ENTERPRISE ARCHITECTURE

Lab Sheet 1 - XML

GAM/IT/2022/F/0096

Part 1: Introduction to XML Syntax and Structure

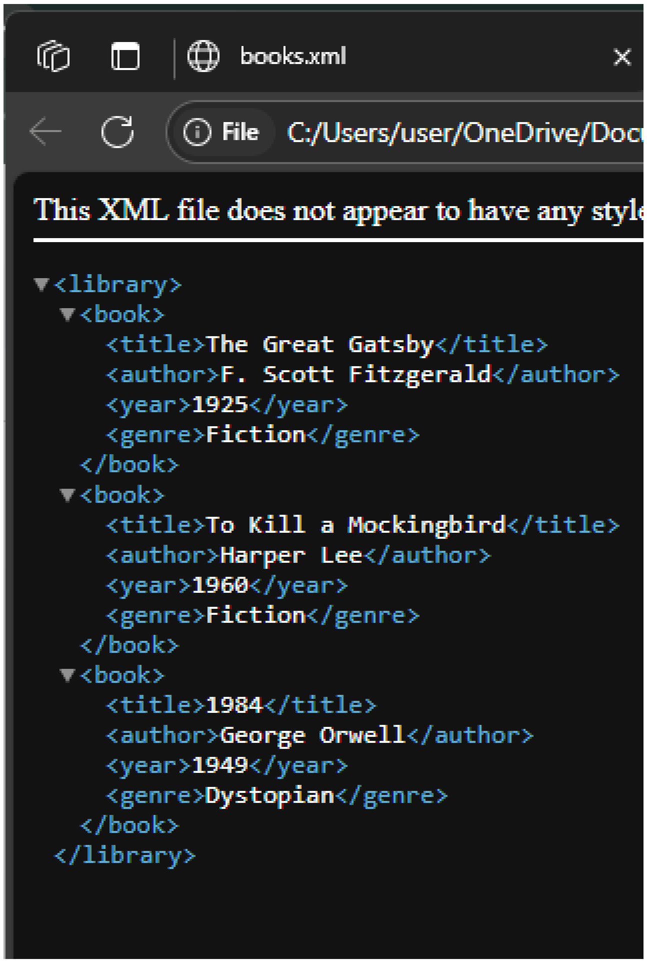
What is XML?

o XML is a markup language used to encode data in a format that is both human-readable and machine-readable. It defines a set of rules for encoding documents in a format that is self-descriptive and can be used across different platforms**.**

Part 2: Creating Your First XML Document

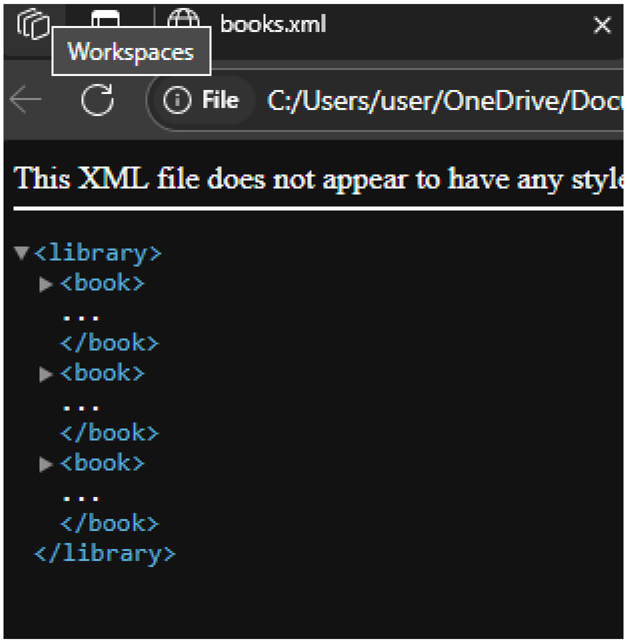
```
<?xml version="1.0" encoding="UTF-8"?>
<library>
    <book>
    <title>The Great Gatsby</title>
    <author>F. Scott Fitzgerald</author>
    <year>1925</year>
    <genre>Fiction</genre>
    </book>
    <book>
    <title>To Kill a Mockingbird</title>
    <author>Harper Lee</author>
    <year>1960</year>
    <genre>Fiction</genre>
    </book>
    <book>
   <title>1984</title>
    <author>George Orwell</author>
    <year>1949</year>
    <genre>Dystopian</genre>
    </book>
</library>
```

Output:



