Basics of XML and HTML

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About

Large amounts of data and information are stored, shared and distributed using HTML and XML-dialects.

They are widely adopted and used in many applications.

The goal is to give you a crash introduction to XML and HTML so you can work with so-called web technologies.

What is XML?

XML

e**X**tensible **M**arkup **L**anguage

XML (wikipedia)

"XML is a **markup language** that defines a set of rules for encoding documents in a **format** that is both ***human-readable*** and ***machine-readable***"

```
<?xml version="1.0"?>
<!DOCTYPE movies>
<movie mins='126' lang='en'>
  <!-- this is a comment -->
  <title>
    Good Will Hunting
  </title>
  <director>
    <first_name>Gus</first_name>
    <last_name>Van Sant</last_name>
  </director>
  <year>1997</year>
  <genre>drama</genre>
</movie>
```

Markup Language?

Markup Languages

A markup language is a system for **annotating** *(i.e. marking)* a document in a way that the content is **distinguished** from its representation.

- LaTeX
- HTML
- Markdown

XML MARKS

In XML the structure markers are defined by angle brackets:

< >

```
<mark>Text marked with a tag</mark>
```

Extensible?

The concept of extensibility means that you can create NEW marks

<newmark>

So what is XML?

XML is **NOT**

A programming language

A network transport protocol

A database

XML is

More than a markup language

A generic language that provides structure and syntax for defining many markup dialects

A standard for the semantic, hierarchical representation of data

It is particularly useful as a format for sharing information between various software systems

Examples

```
<movie>
  Good Will Hunting
</movie>
```

ULTRA SIMPLE YET
COMPLETE XML DOCUMENT

```
<movie>
  Good Will Hunting
</movie>
```

one single
element *'movie'*

start-tag

```
<movie>
  Good Will Hunting
</movie>
```

end-tag

```
<movie>
  Good Will Hunting
</movie>
```

content

Simple Example

```
<movie>
  <title>Good Will Hunting</title>
  <director>Gus Van Sant</director>
  <year>1997</year>
  <genre>drama</genre>
</movie>
```

```
<movie>
   <title>Good Will Hunting</title>
   <director>Gus Van Sant</director>
   <year>1997</year>
   <genre>drama</genre>
</movie>
```

parent element

child elements

```
<movie>
  <title>Good Will Hunting</title>
  <director>Gus Van Sant</director>
  <year>1997</year>
  <genre>drama</genre>
</movie>
```

XML Tree Structure

```
<Root>
  <child_1>...</child_1>
  <child_2>...</child_2>
    <subchild>...</subchild>
  <child_3>...</child_3>
</Root>
```

```
<Root>
   <child_1>...</child_1>
   <child_2>...</child_2>
     <subchild>...</subchild>
   <child_3>...</child_3>
</Root>
```

must have exactly ONE root element

```
<Root>
  <child_1>...</child_1>
  <child_2>.
    <subchild>...</subchild>
  <child_3>...</child_3>
</Root>
```

may contain child elements

```
<Root>
  <child_1>...</child_1>
  <child_2>...</child_2>
    <subchild>
  <child_3>...</child_3>
</Root>
```

may contain subchild elements

Another Example

```
<movie>
  <title>
    Good Will Hunting
  </title>
  <director>
    <first_name>Gus</first_name>
    <last_name>Van Sant</last_name>
  </director>
  <year>1997</year>
  <genre>drama</genre>
</movie>
```

```
<movie>
  <title>
    Good Will Hunting
  </title>
  <director>
    <first_name>Gus</first_name>
    <last_name>Van Sant</last_name>
  </director>
  <year>1997</year>
  <genre>drama</genre>
</movie>
```

one single
element *'movie'*

```
<movie>
  <title>
    Good Will Hunting
  </title>
  <director>
    <first_name>Gus</first_name>
    <last_name>Van Sant</last_name>
  </direc
  <year>1997</year>
  <genre>drama</genre>
</movie>
```

