

Name: _____

1. (1 pt.)

- **Read all material carefully.** Ask for clarifications if needed.
- You may refer to your books, papers, and notes during this test.
- No computer or network access of any kind is allowed (or needed).
- Write, and draw, carefully. Ambiguous or cryptic answers receive zero credit.
- Use the conventions used in class and the textbook for all material.
- COS 480 students should answer non-★ questions; ★ questions are for extra credit.
- COS 580 students should answer all questions, including ★ questions.

Write your name in the space provided above.

```
0 <FernDB>
  <Fern>
    <CommonName lang="en">Ostrich Fern</CommonName>15
    <BinomialName>
      <Genus>Matteuccia</Genus>
      <Species>struthiopteris</Species>
    </BinomialName>
    <HeightLow units="ft">2</HeightLow>
    <HeightUp units="ft">5</HeightUp>
    <Habitats>
      <Habitat id="woods"/>
    </Habitats>
    <FruitDate>
      <Month lang="en">June</Month>
      <Day>5</Day>
    </FruitDate>
    <Habitat id="woods">
      Woodland areas.
    </Habitat>
    <Observation>
      <Date format="ISO">2012-06-01</Date>
      <Location>near shed</Location>
      <Fern>Ostrich Fern</Fern>
    </Observation>
  </Fern>
25 </FernDB>
```

2. (14 pts.) Write XPath queries for

- (a) all common names in the English (**en**) language.
- (b) the common names of all ferns that have a fruit-date in June.

Briefly explain why your queries yield the desired results.

[additional space for answering the earlier question]

3. (20 pts.) Write XQuery queries for

(a) a sorted list of all dates in the ISO format.

(b) *descriptions* of habitats in which a fern of genus *Matteuccia* is found.

Briefly explain why your queries yield the desired results.

[additional space for answering the earlier question]

4. (10 pts.) Write a SQL trigger that inserts a tuple (a, b) into a table S whenever a tuple (a, b, c, d) is deleted from a table R with $c < d$.

5. ★ (15 pts.)

- (a) