**Solution: Parsing XML Document**

1. XML (Extensible Markup Language) 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 is used in web development and other applications for data storage and transmission, as well as for configuring and describing data structures.
2. Groovy is an excellent language for parsing XML because it provides built-in XML parsing capabilities, which makes it easy to work with XML documents. Groovy's XmlSlurper and XmlParser classes simplify the process of reading, parsing, and extracting information from XML documents.
3. Sample XML document is provided in the assignment.
4. & 5. Groovy script to read, parse, and extract information from the sample XML document:

import groovy.xml.Namespace

import groovy.xml.XmlUtil

// Function to parse the XML document and extract information

def parseCatalogXML(String xmlContent) {

def catalogNS = new Namespace("http://www.example.com/catalog")

def booksNS = new Namespace("http://www.example.com/catalog/books")

def musicNS = new Namespace("http://www.example.com/catalog/music")

def xml = new XmlSlurper().parseText(xmlContent)

xml."${catalogNS}books"."${booksNS}book".each { book ->

println "Book ID: ${book.@id}"

println "Author: ${book."${booksNS}author".text()}"

println "Title: ${book."${booksNS}title".text()}"

println "Genre: ${book."${booksNS}genre".text()}"

println "Price: ${book."${booksNS}price".text()}"

println "Publish Date: ${book."${booksNS}publish\_date".text()}"

println()

}

xml."${catalogNS}music"."${musicNS}cd".each { cd ->

println "CD ID: ${cd.@id}"

println "Title: ${cd."${musicNS}title".text()}"

println "Artist: ${cd."${musicNS}artist".text()}"

println "Country: ${cd."${musicNS}country".text()}"

println "Company: ${cd."${musicNS}company".text()}"

println "Price: ${cd."${musicNS}price".text()}"

println "Year: ${cd."${musicNS}year".text()}"

println()

}

}

// Main script

def xmlContent = '''

<?xml version="1.0" encoding="UTF-8"?>

<catalog xmlns="http://www.example.com/catalog"

xmlns:books="http://www.example.com/catalog/books"

xmlns:music="http://www.example.com/catalog/music">

<books:book id="bk001">

<books:author>Writer</books:author>

<books:title>The First Book</books:title>

<books:genre>Fiction</books:genre>

<books:price>44.95</books:price>

<books:publish\_date>2000-10-01</books:publish\_date>

</books:book>

<books:book id="bk002">

<books:author>Writer2</books:author>

<books:title>The Second Book</books:title>

<books:genre>Non-Fiction</books:genre>

<books:price>29.99</books:price>

<books:publish\_date>2001-10-01</books:publish\_date>

</books:book>

<music:cd id="cd001">

<music:title>Empire Burlesque</music:title>

<music:artist>Bob Dylan</music:artist>

<music:country>USA</music:country>

<music:company>Columbia</music:company>

<music:price>10.90</music:price>

<music:year>1985</music:year>

</music:cd>

<music:cd id="cd002">

<music:title>Hide your heart</music:title>

<music:artist>Bonnie Tyler</music:artist>

<music:country>UK</music:country>

<music:company>CBS Records</music:company

<music:price>9.90</music:price>

<music:year>1988</music:year>

</music:cd>

</catalog> '''

// Call the parseCatalogXML function and display the data

parseCatalogXML(xmlContent)