child 1

child 2

child 3

child 4

'movie' has 4 child elements

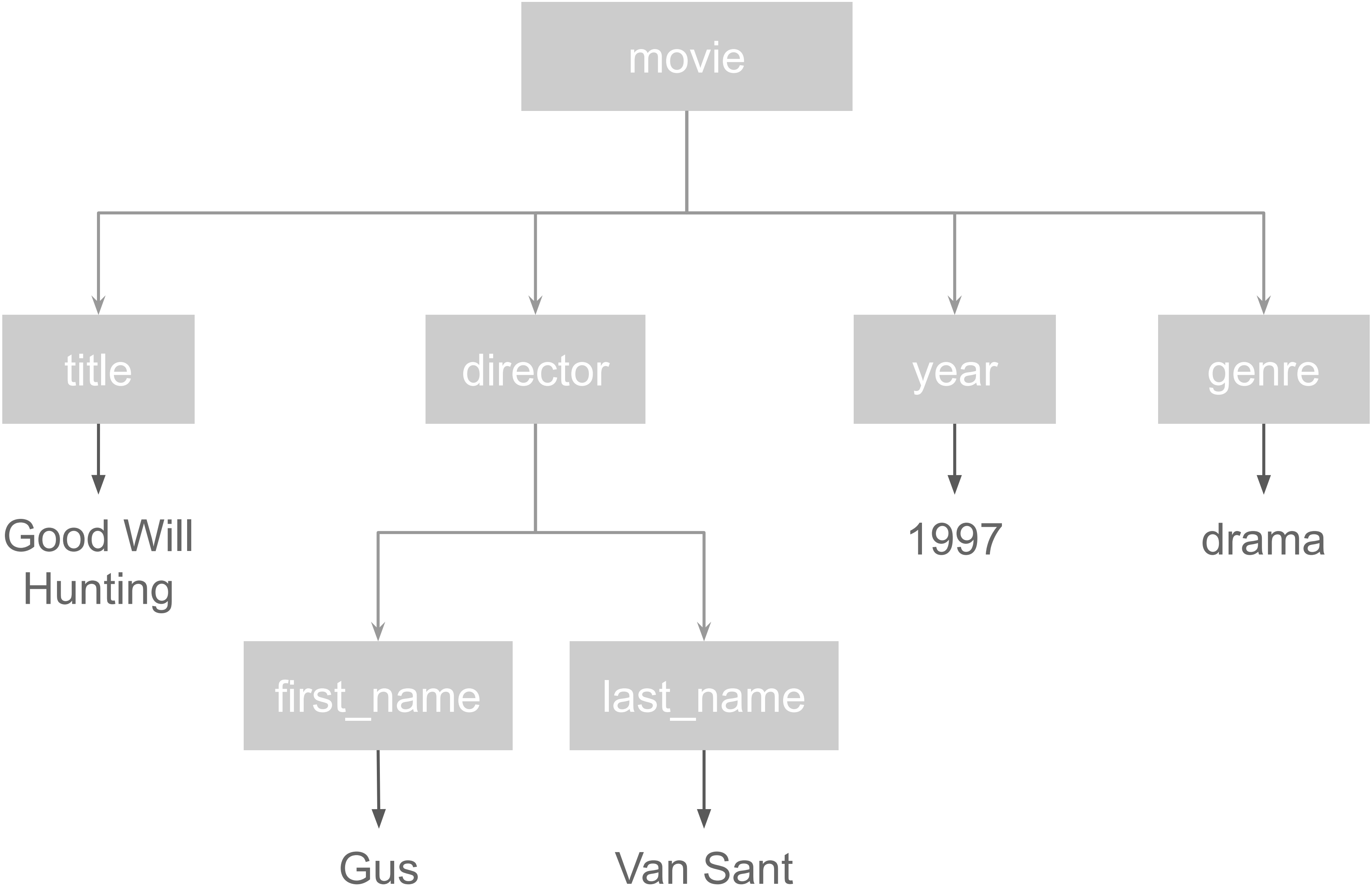
```
<movie>
  <title>
    Good Will Hunting
  </title>
  <director>
    <first_name>Gus</first_name>
    <last_name>Van Sant</last_name>
  </director>
  <year>1997</year>
  <genre>drama</genre>
</movie>
```

