

# XML Data Design

## Assignment 2

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# Design Focus of the DTD

The design of this DTD for the StockMarket XML structure emphasizes modularity, flexibility, and the ability to capture complex relationships within a stock market environment. The DTD follows a hierarchical and reusable design pattern, ensuring clarity, scalability, and ease of maintenance.

## 1. Root-Level Modularity

The root element `<StockMarket>` is designed to be a container for multiple core entities such as `<Investor>`, `<Company>`, `<Broker>`, `<MarketIndex>`, and others. This modular approach allows for flexibility in expanding the schema as new entities or relationships may arise in the stock market domain. Each core entity is treated as an independent module, containing its internal structure and relationships.

## 2. Element Hierarchy and Relationships

- **Nested Structures:** The design leverages nested structures to model real-world relationships. For example, an `<Investor>` has a nested `<Portfolio>`, which contains multiple `<FinancialInstrument>` elements, representing the various financial assets owned by the investor. Similarly, `<TradeOrder>` and `<Transaction>` are deeply nested to capture the detailed lifecycle of a trade order, from placement to execution.
- **Parent-Child Relationships:** The use of parent-child relationships within entities like `<Company>`, `<Investor>`, and `<Broker>` allows for an organized and hierarchical view of the data. For instance, the `<Investor>` element contains child elements like `<Portfolio>` and `<placesOrder>`, which define an investor's financial holdings and their trading activities, respectively.

## 3. Common Entities for Reusability

- **Entity Declaration (%commonElements):** The DTD uses an entity declaration to define common elements such as `id`, `name`, `type`, `amount`, and `date`. This design ensures that repetitive elements are standardized across the DTD. By using a common entity, the DTD avoids redundancy and promotes consistency, making it easier to maintain and update the schema.

- **Element Reuse:** The same elements (e.g., id, name) are used across multiple structures like <Investor>, <Company>, and <MarketIndex>, ensuring uniformity in how data is represented. This approach minimizes duplication and helps in schema validation.

## 4. Use of Optionality and Multiplicity

Optional Elements (?) and Multiple Occurrences (\*, +): The design carefully handles variability in data. For instance:

- The <paysDividend> element within <Company> is marked as optional (?), since not all companies may issue dividends.
- The <FinancialInstrument> within <Portfolio> uses a \* symbol, indicating that an investor may hold zero or more financial instruments.
- The + symbol is used in entities like <Investor> and <Company> to ensure that at least one investor or company must be present in the <StockMarket> structure.

This flexibility allows for representing diverse scenarios in the stock market, where certain attributes or entities may be absent or repeated multiple times.

## 5. Extensibility and Scalability

- **Handling of Complex Financial Instruments:** The DTD is designed to handle various financial instruments like shares, bonds, and mutual funds, making it extensible for future additions. New instrument types can be easily added by expanding the <FinancialInstrument> element.
- **Market Conditions and Trends:** The schema accounts for various market dynamics by including <MarketCondition> and <MarketTrend> elements, which can be expanded as needed. This makes the design future-proof and scalable, allowing the DTD to accommodate new market indicators or conditions.

## 6. Compliance and Regulatory Structure

- **Regulatory and Penalty System:** The design includes dedicated elements for compliance rules (<ComplianceRule>) and penalties (<Penalty>), which are associated with regulatory bodies (<RegulatoryBody>). This structured approach helps to model the enforcement of rules and penalties in a stock market context.
- **Nested Compliance Elements:** The <Penalty> element includes nested information on the penalty amount, the reason for imposition, and the regulatory body responsible for

imposing it. This detailed design allows the system to track and report violations and their enforcement comprehensively.

## 7. Clear and Consistent Structure

- **Element Definitions:** Each element is clearly defined with simple content models such as (#PCDATA), allowing for easy interpretation of its content. The design focuses on clarity by defining atomic data types like IDs, names, and amounts as #PCDATA, making the structure straightforward.
- **Logical Grouping of Elements:** Entities such as <Investor>, <Company>, and <Broker> are logically grouped based on their roles in the stock market, making the document structure intuitive and easy to navigate. For example, <FinancialInstrument> under <Portfolio> captures investments, while <placesOrder> handles trading activities, separating concerns clearly.

## Summary

The DTD is designed to represent complex stock market data using a modular, hierarchical approach, with a focus on reuse and extensibility. The careful handling of optional and repeated elements ensures flexibility, while common entities promote consistency. By incorporating compliance and regulatory elements, the design supports real-world stock market operations and ensures the DTD can evolve alongside changes in the financial landscape.

# DTD File

```
<!ELEMENT StockMarket (Investor+, Company+, Broker+, TradeOrder*, Transaction*,  
MarketIndex+, Penalty*, ComplianceRule*, FinancialInstrument*, MarketCondition+,  
MarketTrend*)>
```

```
<!-- Common Elements for ID, Name, and Type -->
```

```
<!ENTITY % commonElements "
```

```
<!ELEMENT id (#PCDATA)>
```

```
<!ELEMENT name (#PCDATA)>
```

```
<!ELEMENT type (#PCDATA)>
```

```
<!ELEMENT amount (#PCDATA)>
```

```
<!ELEMENT date (#PCDATA)>
```

```
">
```

```
%commonElements;
```

```
<!-- Investor Elements -->
```

```
<!ELEMENT Investor (InvestorID, InvestorName, InvestorType, Portfolio, engagesIn*,  
placesOrder*)>
```

```
<!ELEMENT InvestorID (#PCDATA)>
```

```
<!ELEMENT InvestorName (#PCDATA)>
```

```
<!ELEMENT InvestorType (#PCDATA)>
```

```
<!ELEMENT Portfolio (FinancialInstrument*)>
```

```
<!ELEMENT engagesIn (MarginTrading | ShortSelling)*>
```

```
<!ELEMENT placesOrder (TradeOrder+)>
```

```
<!ELEMENT MarginTrading EMPTY>
```

```
<!ELEMENT ShortSelling EMPTY>
```

```
<!-- Company Elements -->
```

```
<!ELEMENT Company (CompanyID, CompanyName, issuesStock*, operatesInMarket,  
belongsToSector, paysDividend?, violatedComplianceRule?)>
```

```
<!ELEMENT CompanyID (#PCDATA)>
```

```
<!ELEMENT CompanyName (#PCDATA)>
```

```
<!ELEMENT issuesStock (Share | Bond)?>
```

```
<!ELEMENT operatesInMarket (#PCDATA)>
```

```
<!ELEMENT belongsToSector (#PCDATA)>
```

```
<!ELEMENT paysDividend (Dividend?)>
```

```
<!ELEMENT Dividend (DividendAmount, DividendFrequency)>
```

```
<!ELEMENT DividendAmount (#PCDATA)>
```

```
<!ELEMENT DividendFrequency (#PCDATA)>
```

```
<!ELEMENT violatedComplianceRule (ComplianceRule)?>
```

```
<!-- Broker Elements -->
```

```
<!ELEMENT Broker (BrokerID, BrokerName, BrokerType, facilitatesTrade*)>
```

```

<!ELEMENT BrokerID (#PCDATA)>
<!ELEMENT BrokerName (#PCDATA)>
<!ELEMENT BrokerType (#PCDATA)>
<!ELEMENT facilitatesTrade (TradeOrder+)>

<!-- TradeOrder Elements -->
<!ELEMENT TradeOrder (TradeOrderID, TradeOrderType, price, quantity, executedBy,
resultsIn)>
<!ELEMENT TradeOrderID (#PCDATA)>
<!ELEMENT TradeOrderType (#PCDATA)>
<!ELEMENT price (#PCDATA)>
<!ELEMENT quantity (#PCDATA)>
<!ELEMENT executedBy (BrokerType)>
<!ELEMENT resultsIn (Transaction)>

<!-- Transaction Elements -->
<!ELEMENT Transaction (TransactionID, TransactionType, TransactionStatus,
TransactionDate, occursDuring, belongsTo)>
<!ELEMENT TransactionID (#PCDATA)>
<!ELEMENT TransactionType (#PCDATA)>
<!ELEMENT TransactionStatus (#PCDATA)>
<!ELEMENT TransactionDate (#PCDATA)>
<!ELEMENT occursDuring (MarketCondition)>
<!ELEMENT belongsTo (TradeOrderID)>

<!-- FinancialInstrument Elements -->
<!ELEMENT FinancialInstrument (InstrumentID, InstrumentName, InstrumentType,
issuedBy, trackedBy?, hasRisk?)>
<!ELEMENT InstrumentID (#PCDATA)>
<!ELEMENT InstrumentName (#PCDATA)>
<!ELEMENT InstrumentType (#PCDATA)>
<!ELEMENT issuedBy (CompanyName)>
<!ELEMENT trackedBy (MarketIndex)>
<!ELEMENT hasRisk (RiskLevel)>
<!ELEMENT RiskLevel (#PCDATA)>

<!-- Share, Bond, and MutualFund -->
<!ELEMENT Share (ShareID, issuedBy)>
<!ELEMENT ShareID (#PCDATA)>
<!ELEMENT Bond (BondID, issuedBy)>
<!ELEMENT BondID (#PCDATA)>
<!ELEMENT MutualFund (FundID, FundType, issuedBy)>
<!ELEMENT FundType (#PCDATA)>

```

```

<!-- MarketIndex and MarketTrend -->
<!ELEMENT MarketIndex (MarketIndexID, MarketIndexName, observesTrend*)>
<!ELEMENT MarketIndexID (#PCDATA)>
<!ELEMENT MarketIndexName (#PCDATA)>
<!ELEMENT observesTrend (MarketTrend+)>

<!-- MarketTrend -->
<!ELEMENT MarketTrend (MarketTrendID, MarketTrendType, affects*)>
<!ELEMENT MarketTrendID (#PCDATA)>
<!ELEMENT MarketTrendType (#PCDATA)>
<!ELEMENT affects (InstrumentID)>

<!-- MarketCondition -->
<!ELEMENT MarketCondition (MarketConditionID, MarketConditionType)>
<!ELEMENT MarketConditionID (#PCDATA)>
<!ELEMENT MarketConditionType (#PCDATA)>

<!-- ComplianceRule -->
<!ELEMENT ComplianceRule (ComplianceRuleID, ComplianceDescription)>
<!ELEMENT ComplianceRuleID (#PCDATA)>
<!ELEMENT ComplianceDescription (#PCDATA)>

<!-- RegulatoryBody -->
<!ELEMENT RegulatoryBody (RegulatoryBodyID, RegulatoryBodyName,
enforcesRule*)>
<!ELEMENT RegulatoryBodyID (#PCDATA)>
<!ELEMENT RegulatoryBodyName (#PCDATA)>
<!ELEMENT enforcesRule (ComplianceRule)>

<!-- Penalty Definition -->
<!ELEMENT Penalty (PenaltyID, PenaltyReason, imposedBy, PenaltyAmount,
PenaltyDate)>
<!ELEMENT PenaltyID (#PCDATA)>
<!ELEMENT PenaltyReason (#PCDATA)>
<!ELEMENT imposedBy (RegulatoryBody)>
<!ELEMENT PenaltyAmount (#PCDATA)>
<!ELEMENT PenaltyDate (#PCDATA)>

```

# XML File

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE StockMarket SYSTEM "stockmarket.dtd">
<StockMarket>
  <!-- Investors -->
  <Investor>
    <InvestorID>INV001</InvestorID>
    <InvestorName>John Doe</InvestorName>
    <InvestorType>RetailInvestor</InvestorType>
    <Portfolio>
      <FinancialInstrument>
        <InstrumentID>FI001</InstrumentID>
        <InstrumentName>XYZ Stock</InstrumentName>
        <InstrumentType>Share</InstrumentType>
        <issuedBy>
          <CompanyName>XYZ Corp</CompanyName>
        </issuedBy>
        <trackedBy>
          <MarketIndex>
            <MarketIndexID>MI001</MarketIndexID>
            <MarketIndexName>SnP 500</MarketIndexName>
            <observesTrend>
              <MarketTrend>
                <MarketTrendID>MT001</MarketTrendID>
                <MarketTrendType>Bullish</MarketTrendType>
              </MarketTrend>
            </observesTrend>
          </MarketIndex>
        </trackedBy>
        <hasRisk>
          <RiskLevel>High Risk</RiskLevel>
        </hasRisk>
      </FinancialInstrument>
      <FinancialInstrument>
        <InstrumentID>FI002</InstrumentID>
        <InstrumentName>ABC Bond</InstrumentName>
        <InstrumentType>Bond</InstrumentType>
        <issuedBy>
          <CompanyName>ABC Corp</CompanyName>
        </issuedBy>
        <hasRisk>
          <RiskLevel>Low Risk</RiskLevel>
        </hasRisk>
      </FinancialInstrument>
    </Portfolio>
  </Investor>

```