This XML file does not appear to have any style

```
▼<library>
  ▼<book>
     <title>The Great Gatsby</title>
     <author>F. Scott Fitzgerald</author>
     <year>1925</year>
     <genre>Fiction</genre>
   </book>
  ▼<book>
     <title>To Kill a Mockingbird</title>
     <author>Harper Lee</author>
     <year>1960</year>
     <genre>Fiction</genre>
   </book>
  ▼<book>
     <title>1984</title>
     <author>George Orwell</author>
     <year>1949</year>
     <genre>Dystopian</genre>
   </book>
 </library>
```



This XML file does not appear to have any style

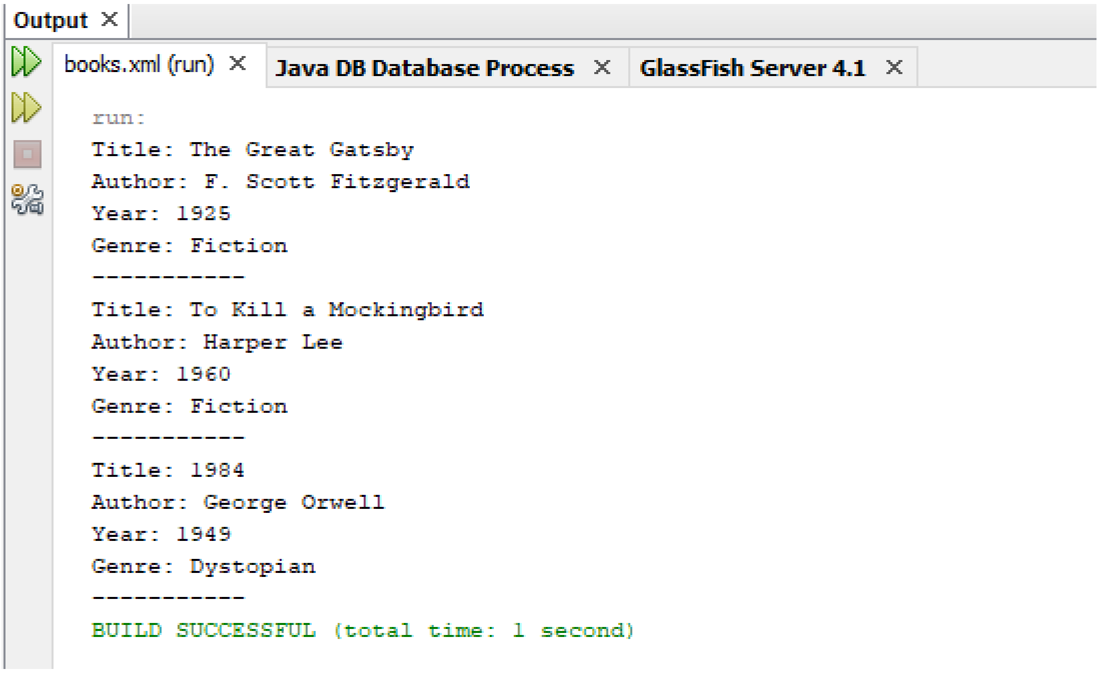
```
▼<library>
  ▶<book>
    ...
   </book>
  ▶<book>
    ...
   </book>
  ▶<book>
    ...
   </book>
 </library>
```

Part 3: Parsing XML in Java

```
import org.w3c.dom.*;

import javax.xml.parsers.*;

public class XmlParser {

public static void main(String[] args) {

 try {
```

```
 // Create a new DocumentBuilderFactory and DocumentBuilder
DocumentBuilderFactory factory =  DocumentBuilderFactory.newInstance();
DocumentBuilder builder = factory.newDocumentBuilder();
 // Parse the XML file
Document document = builder.parse("books.xml");
// Normalize the document
document.getDocumentElement().normalize();
// Get the root element (library)
NodeList nodeList = document.getElementsByTagName("book");
// Loop through each book in the XML document
for (int i = 0; i < nodeList.getLength(); i++) {  Node node = nodeList.item(i);
 if (node.getNodeType() == Node.ELEMENT_NODE) {  Element element = (Element) node;
 // Get and print the details of each book
String title =  element.getElementsByTagName("title").item(0).getTextContent();
String author = element.getElementsByTagName("author").item(0).getTextContent();
String year =  element.getElementsByTagName("year").item(0).getTextContent();
String genre =  element.getElementsByTagName("genre").item(0).getTextContent();
 System.out.println("Title: " + title);
 System.out.println("Author: " + author);
 System.out.println("Year: " + year);
 System.out.println("Genre: " + genre);
 System.out.println("-----------");
 }
}
}catch (Exception e) {
 e.printStackTrace();
 }
}
}
```