'director' has 2 children

subchild 1

subchild 2

Tree Diagram



movie

title

director

year

genre

Good Will Hunting

first_name

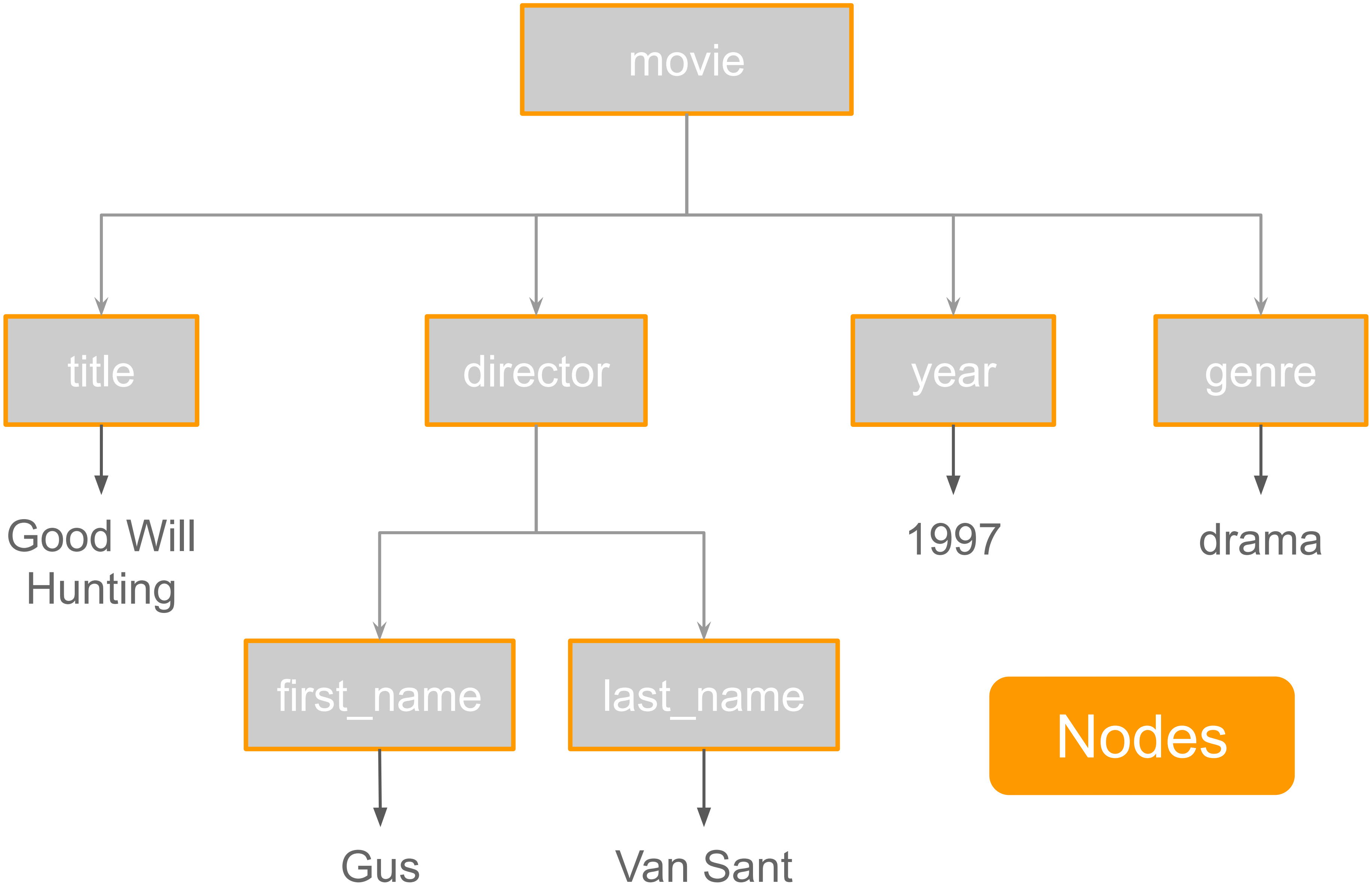
last_name

1997

drama

Gus

Van Sant



movie

title

director

year

genre

Good Will Hunting

1997

drama

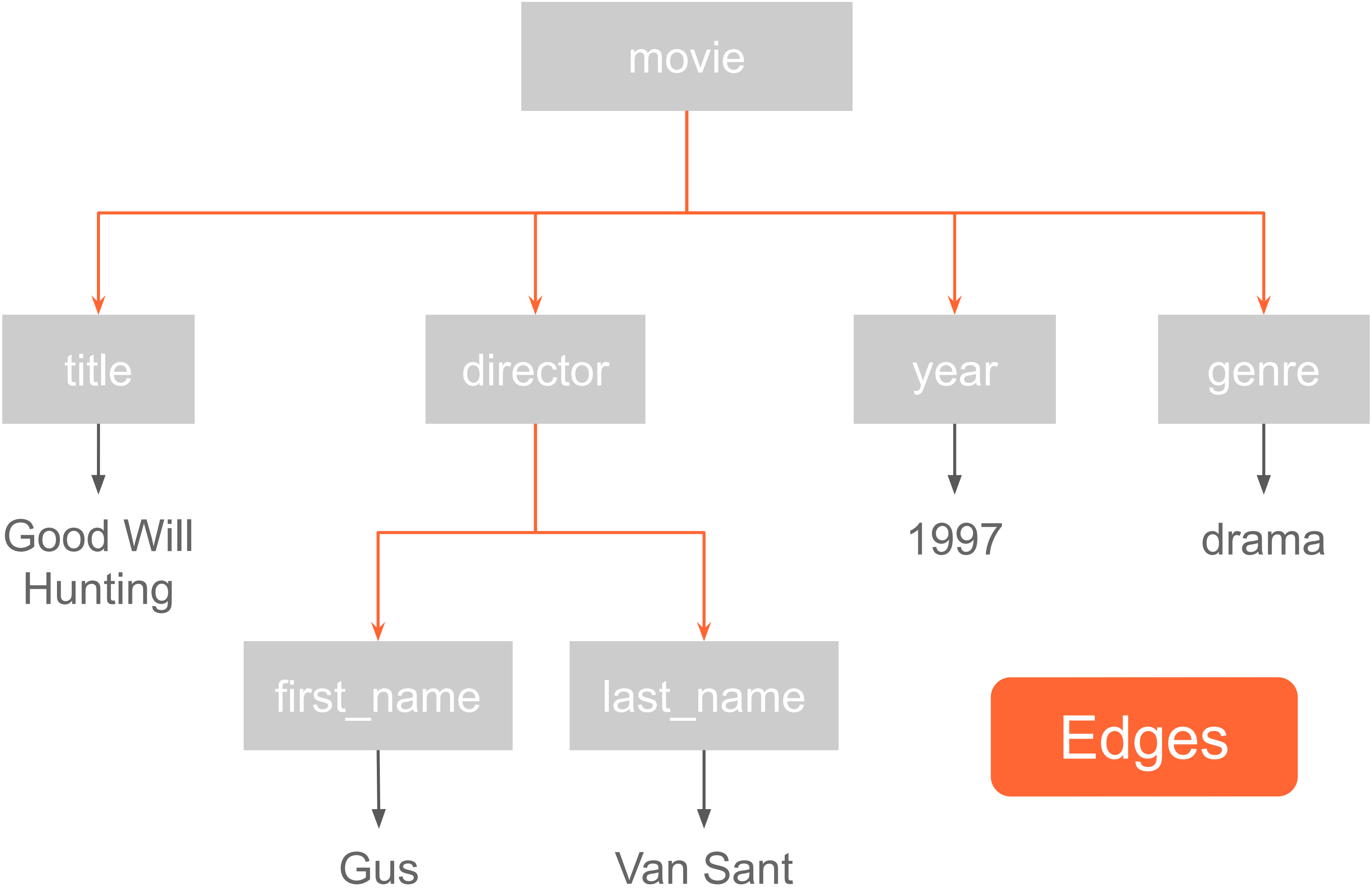
first_name

last_name

Gus

Van Sant

Nodes



movie

title

director

year

genre

Good Will Hunting

1997

drama

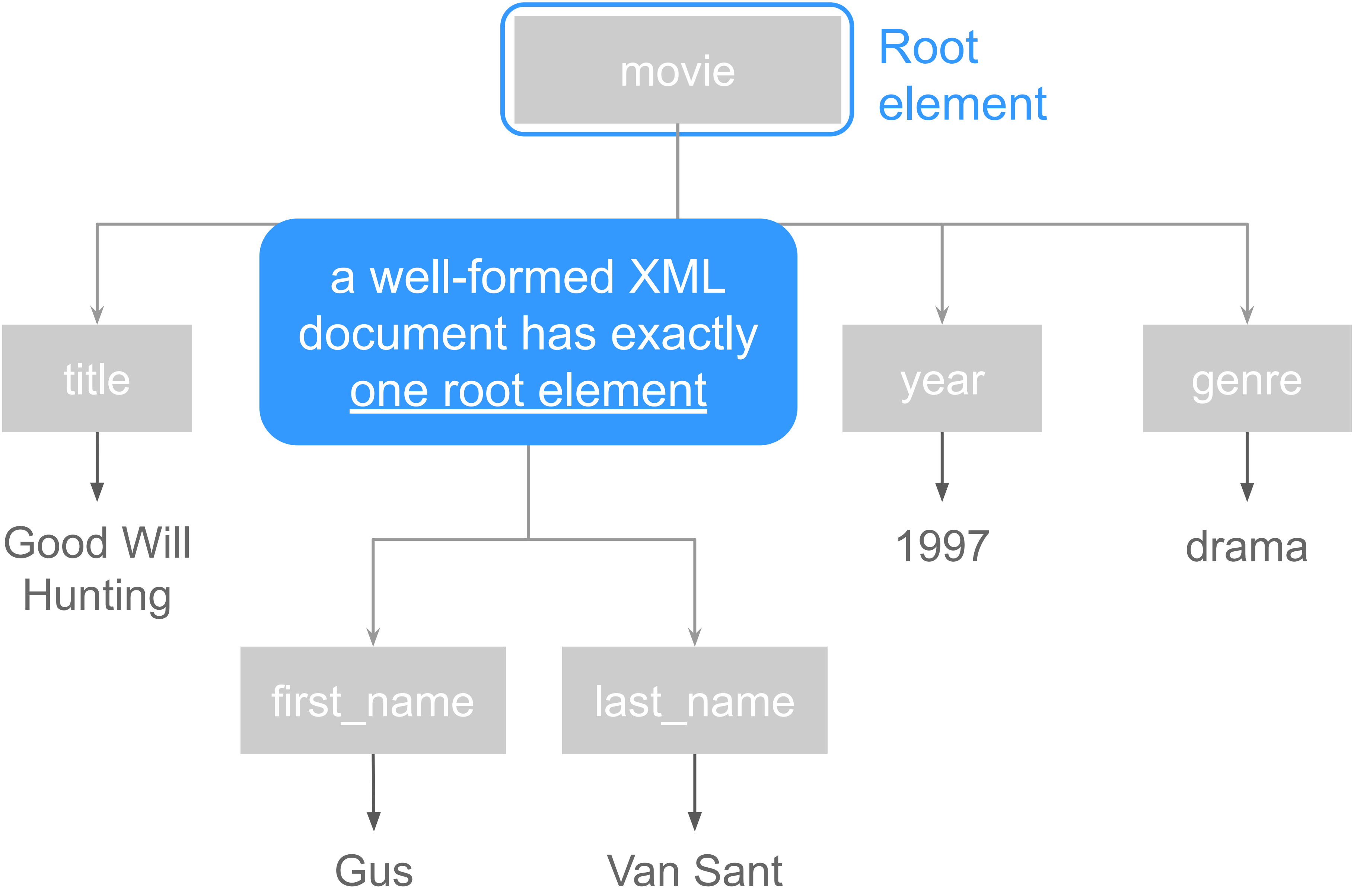
first_name

last_name

Gus

Van Sant

Edges



movie

Root element

a well-formed XML document has exactly one root element