```
</FinancialInstrument>
</Portfolio>
<engagesIn>
  <MarginTrading/>
</engagesIn>
<placesOrder>
  <TradeOrder>
    <TradeOrderID>TO001</TradeOrderID>
    <TradeOrderType>MarketOrder</TradeOrderType>
    <price>120</price>
    <quantity>10</quantity>
    <executedBy>
      <BrokerType>DiscountBroker</BrokerType>
    </executedBy>
    <resultsIn>
      <Transaction>
        <TransactionID>TR001</TransactionID>
        <TransactionType>Buy</TransactionType>
        <TransactionStatus>Complete</TransactionStatus>
        <TransactionDate>2024-09-28</TransactionDate>
        <occursDuring>
          <MarketCondition>
            <MarketConditionID>MC001</MarketConditionID>
            <MarketConditionType>BullMarket</MarketConditionType>
          </MarketCondition>
        </occursDuring>
        <belongsTo>
          <TradeOrderID>TO001</TradeOrderID>
        </belongsTo>
      </Transaction>
    </resultsIn>
  </TradeOrder>
</placesOrder>
</Investor>

<Investor>
  <InvestorID>INV002</InvestorID>
  <InvestorName>Jane Smith</InvestorName>
  <InvestorType>RetailInvestor</InvestorType>
  <Portfolio>
    <FinancialInstrument>
      <InstrumentID>FI003</InstrumentID>
      <InstrumentName>Tech Fund</InstrumentName>
      <InstrumentType>MutualFund</InstrumentType>
```

```
<issuedBy>
  <CompanyName>Tech Innovations</CompanyName>
</issuedBy>
<trackedBy>
  <MarketIndex>
    <MarketIndexID>MI002</MarketIndexID>
    <MarketIndexName>NASDAQ</MarketIndexName>
  </MarketIndex>
</trackedBy>
<hasRisk>
  <RiskLevel>Medium Risk</RiskLevel>
</hasRisk>
</FinancialInstrument>
<FinancialInstrument>
  <InstrumentID>FI004</InstrumentID>
  <InstrumentName>Green Energy Bond</InstrumentName>
  <InstrumentType>Bond</InstrumentType>
  <issuedBy>
    <CompanyName>Green Energy Corp</CompanyName>
  </issuedBy>
  <hasRisk>
    <RiskLevel>Low Risk</RiskLevel>
  </hasRisk>
</FinancialInstrument>
</Portfolio>
<engagesIn>
  <ShortSelling/>
</engagesIn>
<placesOrder>
  <TradeOrder>
    <TradeOrderID>TO002</TradeOrderID>
    <TradeOrderType>LimitOrder</TradeOrderType>
    <price>130</price>
    <quantity>20</quantity>
    <executedBy>
      <BrokerType>OnlineBroker</BrokerType>
    </executedBy>
    <resultsIn>
      <Transaction>
        <TransactionID>TR002</TransactionID>
        <TransactionType>Sell</TransactionType>
        <TransactionStatus>Pending</TransactionStatus>
        <TransactionDate>2024-09-29</TransactionDate>
        <occursDuring>
```

```
        <MarketCondition>
        <MarketConditionID>MC002</MarketConditionID>
        <MarketConditionType>BearMarket</MarketConditionType>
        </MarketCondition>
    </occursDuring>
    <belongsTo>
        <TradeOrderID>TO002</TradeOrderID>
    </belongsTo>
</Transaction>
</resultsIn>
</TradeOrder>
</placesOrder>
</Investor>
```

```
<!-- Companies -->
<Company>
<CompanyID>COM001</CompanyID>
<CompanyName>XYZ Corp</CompanyName>
<issuesStock>
<Share>
    <ShareID>S001</ShareID>
    <issuedBy>
        <CompanyName>Company X</CompanyName>
    </issuedBy>
</Share>
</issuesStock>
<operatesInMarket>Stock Market</operatesInMarket>
<belongsToSector>Technology</belongsToSector>
<paysDividend>
<Dividend>
    <DividendAmount>1.5</DividendAmount>
    <DividendFrequency>Quarterly</DividendFrequency>
</Dividend>
</paysDividend>
</Company>
```

```
<Company>
<CompanyID>COM002</CompanyID>
<CompanyName>ABC Corp</CompanyName>
<issuesStock>
<Share>
    <ShareID>S002</ShareID>
    <issuedBy>
        <CompanyName>Company Z</CompanyName>
```

```
        </issuedBy>
    </Share>
</issuesStock>
<operatesInMarket>Bond Market</operatesInMarket>
<belongsToSector>Finance</belongsToSector>
</Company>

<Company>
  <CompanyID>COM003</CompanyID>
  <CompanyName>Green Energy Corp</CompanyName>
  <issuesStock>
    <Bond>
      <BondID>B002</BondID>
      <issuedBy>
        <CompanyName>CCompany A</CompanyName>
        </issuedBy>
      </Bond>
    </issuesStock>
    <operatesInMarket>Stock Market</operatesInMarket>
    <belongsToSector>Energy</belongsToSector>
    <paysDividend>
      <Dividend>
        <DividendAmount>2.0</DividendAmount>
        <DividendFrequency>Annually</DividendFrequency>
      </Dividend>
    </paysDividend>
  </Company>

