Abstractions and Paradigms of Programming

CER4C3

Bachelor of Engineering

Computer Engineering

What is XML ?

- **Xml** (eXtensible Markup Language) is a mark up language.
- XML is designed to store and transport data.
- XML is designed to carry data, not to display data.
- XML tags are not predefined. You must define your own tags.
- XML is platform independent and language independent.

Why XML is important ?

- Everything in the modern day world revolves around data.
- There are so many languages available to us to present the data that is provided to us (HTML, CSS, JS, Angular etc.)
- There are so many languages available to process the data provided to us (Java, C#, php)
- Lack of mechanisms or languages to send data from one place to other place.

Use of XML

- Suppose there is a server machine at some remote location and a client somewhere around the world. Now, we want to transfer data from server to client. Earlier when we sent data using html pages then, along with the data we also used to send the layout details (the html tags).
- What if I don’t want to send the tags and just the data ?

Creating an XML File – Syntax

```
<root>
   <child>
      <subchild>.....</subchild>
   </child>
</root>
```

Example : Creating an XML file for student information

Example : Student Data

The below XML file stores data of four engineering students

```
<students>
<student>
<name>Mahesh</name><branch>CS</branch>
</student>
<name>Aashish</name><branch>EE</branch>
</student>
<name>Sachin</name><branch>ME</branch>
<name>Mayank</name><branch>CS</branch>
</student>
</students>
```

Points to be noted

As mentioned previously, it is also evident from the examples that the tags in XML are not predefined unlike the tags in HTML i.e., the user or the author of the XML document must create their own tags.

Grammars of XML

Now, in the above XML file created for student information we have two things, we have the structure of the XML file (tag hierarchy) and, the data stored in that XML file.

There is a concept known as the grammars of XML. The grammars of XML can be categorized as –

- **Structure grammar** that defines the layout.
- **Content grammar** that defines the data.

Structure grammar can be defined with the help of DTD (Document Type Definition)

Content grammar can be defined with the help of schema.

Attributes of an element in XML

- XML elements can have attributes, just like HTML.
- Attributes are designed to contain data related to a specific element.

Now, in our previous example of student information let's say we have two students with the same first name and same branch.

<students>

<student>

<name>Aashish</name><branch>EE</branch>

</student>

<student>

<name>Aashish</name><branch>EE</branch>

</student>

</students>

There must be some way to differentiate between the two as obviously, the last name of the student is not being stored in the dataset.

Attributes of an element in XML

<students>
<student sid="S1">
<name>Aashish</name><branch>EE</branch>
</student>
<student sid="S2">
<name>Aashish</name><branch>EE</branch>
</student>
</students>

Attributes of an element in XML

- Every attribute needs a value and, this value must be in double quotes.
- Now, what we have done in the previous example is we have introduced an attribute sid to differentiate between the two students. However, we could have represented sid as an element also.
- Which means there can be two different ways to represent the same information.

The second way : Representing as an element rather than as an attribute

<students>

<student>

<name>Aashish</name><branch>EE</branch>**<sid>S1</sid>**

</student>

<student>

<name>Aashish</name><branch>EE</branch>**<sid>S2</sid>**

</student>

</students>

- In the former example, sid is an attribute. In the last example, sid is an element. Both examples provide the same information.
- There are no rules about when to use attributes or when to use elements in XML.