title

Good Will Hunting

first_name

Gus

last_name

Van Sant

year

1997

genre

drama

XML Attributes

```
<movie mins="126" lang="en">
  Good Will Hunting
</movie>
```

XML elements can have attribtues

attributes attached to
element's start tag

```
<movie mins="126" lang="en">
  Good Will Hunting
</movie>
```

attributes MUST be quoted!

Additional XML elements

```
<?xml version="1.0"? encoding="UTF-8" ?>
<![CDATA[ a > 5 & b < 10 ]]>
<!DOCTYPE Movie>
<!-- This is a comment -->
<movie mins="126" lang="en">
  <title>
    Good Will Hunting
  </title>
  <director>
    <first_name>Gus</first_name>
    <last_name>Van Sant</last_name>
  </director>
  <year>1997</year>
  <genre>drama</genre>
</movie>
```

Markup	Description
`<?xml >`	XML Declaration: identifies content as an XML document
`<?PI >`	Processing Instruction: processing instructions passed to application PI
`<!DOCTYPE >`	Document-Type Declaration: defines the structure of an XML document
`<![CDATA[ ]]>`	Character Data: anything inside a CDATA is ignored by the parser
`<!--   -->`	Comment: for writing comments

XML Dialects

XML

It is useful as a format for sharing information between different software systems.

