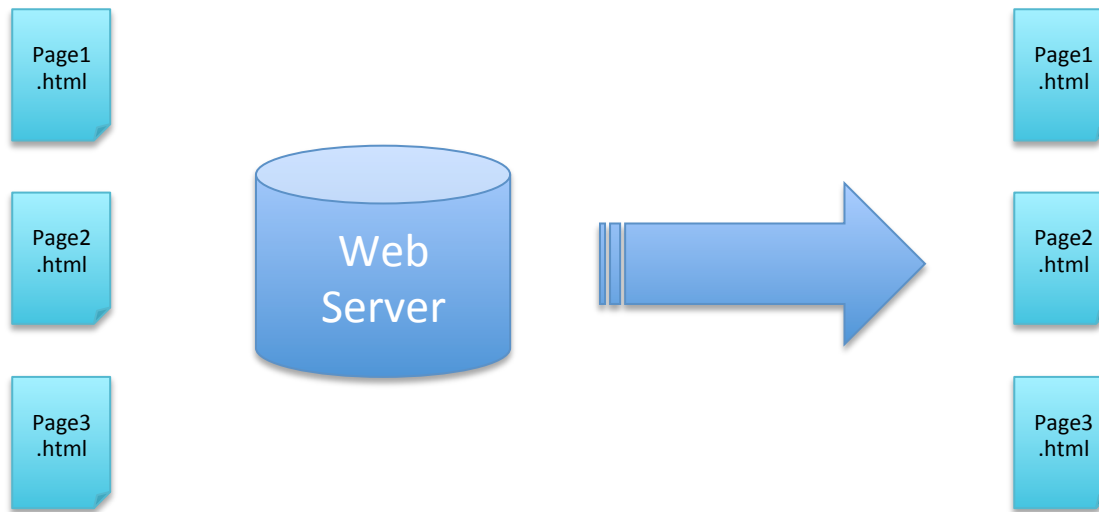
# **DATA VISUALIZATION AND VISUAL ANALYTICS**



# **WEB APPLICATIONS ARCHITECTURE**

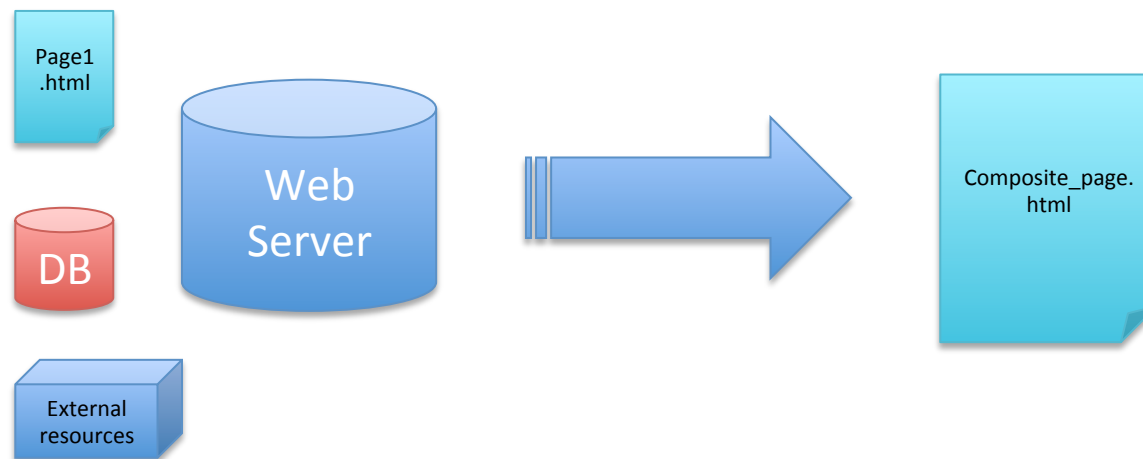
# Static Websites

- The content of each page is sent AS IS from the server to the client



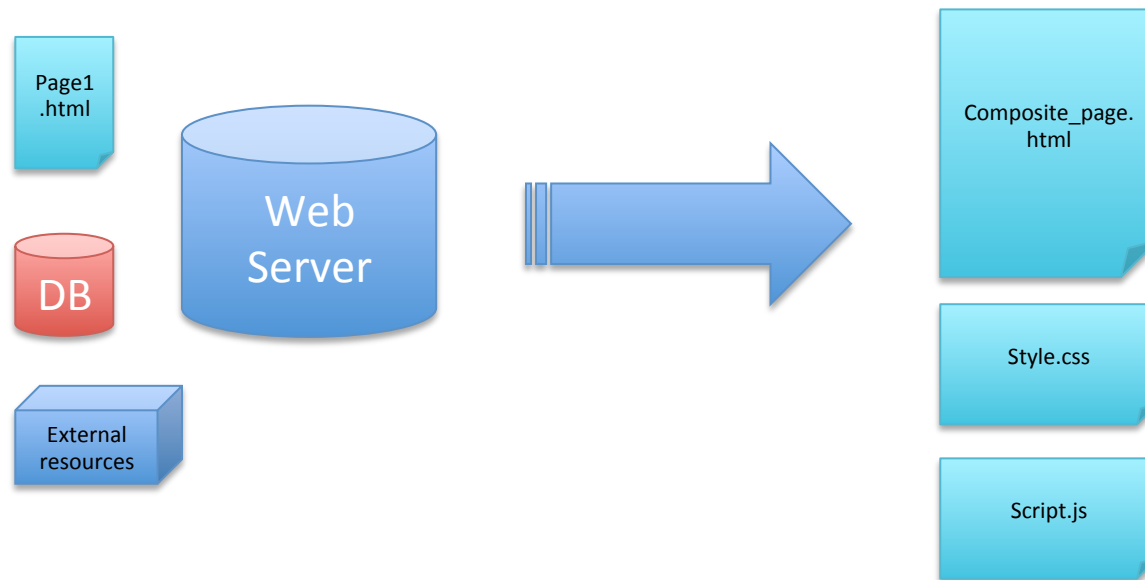
# Dynamic website

- Web page content is composed on demand
- Content is stored in different forms: databases, external resources, other static web pages



# Server Side vs Client Side

- Client-side coding includes HTML, CSS, and Javascript
- This code is transmitted AS IS and executed in the browser