<!-- Brokers -->
<Broker>
  <BrokerID>BROKER001</BrokerID>
  <BrokerName>Alpha Broker</BrokerName>
  <BrokerType>FullServiceBroker</BrokerType>
  <facilitatesTrade>
    <TradeOrder>
      <TradeOrderID>TO003</TradeOrderID>
      <TradeOrderType>MarketOrder</TradeOrderType>
      <price>100</price>
      <quantity>15</quantity>
      <executedBy>
        <BrokerType>FullServiceBroker</BrokerType>
      </executedBy>
      <resultsIn>
        <Transaction>
```

```
<TransactionID>TR003</TransactionID>
<TransactionType>Buy</TransactionType>
<TransactionStatus>Complete</TransactionStatus>
<TransactionDate>2024-09-30</TransactionDate>
<occursDuring>
  <MarketCondition>
    <MarketConditionID>MC003</MarketConditionID>
    <MarketConditionType>NeutralMarket</MarketConditionType>
  </MarketCondition>
</occursDuring>
<belongsTo>
  <TradeOrderID>TO003</TradeOrderID>
</belongsTo>
</Transaction>
</resultsIn>
</TradeOrder>
</facilitatesTrade>
</Broker>

<Broker>
<BrokerID>BROKER002</BrokerID>
<BrokerName>Beta Broker</BrokerName>
<BrokerType>DiscountBroker</BrokerType>
<facilitatesTrade>
<TradeOrder>
  <TradeOrderID>TO004</TradeOrderID>
  <TradeOrderType>LimitOrder</TradeOrderType>
  <price>110</price>
  <quantity>5</quantity>
  <executedBy>
    <BrokerType>DiscountBroker</BrokerType>
  </executedBy>
  <resultsIn>
    <Transaction>
      <TransactionID>TR004</TransactionID>
      <TransactionType>Sell</TransactionType>
      <TransactionStatus>Pending</TransactionStatus>
      <TransactionDate>2024-09-29</TransactionDate>
      <occursDuring>
        <MarketCondition>
          <MarketConditionID>MC004</MarketConditionID>
          <MarketConditionType>BearMarket</MarketConditionType>
        </MarketCondition>
      </occursDuring>
```

```
        <belongsTo>
            <TradeOrderID>TO004</TradeOrderID>
        </belongsTo>
    </Transaction>
</resultsIn>
</TradeOrder>
</facilitatesTrade>
</Broker>
```

```
<!-- Market Index -->
<MarketIndex>
    <MarketIndexID>MI001</MarketIndexID>
    <MarketIndexName>SnP 500</MarketIndexName>
    <observesTrend>
        <MarketTrend>
            <MarketTrendID>MT001</MarketTrendID>
            <MarketTrendType>Upward</MarketTrendType>
        </MarketTrend>
    </observesTrend>
</MarketIndex>
```

```
<MarketIndex>
    <MarketIndexID>MI002</MarketIndexID>
    <MarketIndexName>NASDAQ</MarketIndexName>
    <observesTrend>
        <MarketTrend>
            <MarketTrendID>MT002</MarketTrendID>
            <MarketTrendType>Downward</MarketTrendType>
        </MarketTrend>
    </observesTrend>
</MarketIndex>
```

```
<!-- Penalties -->
<Penalty>
    <PenaltyID>PEN001</PenaltyID>
    <PenaltyReason>Violation of SEC regulations.</PenaltyReason>
    <imposedBy>
        <RegulatoryBody>
            <RegulatoryBodyID>RB001</RegulatoryBodyID>
            <RegulatoryBodyName>SEC</RegulatoryBodyName>
        </RegulatoryBody>
    </imposedBy>
    <PenaltyAmount>5000</PenaltyAmount>
    <PenaltyDate>2024-08-15</PenaltyDate>
```

```
</Penalty>

<!-- Compliance Rules -->
<ComplianceRule>
  <ComplianceRuleID>CR001</ComplianceRuleID>
  <ComplianceDescription>All brokers must comply with SEC
regulations.</ComplianceDescription>
</ComplianceRule>