Allows the analyst to think about data in new ways because of the metadata on the structure for complex data.

XML is used for

- traditional data sets (i.e. data tables)
- spreadsheets (i.e. excel)
- visual graphical displays such as SVG
- social network structures
- text documents
- descriptions of user interfaces
- RSS feeds
- data sent to and from web services
- XML databases

Some XML dialects

- **KML** *(Keyhole Markup Language)* for describing geo-spatial information used in Google Earth, Google Maps, Google Sky
- **SVG** *(Scalable Vector Graphics)* for visual graphical displays of two-dimensional graphics with support for interactivity and animation
- **PMML** *(Predictive Model Markup Language)* for describing and exchanging models produced by data mining and machine learning algorithms

Some XML dialects

- **RSS** *(Rich Site Summary)* feeds for publishing blog entries
- **SDMX** *(Statistical Data and Metadata Exchange)* for organizing and exchanging statistical information
- **SBML** *(Systems Biology Markup Language)* for describing biological systems.

What is HTML?

HTML

Hyper**T**ext **M**arkup **L**anguage

Hypertext

Hypertext is text that contains links to other texts.

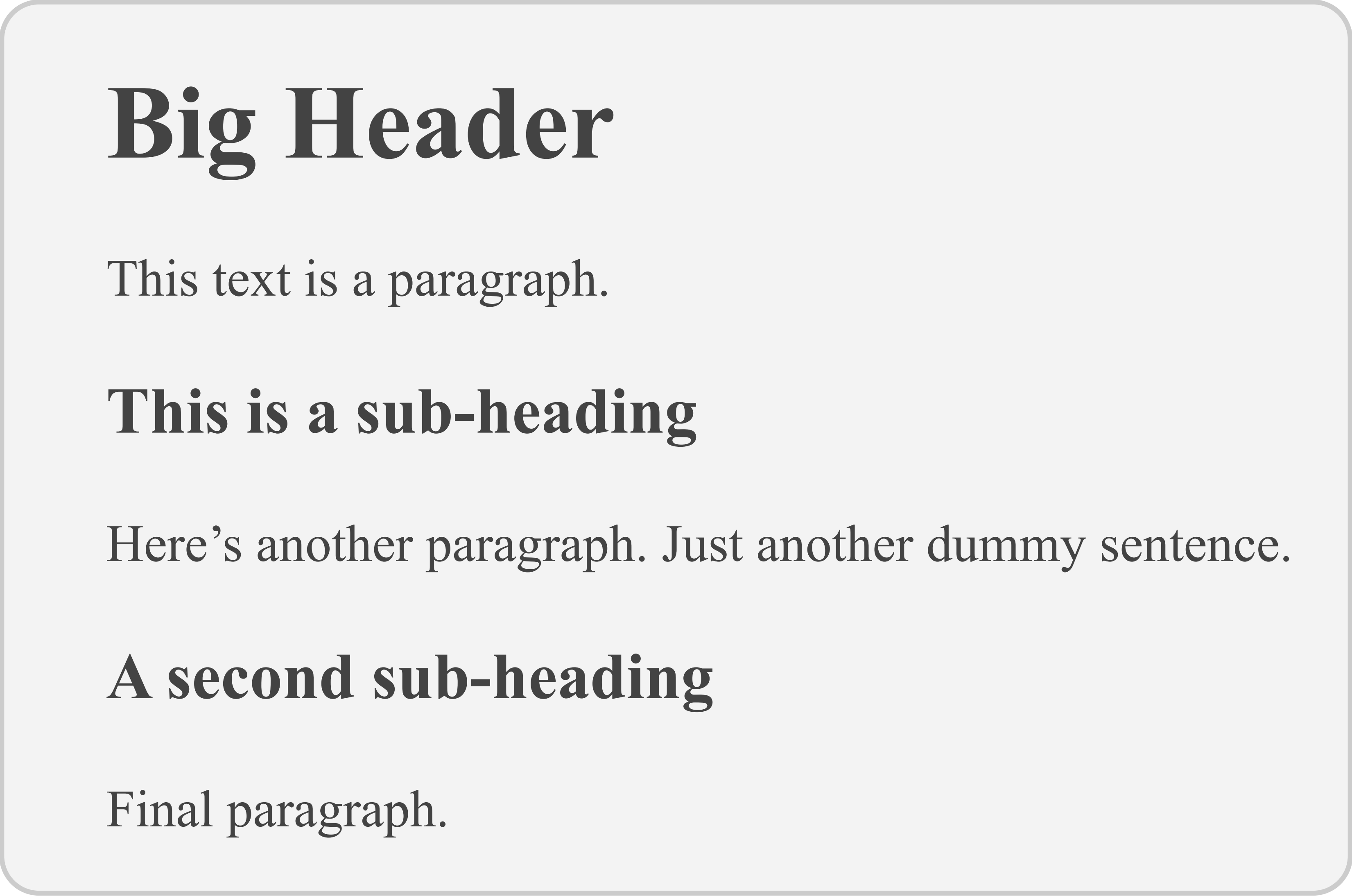
By clicking on a link in a **hypertext** document, a user can quickly jump to different content.

