

# XML and DTDs: Exercises

## XML document

The following XML document is well-formed

```
<?xml version="1.0" standalone="no" ?>
<!DOCTYPE DATA SYSTEM "blah.dtd">
<DATA>
  <ANIMALS>
    <COW name = "Snowball" home = "Red Barn Acres"/>
    <HEN name = "Henrietta" birthdate = "120724" home = "Red Barn Acres"/>
  </ANIMALS>
  <FARMS>
    <FARM owner = "Old MacDonald" name = "Red Barn Acres">
      A picturesque hobby farm on 150 acres
    </FARM>
    <FARM ownder = "Wiloughby Clive" name = "Weatherby Farm">
    </FARM>
    <FARM owner = "Egg Masters Inc" name = "Farm 23">
      A factory farm on a quarter section of land
    </FARM>
    <FARM ownder = "Wiloughby Clive" name = "Weatherby Farm">
    </FARM>
  </FARMS>
</DATA>
```

## Questions

1. Let's recap some terminology.
  - (a) What is the root element of this XML file?
  - (b) Name three tags in the XML file.
  - (c) Name an empty element in the XML file.
  - (d) Name three attributes in the XML file.
  - (e) Is this XML document well-formed? Explain.
  - (f) Is this XML document valid? Explain.

Here is the XML again, for reference:

```
<?xml version="1.0" standalone="no" ?>
<!DOCTYPE DATA SYSTEM "blah.dtd">
<DATA>
  <ANIMALS>
    <COW name = "Snowball" home = "Red Barn Acres"/>
    <HEN name = "Henrietta" birthdate = "120724" home = "Red Barn Acres"/>
  </ANIMALS>
  <FARMS>
    <FARM owner = "Old MacDonald" name = "Red Barn Acres">
      A picturesque hobby farm on 150 acres
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    <FARM ownder = "Wiloughby Clive" name = "Weatherby Farm">
    </FARM>
    <FARM owner = "Egg Masters Inc" name = "Farm 23">
      A factory farm on a quarter section of land
    </FARM>
    <FARM ownder = "Wiloughby Clive" name = "Weatherby Farm">
    </FARM>
  </FARMS>
</DATA>
```

2. Suppose this XML is valid with respect to its DTD. For each of the following rules, circle Yes or No to indicate whether it could be part of that DTD.

<!ELEMENT DATA (ANIMALS+, FARMS*)>	Yes	No
<!ATTLIST COW birthdate CDATA #IMPLIED>	Yes	No
<!ELEMENT HEN EMPTY>	Yes	No
<!ELEMENT ANIMALS (HEN   COW)*>	Yes	No

3. Write a DTD definition for element FARMS that accepts the above instance document and enforces this rule: There must be at least four farms in the file. If this is not possible, explain why
4. Write a DTD definition for attribute **name** of element FARM that accepts the above instance document and enforces this rule: No two farms have the same name. If this is not possible, explain why.
5. Suppose our DTD includes a rule defining an element called DOG — we just didn't happen to engage it in this XML file. Write a new DTD rule for element ANIMALS that enforces the following: there must be at least one DOG, and the order of the animals is all DOGs first, then HENs and COWs in any order.