<!-- Market Conditions -->
<MarketCondition>
  <MarketConditionID>MC001</MarketConditionID>
  <MarketConditionType>BullMarket</MarketConditionType>
</MarketCondition>
<MarketCondition>
  <MarketConditionID>MC002</MarketConditionID>
  <MarketConditionType>BearMarket</MarketConditionType>
</MarketCondition>
<MarketCondition>
  <MarketConditionID>MC003</MarketConditionID>
  <MarketConditionType>NeutralMarket</MarketConditionType>
</MarketCondition>
</StockMarket>
```

# XPATH Queries

XPath Queries		
Description	Query	Output
List the names of all Retail Investors	/StockMarket/Investor[InvestorType='RetailInvestor']/InvestorName	<?xml version="1.0" encoding="UTF-8"?> <InvestorName>John Doe</InvestorName> <InvestorName>Jane Smith</InvestorName>
Retrieve All Trade Order IDs	//TradeOrder/TradeOrderID	<?xml version="1.0" encoding="UTF-8"?> <TradeOrderID>TO001</TradeOrderID> <TradeOrderID>TO002</TradeOrderID> <TradeOrderID>TO003</TradeOrderID> <TradeOrderID>TO004</TradeOrderID>



Retrieve Trade Orders Placed by Investors Who Engage in Margin Trading	//Investor[engagesIn/MarginTrading]/placesOrder/TradeOrder	<?xml version="1.0" encoding="UTF-8"?> <TradeOrder> <TradeOrderID>TO001</TradeOrderID> <TradeOrderType>MarketOrder</TradeOrderType> <price>120</price> <quantity>10</quantity> <executedBy> <BrokerType>DiscountBroker</BrokerType> </executedBy> <resultsIn> <Transaction> <TransactionID>TR001</TransactionID> <TransactionType>Buy</TransactionType> <TransactionStatus>Complete</TransactionStatus> <TransactionDate>2024-09-28</TransactionDate> <occursDuring> <MarketCondition> <MarketConditionID>MC001</MarketConditionID> <MarketConditionType>BullMarket</MarketConditionType> </MarketCondition> </occursDuring> <belongsTo> <TradeOrderID>TO001</TradeOrderID> </belongsTo> </Transaction> </resultsIn> </TradeOrder>
------------------------------------------------------------------------------	------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

<p>List all companies that pay dividends:</p>	<p>/StockMarket/Company[paysDividend]</p>	<pre> &lt;?xml version="1.0" encoding="UTF-8"?&gt; &lt;Company&gt; &lt;CompanyID&gt;COM001&lt;/Compan yID&gt; &lt;CompanyName&gt;XYZ Corp&lt;/CompanyName&gt; &lt;issuesStock&gt; &lt;Share&gt; &lt;ShareID&gt;S001&lt;/ShareID&gt; &lt;issuedBy&gt; &lt;CompanyName&gt;Company X&lt;/CompanyName&gt; &lt;/issuedBy&gt; &lt;/Share&gt; &lt;/issuesStock&gt; &lt;operatesInMarket&gt;Stock Market&lt;/operatesInMarket&gt; &lt;belongsToSector&gt;Technology&lt;/b elongsToSector&gt; &lt;paysDividend&gt; &lt;Dividend&gt; &lt;DividendAmount&gt;1.5&lt;/Dividend Amount&gt; &lt;DividendFrequency&gt;Quarterly&lt;/ DividendFrequency&gt; &lt;/Dividend&gt; &lt;/paysDividend&gt; &lt;/Company&gt; &lt;Company&gt; &lt;CompanyID&gt;COM003&lt;/Compan yID&gt; &lt;CompanyName&gt;Green Energy Corp&lt;/CompanyName&gt; &lt;issuesStock&gt; &lt;Bond&gt; &lt;BondID&gt;B002&lt;/BondID&gt; &lt;issuedBy&gt; &lt;CompanyName&gt;CCompany A&lt;/CompanyName&gt; &lt;/issuedBy&gt; &lt;/Bond&gt; &lt;/issuesStock&gt; &lt;operatesInMarket&gt;Stock Market&lt;/operatesInMarket&gt; &lt;belongsToSector&gt;Energy&lt;/belon gsToSector&gt; &lt;paysDividend&gt; </pre>
-----------------------------------------------	-------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

		<div>&lt;Dividend&gt; &lt;DividendAmount&gt;2.0&lt;/DividendAmount&gt; &lt;DividendFrequency&gt;Annually&lt;/DividendFrequency&gt; &lt;/Dividend&gt; &lt;/paysDividend&gt; &lt;/Company&gt;</div>