The term was coined by Ted Nelson (1965).

HTML is

The standard markup language for creating web pages and web applications

```
<html>
  <head>
    <title>Page title</title>
  </head>
  <body>
    <h1>Big Header</h1>
    <p>This text is a paragraph.</p>
    <h2>This is a sub-heading</h2>
    <p>Here’s another paragraph. Just
        another dummy sentence.</p>
    <h2>A second sub-heading</h2>
    <p>Final paragraph.</p>
  </body>
</html>
```



Big Header

This text is a paragraph.

This is a sub-heading

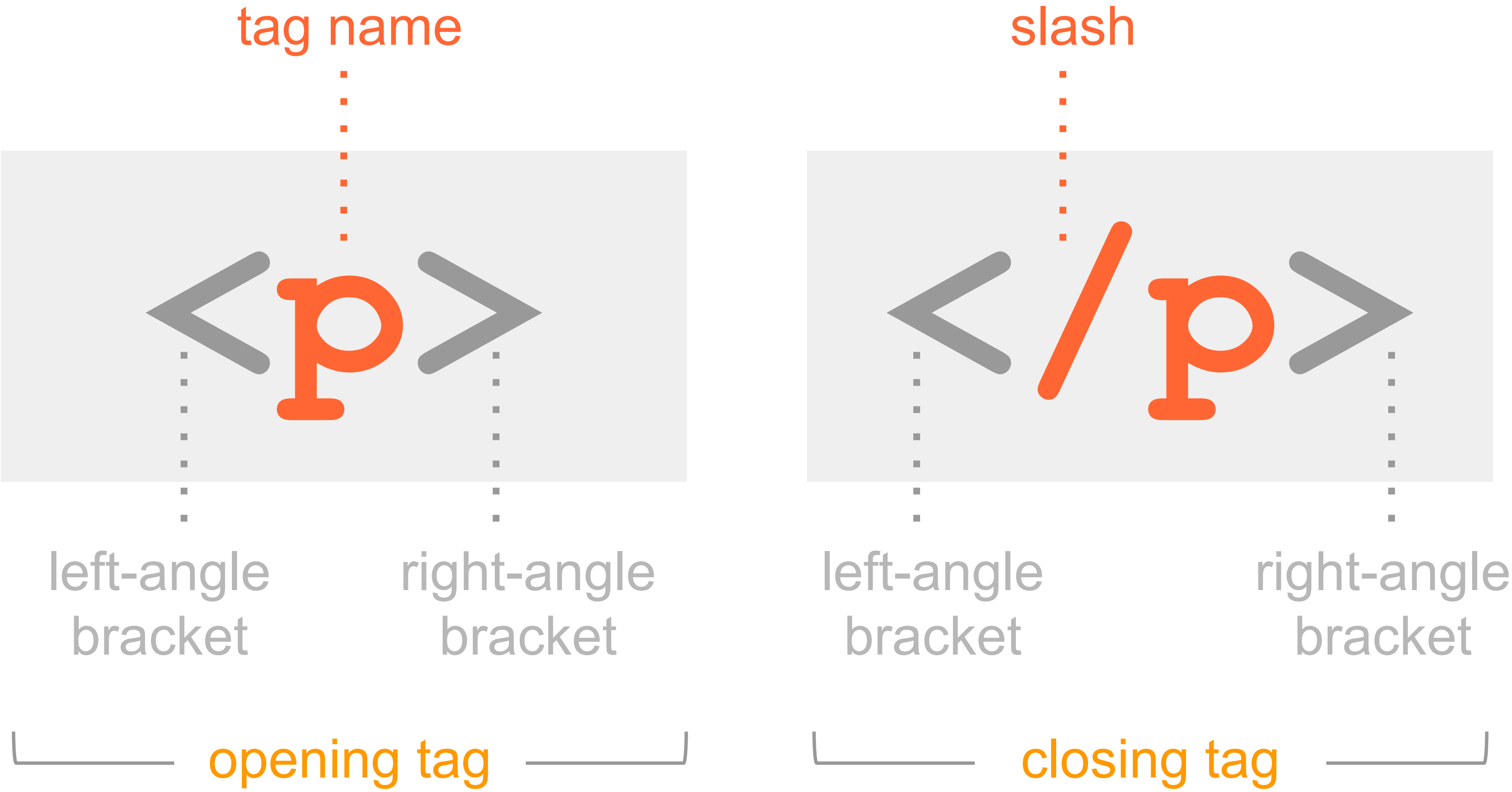
Here’s another paragraph. Just another dummy sentence.

