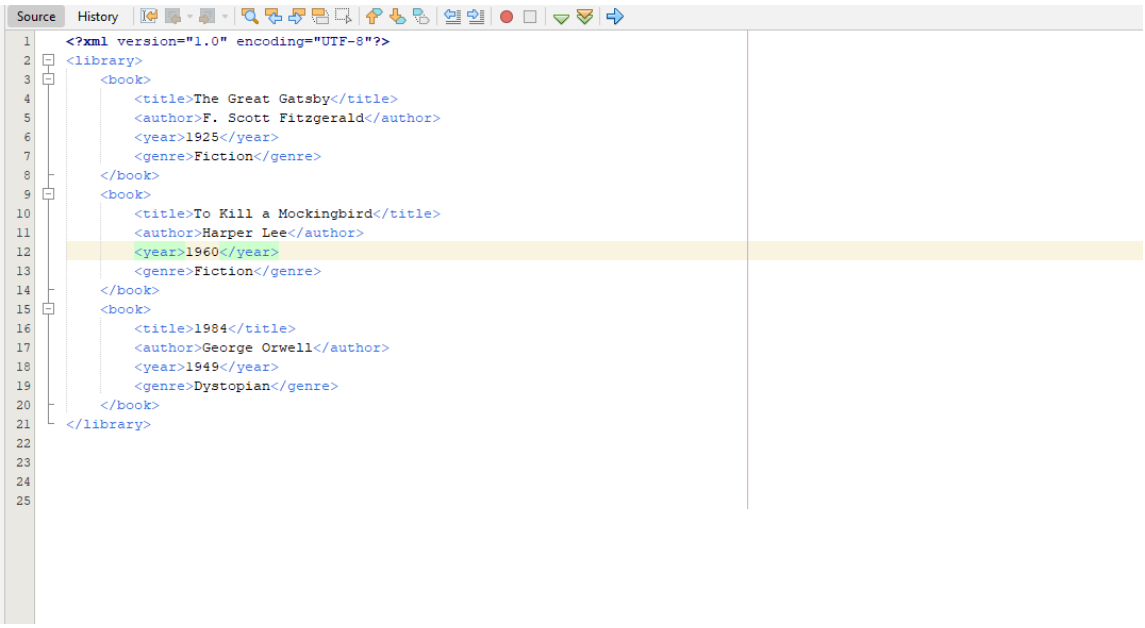
GAM/IT/2022/F/0064 – P. K. D. H. Madushani

Lab Sheet : Introduction to XML and Basic Operations

2. Creating Your First XML Document

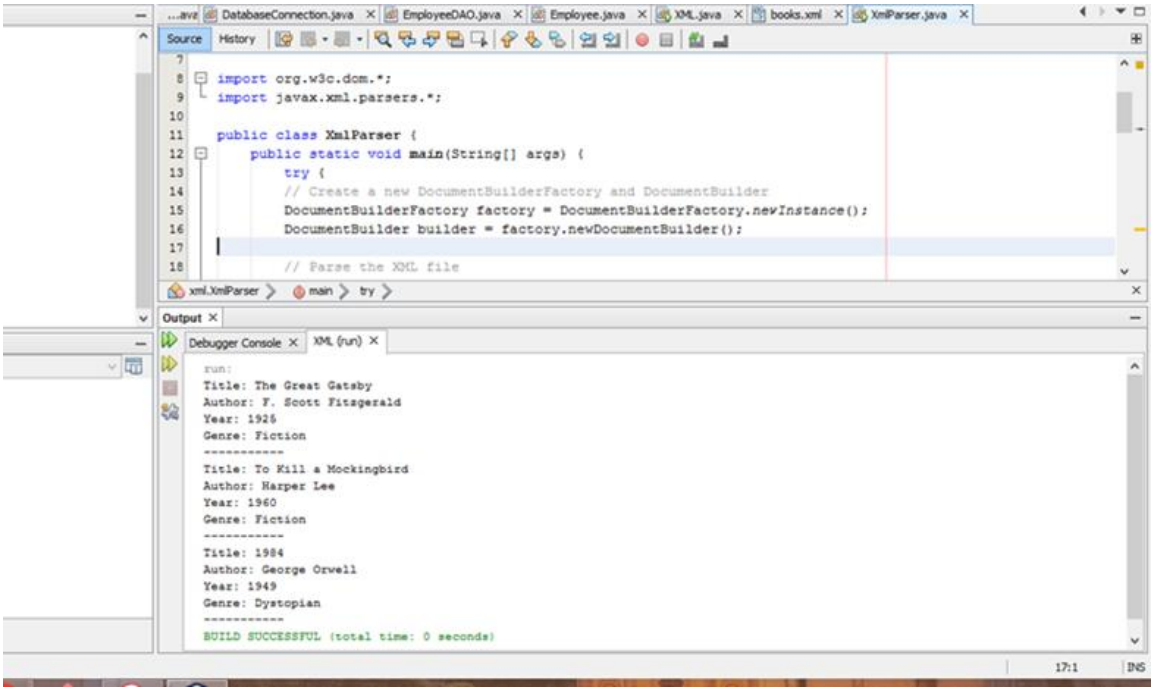
```
<?xml version="1.0" encoding="UTF-8"?>
<library>
    <book>
        <title>The Great Gatsby</title>
        <author>F. Scott Fitzgerald</author>
        <year>1925</year>
        <genre>Fiction</genre>
    </book>
    <book>
        <title>To Kill a Mockingbird</title>
        <author>Harper Lee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



3. Parsing XML in Java

```
import javax.xml.parsers.DocumentBuilderFactory;
import javax.xml.parsers.DocumentBuilder;
import org.w3c.dom.Document;
import org.w3c.dom.NodeList;
import org.w3c.dom.Node;
import org.w3c.dom.Element;
import java.io.File;

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
         File xmlFile = new File("books.xml");
```

```
    Document document = builder.parse(xmlFile);

    // Normalize the document
    document.getDocumentElement().normalize();

    // Get the list of <book> elements (corrected tag)
    NodeList nodeList = document.getElementsByTagName("book");

    // Loop through each <book> element
    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 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();   }  }  }
```



4. Modifying XML Data

// Modify the year of the first book

Element firstBook = (Element) nodeList.item(0);

firstBook.getElementsByTagName("year").item(0).setTextContent("2023");

// Save the modified document to updated_books.xml

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); public static void main(String[] args) throws InterruptedException {

Counter counter=new Counter();

// Create and start multiple threads

```
Thread thread1 = new SynchronizedExample(counter);
Thread thread2 = new SynchronizedExample(counter);
thread1.start();
thread2.start();
// Wait for threads to finish
thread1.join();
thread2.join();
System.out.println("Final counter value: " + counter.getCount());
```