# HTML, CSS, and Javascript

- HTML

- CSS

- Javascript



- Structure

- Presentation

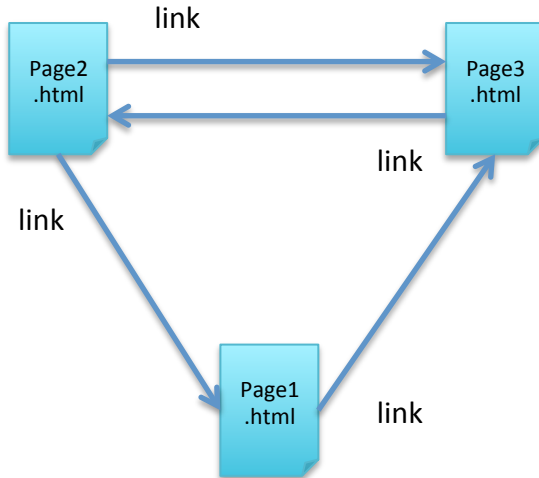
- Behavior



# HTML 101

# Hyper Text Markup Language (HTML)

- Hyper Text



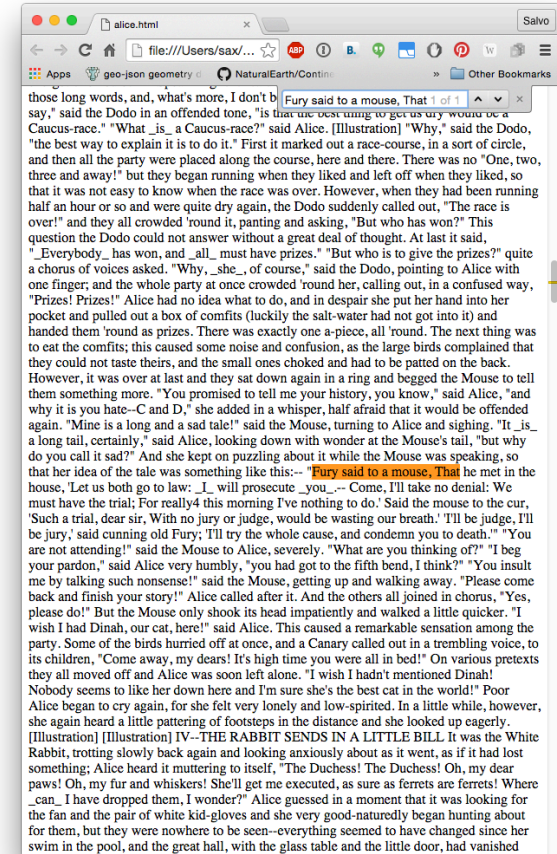
- Markup Language

- Composed of **markup tags**
- Tags group and describe page content



# HTML Structure

```
alice.html — Desktop
448
449 "It is a long tail, certainly," said Alice, looking down with wonder
450 at the Mouse's tail, "but why do you call it sad?" And she kept on
451 puzzling about it while the Mouse was speaking, so that her idea of the
452 tale was something like this:—
453 —
454 "Fury said to
455 a mouse, That
456 he met in the
457 house, 'Let
458 us both go
459 to law; I
460 will prosecute
461 you.—
462 Come, I'll
463 take no denial:
464 We
465 must have
466 the trial;
467 For really4
468 this morning
469 I've
470 nothing
471 to do.'"
472 Said the
473 mouse to
474 the cur,
475 "Such a
476 trial, dear
477 sir, with
478 no jury
479 or judge,
480 would
481 be wasting
482 our
483 breath.'"
484 "I'll be
485 judge,
486 I'll be
487 jury,'"
488 said
489 cunning
490 old
491 Fury;—
492 "I'll
493 try
494 the
495 whole
496 cause,
497 and
498 condemn
499 you to
500 death.'"
501 —
502 "You are not attending!" said the Mouse to Alice, severely. "What are
503 you thinking of?"
504 —
505
```



# Markup Language

- HTML tags give structure
- They also provide semantics
  - Headings for headers
  - UL for unordered list
  - ...

```
<p>
    'To begin with,' said the Cat, 'a dog's not mad. You grant that?'
</p>
<p>
    'I suppose so,' said Alice.
</p>
<p>
    "
        'Well, then,' the Cat went on, 'you see, a dog growls when it's angry, and
        wags its tail when it's pleased. Now "
        <i>I</i>
        " growl when I'm pleased, and wag my
        tail when I'm angry. Therefore I'm mad.'
    "
</p>
<p>...</p>
<p>...</p>
<p>...</p>
<p>
    'You'll see me there,' said the Cat, and vanished.
</p>
<p>...</p>
<p>...</p>
<p>...</p>
<p>
    'I thought it would,' said the Cat, and vanished again.
</p>
<p>...</p>
<p>
    'Did you say pig, or fig?' said the Cat.
</p>
<p>...</p>
<p>...</p>
<p>...</p>
<p>...</p>
<p>...</p>
<div style="height: 4em;">...</div>