A second sub-heading

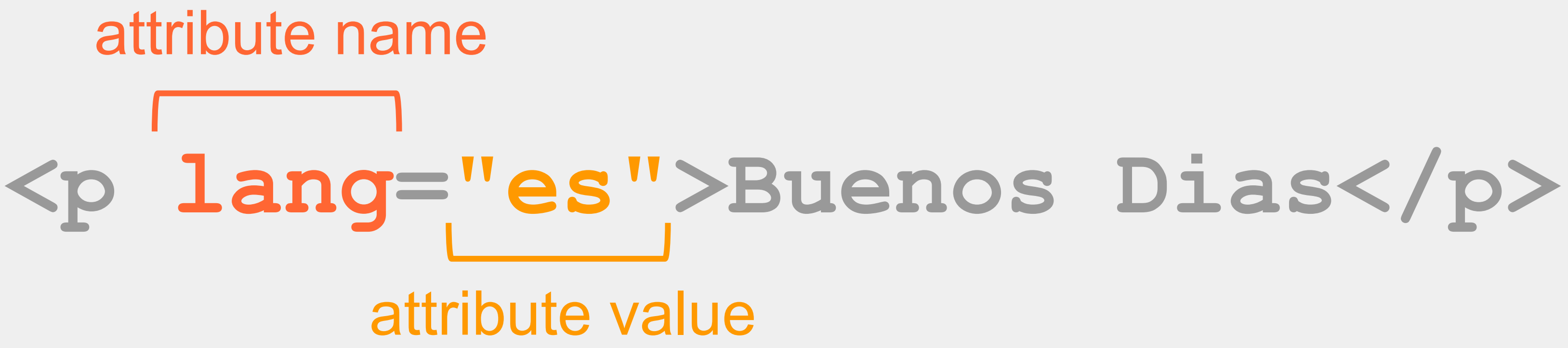
Final paragraph.

HTML elements

Basic elemet structure



Elemet attributes



attribute name

```
<p lang="es">Buenos Dias</p>
```

attribute value

Attributes provide additional information about the contents of an element. They appear on the opening tag of the element and are made up of two parts: a **name** and a **value**, separated by an equals sign.

Head (with Title) and Body

```
<html>
  <head>
    <title>Page title</title>
  </head>
  <body>
    <h1>Big Header</h1>
    <p>This text is a paragraph.</p>
    <h2>This is a sub-heading</h2>
    <p>Here’s another paragraph. Just
       another silly dummy sentence.</p>
  </body>
</html>
```

Body, Head, and Title

<body>
Everything inside the body element is shown inside the main browser window

<head>
Before the body there's usually a head element. This contains information about the page.

<title>
Inside the head we usually find a title element. Its contents are shown in the top of the browser or on the tab for the page.

Summary

HTML pages are text documents

HTML uses tags, which are characters that sit inside angled brackets. They act like containers and tell you something about the information that lies between them.

To learn HTML you need to know what tags are available for you to use

Summary

Tags usually come in pairs. The opening tag denotes the start of a piece of content; the closing tag denotes the end

Opening tags can carry attributes, which tell us more about the content of that element.

Attributes require a name and a value.

To learn HTML, you need to know what tags are available for you to use, what they do, and where they can go.