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Question:

1. Create a W3C schema about information regarding the characters described in a book satisfying the following requirements:
 - **book** will be the root element.
 - **book** must have an attribute named **isbn**, which must be a number having 10 digits.
 - The root element will have **title** (must occur exactly once), **author** (must occur exactly once), **character** (may occur any number of times including 0) elements in sequence.
 - The **title** is a string.
 - The **author** is a string.
 - Each character will further have sub-elements **name** (must occur exactly once), **type** (must occur exactly once), and **location** (must occur exactly once) in sequence.
 - **name** is a string and can be of atmost length 10. This element can have an optional attribute **king-of**, whose value can be string. The value of **king-of** must start with a capital letter followed by lowercase letters or space, and of atleast length 3.
 - **type** is a string that can take values only from Men, Elves, Dwarves, or Orcs.
 - **location** must have the fixed value of Middle-earth.
2. Prepare an XML file conforming to the schema described above with atleast two **characters**, and prove the vaidity using xmllint application.

Solution:

book.xml

```
<?xml version="1.0"?>
<book isbn="1132326780">
  <title>Schema in XML</title>
  <author>XML</author>
  <character>
    <name king-of="Vri">Vrinda</name>
    <type>Elves</type>
    <location>Middle-earth</location>
  </character>
  <character>
    <name king-of="Vrinda">Dhingra</name>
    <type>Elves</type>
    <location>Middle-earth</location>
  </character>
</book>
```

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book.xsd

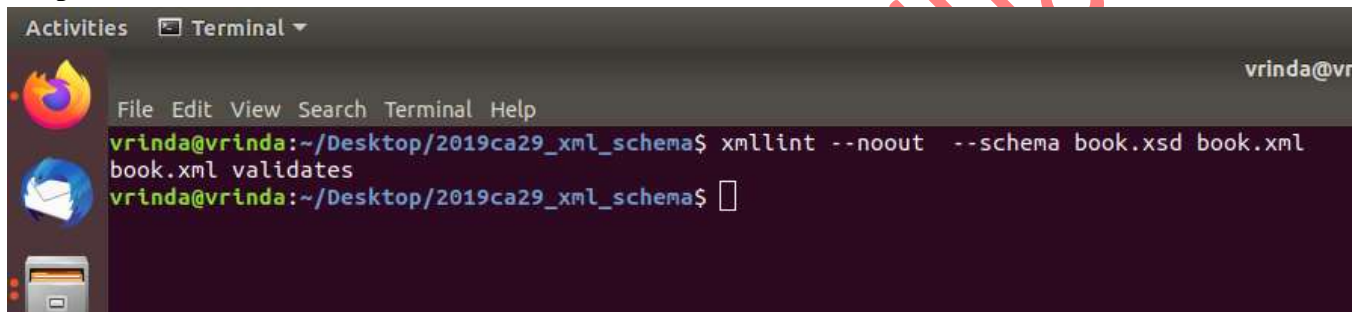
```
<?xml version="1.0"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">
<xs:element name="book" type="toType"/>
<xs:complexType name="toType">
  <xs:sequence>
    <xs:element name="title" type="xs:string"/>
    <xs:element name="author" type="xs:string"/>
    <xs:element name="character" type="char" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="isbn" type="attri"/>
</xs:complexType>
<xs:complexType name="char">
  <xs:sequence>
    <xs:element name="name" type="var1"/>
    <xs:element name="type" type="var2"/>
    <xs:element name="location" type="xs:string" fixed="Middle-earth"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="attri">
  <xs:restriction base="xs:string">
    <xs:pattern value="[0-9]{10}"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="var1">
  <xs:simpleContent>
    <xs:extension base="var3">
      <xs:attribute name="king-of" type="kingtype" use="optional"/>
    </xs:extension>
  </xs:simpleContent>
</xs:complexType>
<xs:simpleType name="kingtype">
  <xs:restriction base="xs:string">
    <xs:pattern value="[A-Z][a-z]*"/>
    <xs:minLength value="3"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="var3">
  <xs:restriction base="xs:string">
    <xs:maxLength value="10"/>
  </xs:restriction>
</xs:simpleType>
</xs:schema>
```

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```
</xs:restriction>
</xs:simpleType>
<xs:simpleType name="var2">
  <xs:restriction base="xs:string">
    <xs:enumeration value="Men"/>
    <xs:enumeration value="Elves"/>
    <xs:enumeration value="Dwarves"/>
    <xs:enumeration value="Orcs"/>
  </xs:restriction>
</xs:simpleType>
</xs:schema>
```

Output:

A terminal window titled 'Terminal' showing the execution of the 'xmllint' command. The prompt is 'vrinda@vrinda:~/Desktop/2019ca29_xml_schema\$'. The command entered is 'xmllint --noout --schema book.xsd book.xml'. The output is 'book.xml validates'. The prompt then changes to 'vrinda@vrinda:~/Desktop/2019ca29_xml_schema\$'.

```
vrinda@vrinda:~/Desktop/2019ca29_xml_schema$ xmllint --noout --schema book.xsd book.xml
book.xml validates
vrinda@vrinda:~/Desktop/2019ca29_xml_schema$
```