--	--	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Select Market Conditions	//MarketCondition	<?xml version="1.0" encoding="UTF-8"?> <MarketCondition> <MarketConditionID>MC001</Ma rketConditionID> <MarketConditionType>BullMarke t</MarketConditionType> </MarketCondition> <MarketCondition> <MarketConditionID>MC002</Ma rketConditionID> <MarketConditionType>BearMark et</MarketConditionType> </MarketCondition> <MarketCondition> <MarketConditionID>MC003</Ma rketConditionID> <MarketConditionType>NeutralMa rket</MarketConditionType> </MarketCondition> <MarketCondition> <MarketConditionID>MC004</Ma rketConditionID> <MarketConditionType>BearMark et</MarketConditionType> </MarketCondition> <MarketCondition> <MarketConditionID>MC001</Ma rketConditionID> <MarketConditionType>BullMarke t</MarketConditionType> </MarketCondition> <MarketCondition> <MarketConditionID>MC002</Ma rketConditionID> <MarketConditionType>BearMark et</MarketConditionType> </MarketCondition> <MarketCondition> <MarketConditionID>MC003</Ma rketConditionID> <MarketConditionType>NeutralMa rket</MarketConditionType> </MarketCondition>
--------------------------	-------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

List companies belonging to the tech sector paying dividends	//Company[belongsToSector = 'Technology' and paysDividend]	<?xml version="1.0" encoding="UTF-8"?> <Company> <CompanyID>COM001</CompanyID> <CompanyName>XYZ Corp</CompanyName> <issuesStock> <Share> <ShareID>S001</ShareID> <issuedBy> <CompanyName>Company X</CompanyName> </issuedBy> </Share> </issuesStock> <operatesInMarket>Stock Market</operatesInMarket> <belongsToSector>Technology</belongsToSector> <paysDividend> <Dividend> <DividendAmount>1.5</DividendAmount> <DividendFrequency>Quarterly</DividendFrequency> </Dividend> </paysDividend> </Company>
--------------------------------------------------------------	------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

# XQuery Queries

XQuery Queries		
Description	Query	Output
Count the number of Investors engaging in Margin Trading	count(/StockMarket/Investor[engagesIn/MarginTrading])	<?xml version="1.0" encoding="UTF-8"?>1
Retrieve Transactions Grouped by Transaction Status	for \$status in distinct-values(//Transaction/TransactionStatus) return <Result> <Status>{\$status}</Status> <Transactions>{ for \$transaction in //Transaction[TransactionStatus = \$status] return \$transaction }</Transactions> </Result>	<?xml version="1.0" encoding="UTF-8"?> <Result> <Status>Complete</Status> <Transactions> <Transaction> <TransactionID>TR001</TransactionID> <TransactionType>Buy</TransactionType> <TransactionStatus>Complete</TransactionStatus> <TransactionDate>2024-09-28</TransactionDate> <occursDuring> <MarketCondition> <MarketConditionID>MC001</MarketConditionID> <MarketConditionType>BullMarket</MarketConditionType> </MarketCondition> </occursDuring> <belongsTo> <TradeOrderID>TO001</TradeOrderID> </belongsTo> </Transaction> <Transaction> <TransactionID>TR003</TransactionID> <TransactionType>Buy</TransactionType> <TransactionStatus>Complete</TransactionStatus> <TransactionDate>2024-09-30</TransactionDate>