Output:



```
run:
Title: The Great Gatsby
Author: F. Scott Fitzgerald
Year: 1925
Genre: Fiction
-----------
Title: To Kill a Mockingbird
Author: Harper Lee
Year: 1960
Genre: Fiction
-----------
Title: 1984
Author: George Orwell
Year: 1949
Genre: Dystopian
-----------
BUILD SUCCESSFUL (total time: 1 second)
```

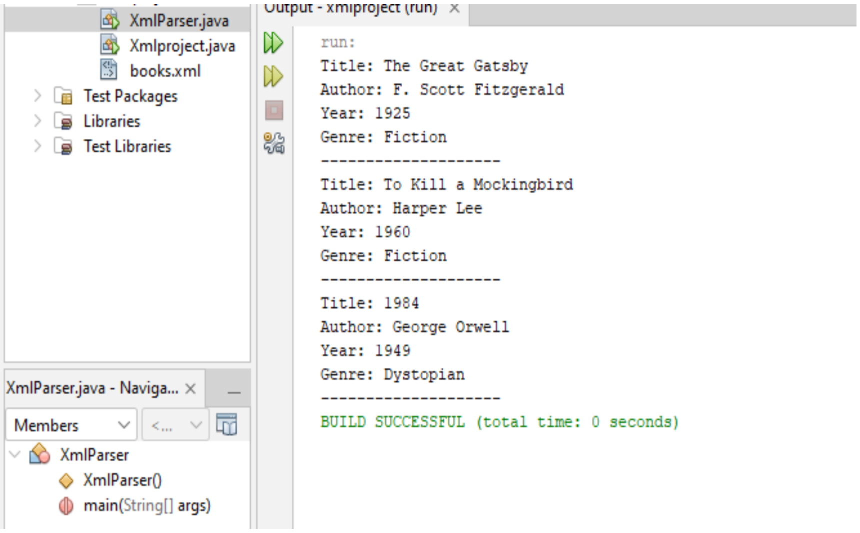
Part 4: Modifying XML Data

```
import java.io.File;

import java.io.InputStream;

import javax.xml.parsers.*;

import javax.xml.transform.Transformer;

import javax.xml.transform.TransformerFactory;

import javax.xml.transform.dom.DOMSource;

import javax.xml.transform.stream.StreamResult;

import org.w3c.dom.*;


public class XmlParser {

    public static void main(String[] args) {

        try {

            // Load XML from the src/xmlproject folder

            InputStream inputStream = XmlParser.class.getResourceAsStream("books.xml");
```

```
if (inputStream == null) {
    System.out.println("File not found in package xmlproject!");
    return;
}
// Create a DocumentBuilderFactory and parse the XML content
DocumentBuilderFactory factory = DocumentBuilderFactory.newInstance();
DocumentBuilder builder = factory.newDocumentBuilder();
Document document = builder.parse(inputStream);
// Normalize document
document.getDocumentElement().normalize();
// Get all <book> elements
NodeList nodeList = document.getElementsByTagName("book");
// Loop through each book
for (int i = 0; i < nodeList.getLength(); i++) {
    Node node = nodeList.item(i);

    if (node.getNodeType() == Node.ELEMENT_NODE) {
        Element element = (Element) node;
        // Extract values for each book
        String title = element.getElementsByTagName("title").item(0).getTextContent();
        String author = element.getElementsByTagName("author").item(0).getTextContent();
        String year = element.getElementsByTagName("year").item(0).getTextContent();
        String genre = element.getElementsByTagName("genre").item(0).getTextContent();

        // Print book details
        System.out.println("Title: " + title);
        System.out.println("Author: " + author);
        System.out.println("Year: " + year);
        System.out.println("Genre: " + genre);
```

```
                    System.out.println("--------------------");
                }
            }
            Element firstBook = (Element) nodeList.item(0);
            firstBook.getElementsByTagName("year").item(0).setTextContent("2023");
            TransformerFactory transformerFactory = TransformerFactory.newInstance();
            Transformer transformer = transformerFactory.newTransformer();
            DOMSource source = new DOMSource(document);
            StreamResult result = new StreamResult(new File("updated_books.xml"));
            transformer.transform(source, result);

        } catch (Exception e) {
            e.printStackTrace();
        }
    }
}
```

Output:



```
run:
Title: The Great Gatsby
Author: F. Scott Fitzgerald
Year: 1925
Genre: Fiction
--------------------
Title: To Kill a Mockingbird
Author: Harper Lee
Year: 1960
Genre: Fiction
--------------------
Title: 1984
Author: George Orwell
Year: 1949
Genre: Dystopian
--------------------
BUILD SUCCESSFUL (total time: 0 seconds)
```