<h2>
    CHAPTER VII. A Mad Tea-Party
```

- Browser applies built-in styles to each tag
- Even with default style, web pages should be readable and its hierarchy clear

#### CHAPTER IV. The Rabbit Sends in a Little Bill

It was the White Rabbit, trotting slowly back again, and looking anxiously about as it went, as if it had lost something; and she heard it muttering to itself 'The Duchess! The Duchess! Oh my dear paws! Oh my fur and whiskers! She'll get me executed, as sure as ferrets are ferrets! Where *can* I have dropped them, I wonder?' Alice guessed in a moment that it was looking for the fan and the pair of white kid gloves, and she very good-naturedly began hunting about for them, but they were nowhere to be seen—everything seemed to have changed since her swim in the pool, and the great hall, with the glass table and the little door, had vanished completely.

Very soon the Rabbit noticed Alice, as she went hunting about, and called out to her in an angry tone, 'Why, Mary Ann, what *are* you doing out here? Run home this moment, and fetch me a pair of gloves and a fan! Quick, now!' And Alice was so much frightened that she ran off at once in the direction it pointed to, without trying to explain the mistake it had made.

'He took me for his housemaid,' she said to herself as she ran. 'How surprised he'll be when he finds out who I am! But I'd better take him his fan and gloves—that is, if I can find them.' As she said this, she came upon a neat little house, on the door of which was a bright brass plate with the name 'W. RABBIT' engraved upon it. She went in without knocking, and hurried upstairs, in great fear lest she should meet the real Mary Ann, and be turned out of the house before she had found the fan and gloves.

'How queer it seems,' Alice said to herself, 'to be going messages for a rabbit! I suppose Dinah'll be sending me on messages next!' And she began fancying the sort of thing that would happen: "Miss Alice! Come here directly, and get ready for your walk!" "Coming in a minute, nurse! But I've got to see that the mouse doesn't get out." Only I don't think,' Alice went on, 'that they'd let Dinah stop in the house if it began ordering people about like that!'