		<div>&lt;occursDuring&gt; &lt;MarketCondition&gt; &lt;MarketConditionID&gt;MC003&lt;/MarketConditionID&gt; &lt;MarketConditionType&gt;NeutralMarket&lt;/MarketConditionType&gt; &lt;/MarketCondition&gt; &lt;/occursDuring&gt; &lt;belongsTo&gt; &lt;TradeOrderID&gt;TO003&lt;/TradeOrderID&gt; &lt;/belongsTo&gt; &lt;/Transaction&gt; &lt;/Transactions&gt; &lt;/Result&gt; &lt;Result&gt; &lt;Status&gt;Pending&lt;/Status&gt; &lt;Transactions&gt; &lt;Transaction&gt; &lt;TransactionID&gt;TR002&lt;/TransactionID&gt; &lt;TransactionType&gt;Sell&lt;/TransactionType&gt; &lt;TransactionStatus&gt;Pending&lt;/TransactionStatus&gt; &lt;TransactionDate&gt;2024-09-29&lt;/TransactionDate&gt; &lt;occursDuring&gt; &lt;MarketCondition&gt; &lt;MarketConditionID&gt;MC002&lt;/MarketConditionID&gt; &lt;MarketConditionType&gt;BearMarket&lt;/MarketConditionType&gt; &lt;/MarketCondition&gt; &lt;/occursDuring&gt; &lt;belongsTo&gt; &lt;TradeOrderID&gt;TO002&lt;/TradeOrderID&gt; &lt;/belongsTo&gt; &lt;/Transaction&gt; &lt;Transaction&gt; &lt;TransactionID&gt;TR004&lt;/TransactionID&gt; &lt;TransactionType&gt;Sell&lt;/TransactionType&gt; &lt;TransactionStatus&gt;Pending&lt;/TransactionStatus&gt; &lt;TransactionDate&gt;2024-09-29&lt;/TransactionDate&gt; &lt;occursDuring&gt; &lt;MarketCondition&gt; &lt;MarketConditionID&gt;MC004&lt;/MarketConditionID&gt; &lt;MarketConditionType&gt;BearMarket&lt;/Market</div>
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		ConditionType> </MarketCondition> </occursDuring> <belongsTo> <TradeOrderID>TO004</TradeOrderID> </belongsTo> </Transaction> </Transactions> </Result>
Retrieve All Trade Orders Along with Their Quantities and Executed Prices	for \$tradeOrder in //TradeOrder return <TradeOrderDetails> <TradeOrderID>{\$tradeOrder/TradeOrderID}</TradeOrderID> <Quantity>{\$tradeOrder/quantity}</Quantity> <ExecutedPrice>{\$tradeOrder/price}</ExecutedPrice> </TradeOrderDetails>	<?xml version="1.0" encoding="UTF-8"?> <TradeOrderDetails> <TradeOrderID> <TradeOrderID>TO001</TradeOrderID> </TradeOrderID> <Quantity> <quantity>10</quantity> </Quantity> <ExecutedPrice> <price>120</price> </ExecutedPrice> </TradeOrderDetails> <TradeOrderDetails> <TradeOrderID> <TradeOrderID>TO002</TradeOrderID> </TradeOrderID> <Quantity> <quantity>20</quantity> </Quantity> <ExecutedPrice> <price>130</price> </ExecutedPrice> </TradeOrderDetails> <TradeOrderDetails> <TradeOrderID> <TradeOrderID>TO003</TradeOrderID> </TradeOrderID> <Quantity> <quantity>15</quantity> </Quantity> <ExecutedPrice> <price>100</price> </ExecutedPrice> </TradeOrderDetails> <TradeOrderDetails> <TradeOrderID> <TradeOrderID>TO004</TradeOrderID> </TradeOrderID> <Quantity>



		<pre> &lt;quantity&gt;5&lt;/quantity&gt; &lt;/Quantity&gt; &lt;ExecutedPrice&gt; &lt;price&gt;110&lt;/price&gt; &lt;/ExecutedPrice&gt; &lt;/TradeOrderDetails&gt; </pre>
Retrieve companies belonging to a specific sector (e.g., Energy):	<pre> for \$c in /StockMarket/Company[belongsToSector='Energy'] return &lt;CompanyName&gt;{\$c/CompanyName/text()}&lt;/CompanyName&gt; </pre>	<pre> &lt;?xml version="1.0" encoding="UTF-8"?&gt; &lt;CompanyName&gt;Green Energy Corp&lt;/CompanyName&gt; </pre>
List all companies paying dividends from tech and finance sectors.	<pre> for \$company in /StockMarket/Company where (\$company/belongsToSector = 'Technology' or \$company/belongsToSector = 'Finance') and \$company/paysDividend return &lt;Company&gt; &lt;CompanyName&gt;{\$company/CompanyName/text()}&lt;/CompanyName&gt; &lt;Sector&gt;{\$company/belongsToSector/text()}&lt;/Sector&gt; &lt;DividendAmount&gt;{\$company/paysDividend/Dividend/DividendAmount/text()}&lt;/DividendAmount&gt; &lt;DividendFrequency&gt;{\$company/paysDividend/Dividend/DividendFrequency/text()}&lt;/DividendFrequency&gt; &lt;/Company&gt; </pre>	<pre> &lt;?xml version="1.0" encoding="UTF-8"?&gt; &lt;Company&gt; &lt;CompanyName&gt;XYZ Corp&lt;/CompanyName&gt; &lt;Sector&gt;Technology&lt;/Sector&gt; &lt;DividendAmount&gt;1.5&lt;/DividendAmount&gt; &lt;DividendFrequency&gt;Quarterly&lt;/DividendFrequency&gt; &lt;/Company&gt; </pre>