

## Lab Sheet 3: Introduction to XML and Basic Operations

### Part 2: Creating Your First XML Document

#### 1. Create an XML Document:

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  <!--
3  Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change this license
4  Click nbfs://nbhost/SystemFileSystem/Templates/XML/XMLDocument.xml to edit this template
5  -->
6
7
8  <library>
9    <book>
10      <title>The Great Gatsby</title>
11      <author>F. Scott Fitzgerald</author>
12      <year>1925</year>
13      <genre>Fiction</genre>
14    </book>
15    <book>
16      <title>To Kill a Mockingbird</title>
17      <author>Harper Lee</author>
18      <year>1960</year>
19      <genre>Fiction</genre>
20    </book>
21    <book>
22      <title>1984</title>
23      <author>George Orwell</author>
24      <year>1949</year>
25      <genre>Dystopian</genre>
26    </book>
27  </library>
28
```

## Part 3: Parsing XML in Java

### 1. Create a Java Class for XML Parsing:

```
10
11 public class XmlParser {
12     public static void main(String[] args) {
13         try {
14             // Initialize parser
15             DocumentBuilderFactory factory = DocumentBuilderFactory.newInstance();
16             DocumentBuilder builder = factory.newDocumentBuilder();
17
18             // Parse the XML file with absolute path
19             File xmlFile = new File(pathname: "C:\\Users\\USER\\Desktop\\java2\\XMLExample\\src\\xmlexample\\book.xml");
20             Document document = builder.parse(f: xmlFile);
21
22             // Normalize
23             document.getDocumentElement().normalize();
24
25             // Get all book nodes
26             NodeList nodeList = document.getElementsByTagName(tagname: "book");
27
28             for (int i = 0; i < nodeList.getLength(); i++) {
29                 Node node = nodeList.item(index: i);
30
31                 if (node.getNodeType() == Node.ELEMENT_NODE) {
32                     Element element = (Element) node;
33
34                     String title = element.getElementsByTagName(name: "title").item(index: 0).getTextContent();
35                     String author = element.getElementsByTagName(name: "author").item(index: 0).getTextContent();
36                     String year = element.getElementsByTagName(name: "year").item(index: 0).getTextContent();
37                     String genre = element.getElementsByTagName(name: "genre").item(index: 0).getTextContent();
38
39                     System.out.println("Title: " + title);
40                     System.out.println("Author: " + author);
41                     System.out.println("Year: " + year);
42                     System.out.println("Genre: " + genre);
43                     System.out.println(x: "-----");
44                 }
45             }
46         } catch (Exception e) {
47             e.printStackTrace();
48         }
49     }
50 }
```

```
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)
```

## Part 4: Modifying XML Data

### 1. Modify the XML Document:

```
1  /*
2   * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change this license
3   * Click nbfs://nbhost/SystemFileSystem/Templates/Classes/Class.java to edit this template
4   */
5   package xmlexample;
6
7   import org.w3c.dom.*;
8   import javax.xml.parsers.*;
9   import java.io.File;
10  import javax.xml.transform.*;
11  import javax.xml.transform.dom.DOMSource;
12  import javax.xml.transform.stream.StreamResult;
13
14  public class XmlParser {
15      public static void main(String[] args) {
16          try {
17              // Initialize parser
18              DocumentBuilderFactory factory = DocumentBuilderFactory.newInstance();
19              DocumentBuilder builder = factory.newDocumentBuilder();
20
21              // Parse the XML file with absolute path
22              File xmlFile = new File(pathname: "C:\\Users\\USER\\Desktop\\java2\\XMLExample\\src\\xmlexample\\book.xml");
23              Document document = builder.parse(f: xmlFile);
24
25              // Normalize
26              document.getDocumentElement().normalize();
27
28              // Get all book nodes
29              NodeList nodeList = document.getElementsByTagName(tagname: "book");
30
31              for (int i = 0; i < nodeList.getLength(); i++) {
32                  Node node = nodeList.item(index: i);
33
34                  if (node.getNodeType() == Node.ELEMENT_NODE) {
35                      Element element = (Element) node;
36
37                      String title = element.getElementsByTagName(name: "title").item(index: 0).getTextContent();
38                      String author = element.getElementsByTagName(name: "author").item(index: 0).getTextContent();
39                      String year = element.getElementsByTagName(name: "year").item(index: 0).getTextContent();
40                      String genre = element.getElementsByTagName(name: "genre").item(index: 0).getTextContent();
41
42                      System.out.println("Title: " + title);
43                      System.out.println("Author: " + author);
44                      System.out.println("Year: " + year);
45                      System.out.println("Genre: " + genre);
46                      System.out.println(s: "-----");
47
48                      // Modify the year of the first book
49                      Element firstBook = (Element)nodeList.item(index: 0);
50                      firstBook.getElementsByTagName(name: "year").item(index: 0).setTextContent(textContent: "2023");
51
52                      TransformerFactory transformerFactory = TransformerFactory.newInstance();
53                      Transformer transformer = transformerFactory.newTransformer();
54                      DOMSource source = new DOMSource(s: document);
55                      StreamResult result = new StreamResult(new File(pathname: "updated_books.xml"));
56                      transformer.transform(xmlSource: source, outputTarget: result);
57                  }
58              }
59          } catch (Exception e) {
60              e.printStackTrace();
61          }
62      }
63  }
```

```
<!--  
Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change this license  
Click nbfs://nbhost/SystemFileSystem/Templates/XML/XMLDocument.xml to edit this template  
-->
```

```
▼<root>  
  ▼<library>  
    ▼<book>  
      <title>The Great Gatsby</title>  
      <author>F. Scott Fitzgerald</author>  
      <year>2023</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>  
</root>
```