By this time she had found her way into a tidy little room with a table in the window, and on it (as she had hoped) a fan and two or three pairs of tiny white kid gloves: she took up the fan and a pair of the gloves, and was just going to leave the room, when her eye fell upon a little bottle that stood near the looking-glass. There was no label this time with the words 'DRINK ME,' but nevertheless she uncorked it and put it to her lips. I know *something* interesting is sure to happen,' she said to herself, 'whenever I eat or drink anything; so I'll just see what this bottle does. I do hope it'll make me grow large again, for really I'm quite tired of being such a tiny little thing!'

It did so indeed, and much sooner than she had expected: before she had drunk half the bottle, she found her head pressing against the ceiling, and had to stoop to save her neck from being broken. She hastily put down the bottle, saying to herself 'That's quite enough—I hope I shan't grow any more—As it is, I can't get out at the door—I do wish I hadn't drunk quite so much!'

Alas! it was too late to wish that! She went on growing, and growing, and very soon had to kneel down on the floor: in another minute there was not even room for this, and she tried the effect of lying down with one elbow against the door, and the other arm curled round her head. Still she went on growing, and, as a last resource, she put one arm out of the window, and one foot up the chimney, and said to herself 'Now I can do no more, whatever happens. What *will* become of me?'

Luckily for Alice, the little magic bottle had now had its full effect, and she grew no larger: still it was very uncomfortable, and, as there seemed to be no sort of chance of her ever getting out of the room again, no wonder she felt unhappy.

'It was much pleasanter at home,' thought poor Alice, 'when one wasn't always growing larger and smaller, and being ordered about by mice and rabbits. I almost wish I hadn't gone down that rabbit-hole—and yet—and yet—it's rather curious, you know, this sort of life! I do wonder what *can* have happened to me! When I used to read fairy-tales, I fancied that kind of thing never happened, and now here I am in the middle of one! There ought to be a book written about me, that there ought! And when I grow up, I'll write one—but I'm grown up now,' she added in a sorrowful tone; 'at least there's no room to grow up any more *here*.'

'But then,' thought Alice, 'shall I *never* get any older than I am now? That'll be a comfort, one way—never to be an old woman—but then—always to have lessons to learn! Oh, I shouldn't like *that*!'

'Oh, you foolish Alice!' she answered herself. 'How can you learn lessons in here? Why, there's hardly room for *you*, and no room at all for any lesson-books!'

And so she went on, taking first one side and then the other, and making quite a conversation of it altogether; but after a few minutes she heard a voice outside, and stopped to listen.

'Mary Ann! Mary Ann!' said the voice. 'Fetch me my gloves this moment!' Then came a little pattering of feet on the stairs. Alice knew it was the Rabbit coming to look for her, and she trembled till she shook the house, quite forgetting that she was now

## Relevant tags: DOCTYPE

- It is not a common tag
  - No closing tag
  - Opening with “!”
- It is a **declaration**
- Select the correct dialect of HTML the page is using
- E.g.: `<!DOCTYPE html>` selects HTML5

## Relevant tags: HTML

- This tag enclose the whole document
- `<html></html>`

## Relevant tags: HEAD

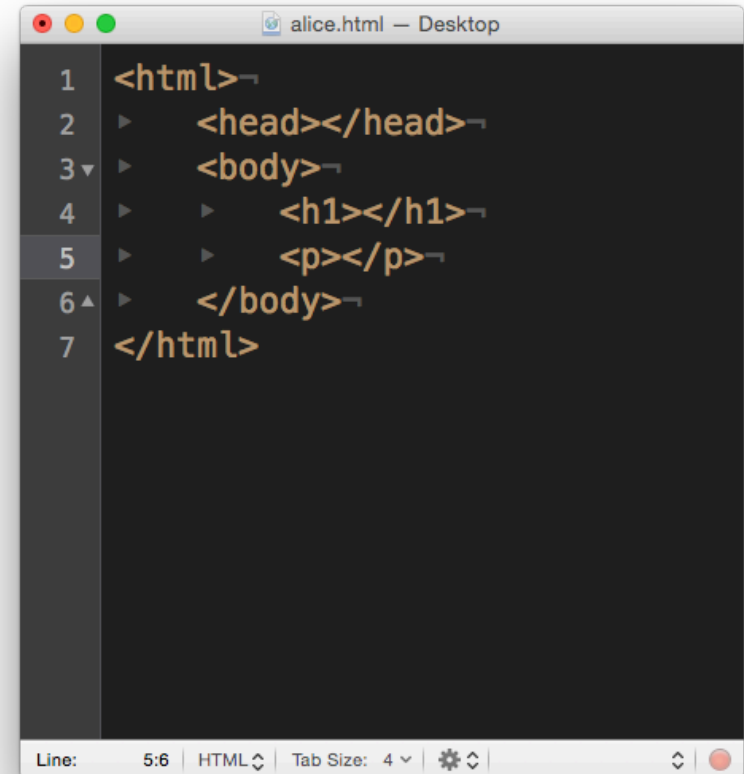
- It provides information to browser to retrieve additional information for the page
  - Javascript, styles, information, meta, etc.
- `<head></head>`

