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Lab Exercise 5

Summary Report: Transformation and Validation

Purpose

The XSL stylesheet and XSD schema provided are designed to transform an XML document into an HTML table format while ensuring that the XML data adheres to predefined rules.

- XSD Schema: Defines the structure, data types, and constraints for the XML document. It includes data validation for elements such as phone numbers, email addresses, and prices.
- XSL Stylesheet: Transforms the XML data into an HTML format for display, including tables for movie provider details and screenings.

Transformation Process

1. XML to HTML Transformation:
    - XML Document: Represents movie providers and their associated screenings.
    - XSLT Stylesheet: Transforms the XML data into a structured HTML report.
        - Provider Information: Includes provider ID, name, phone, email, address, price, rating, longitude, and latitude.
        - Screening Details: For each provider, lists screenings with movie name, showtime, and price.
2. HTML Output:
    - Provides a clear, styled table of movie provider details.
    - Displays additional tables for screenings associated with each provider.
    - Includes CSS styling for better readability and presentation.

Validation Process

1. XML Validation:
    - XML Schema: Ensures XML conforms to the schema rules.
    - Validation Steps:
        - Schema Definition: Define data types, constraints, and structure.
        - Validation Tools: Use tools like xmllint, XMLSpy, or online validators to check XML against the schema.
2. Errors and Issues:
    - Phone Number Format Error
        - The phone number does not match the required pattern (XXX-XXX-XXXX).

```
<movie:provider id="m5">
    <movie:name>Palace Cinema Como</movie:name>
    <movie:phone>1234567890</movie:phone>
    <movie:email>contact@palacecomo.com</movie:email>
```

    - Missing Required Element
        - A required element <movie:rating> is missing from the XML

```
<movie:provider id="m4">
    <movie:name>Vue Cinema</movie:name>
    <movie:phone>111-222-3333</movie:phone>
    <movie:email>contact@vuecinema.com</movie:email>
    <movie:address>O2 Arena, Peninsula Square, London, SE10 0DX</movie:address>
    <movie:price>12.00</movie:price>
    <movie:longitude>34.123456</movie:longitude>
    <movie:latitude>-84.123456</movie:latitude>
    <movie:screenings>
```

    - Incorrect Data Type
        - The data type of an element <movie:rating> does not match the schema definition.

```
    <movie:phone>111-222-3333</movie:phone>
    <movie:email>contact@arclighthollywood.com</movie:email>
    <movie:address>6360 Sunset Blvd, Los Angeles, CA, 90028</movie:address>
    <movie:price>12.00</movie:price>
    <movie:rating>Excellent</movie:rating>
    <movie:longitude>34.123456</movie:longitude>
    <movie:latitude>-84.123456</movie:latitude>
    <movie:screenings>
```

Documentation of the Solution

The solution aims to manage and present movie provider information in a structured and human-readable format. This is accomplished by defining an XML Schema (XSD) to enforce data structure, using an XML document to store data, and applying an XSLT stylesheet to transform the XML data into an HTML format for easy viewing.

1. XSD Schema (onlinemovieticketing.xsd)

Purpose: The XSD schema defines the structure and data types of the XML document that holds movie provider information. It ensures that the XML data adheres to a specific format, including restrictions on phone numbers, email addresses, prices, and other attributes.

Key Elements:

- phoneType and emailType: Custom types to validate phone numbers and email addresses using regular expressions.
- priceType: Restricts prices to values between 0 and 100.
- screeningType: Represents individual movie screenings, including the movie name, showtime, and price.
- movieProvidersType: The root structure that contains all providers, including their details such as name, contact information, location, and screenings.

Validation: The XSD schema is used to validate the XML document, ensuring that the data conforms to the expected structure and types.

2. XML Document (onlinemovieticketing.xml)

Purpose: The XML document stores data about various movie providers, including their contact information, pricing, ratings, and detailed screenings.

Structure:

- Each provider is represented as a <movie:provider> element with a unique id.
- Inside each provider, elements like <movie:name>, <movie:phone>, and <movie:screenings> provide detailed information.
- Screenings are defined with <movie:screening> elements, each containing the movie name, showtime, and price.

Schema Reference: The XML document references the XSD schema using xsi:schemaLocation, ensuring that the document can be validated against the schema.

3. XSL Stylesheet (onlinemovieticketing.xsl)

Purpose: The XSLT stylesheet transforms the XML data into an HTML format, making it easy to read and navigate. The HTML is styled using CSS embedded within the XSLT.

Key Components:

- Table Generation: The stylesheet generates an HTML table displaying provider details like ID, name, phone, email, address, price, rating, longitude, and latitude.

- Screening Display: For each provider, the stylesheet generates an additional section that lists the screenings with their movie names, showtimes, and prices.
- Styling: CSS is used to enhance the readability of the generated HTML, with styles applied to tables, headings, and rows.

Transformation: The XSLT stylesheet is applied to the XML document to produce an HTML file, which can be viewed in a web browser.

Errors and Issues in Validation

Scenario 1: Invalid Phone Number

- Error: <movie:phone>1234567890</movie:phone>
- Issue: The phone number does not match the expected pattern \d{3}-\d{3}-\d{4}.
- Expected Validation Result: Error indicating that the phone number does not conform to the required format.

Scenario 2: Missing Required Element

- Error: Missing <movie:rating> element inside a <movie:provider> entry.
- Issue: The XML document lacks a required element.
- Expected Validation Result: Error indicating that a required element is missing.

Scenario 3: Incorrect Data Type

- Error: <movie:rating>Excellent</movie:rating>
- Issue: The rating is provided as a string, but it should be a decimal.
- Expected Validation Result: Error indicating that the data type of the rating is incorrect.

Summary

- Purpose of XSD Schema: Enforces the structure and types of data in the XML document, ensuring data integrity and consistency.
- Purpose of XML Document: Stores structured information about movie providers and their screenings.
- Purpose of XSL Stylesheet: Transforms XML data into a styled HTML format for easy viewing and navigation.
- Validation and Testing: Various scenarios are tested to ensure data conforms to the schema, including checking for valid phone numbers, email addresses, and price ranges.

This documentation highlights the components and functionality of the solution, including validation and transformation processes.