## Relevant tags: **body**

- Contains the document content
- The enclosed tags are showed in the browser window
- `<body></body>`

# Minimal Structure

- This is a basic structure for a web page
- HTML uses **nesting** to code hierarchies
- For readability, enclosed tags are indented w.r.t. container



```
1 <html>
2   <head></head>
3   <body>
4     <h1></h1>
5     <p></p>
6   </body>
7 </html>
```

The screenshot shows a code editor window titled "alice.html - Desktop". The code is displayed on a dark background with light-colored text. The code is as follows:

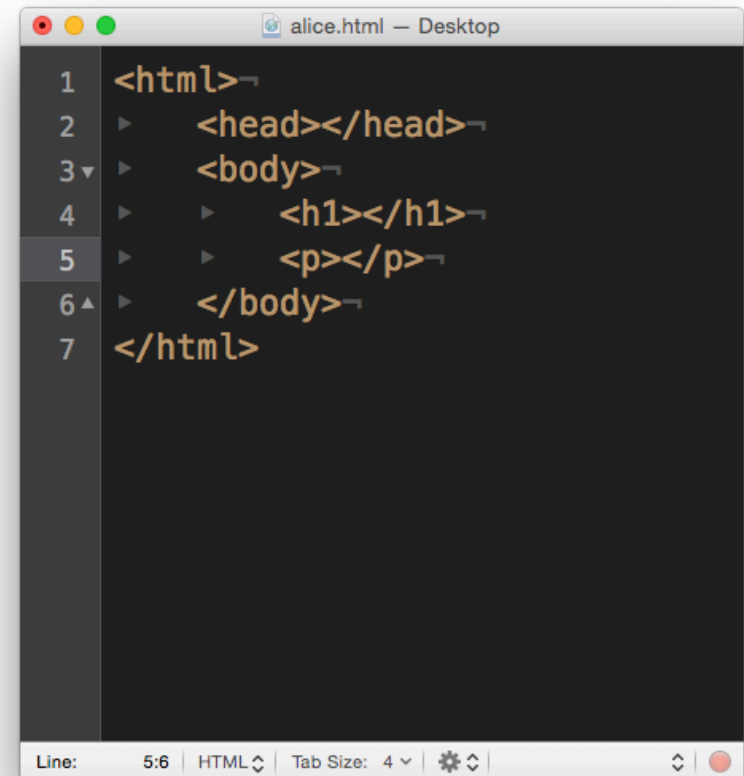
```
1 <html>
2   <head></head>
3   <body>
4     <h1></h1>
5     <p></p>
6   </body>
7 </html>
```

The code is indented to show the hierarchy: the body is indented under html, the head is indented under body, and the h1 and p are indented under body. The status bar at the bottom shows "Line: 5:6 | HTML | Tab Size: 4".



# Document Hierarchy

- Each tag has a parent
- A tag may have children or siblings
- Examples:
  - `h1` is a child of `body`
  - `body` has two children
  - `p` is sibling of `h1`



```
1 <html>
2   <head></head>
3   <body>
4     <h1></h1>
5     <p></p>
6   </body>
7 </html>
```

The screenshot shows a code editor window titled "alice.html - Desktop". The code is displayed in a dark theme with line numbers on the left. The code is as follows:

```
1 <html>
2   <head></head>
3   <body>
4     <h1></h1>
5     <p></p>
6   </body>
7 </html>
```

The status bar at the bottom indicates "Line: 5:6", "HTML", and "Tab Size: 4".

# HTML Element

- An element is the union of two corresponding tags and their content
- Tags are usually present in pairs:
  - **Start tag**
  - **End tag**

`<tag>Content</tag>`

# Named tags

- HTML has a set of predefined tag names, associated with special structures

```
<h1>My Title</h1>
```

# Essential Tags

- Primary Structure

- html
- head
- body

- Head Elements

- title
- meta
- link

- Formatting elements (inline)

- em, i
- strong, b
- q, blockquote
- Span

- Structural Elements (blocks)

- p
- h1-h6
- ul, ol
- a
- img
- div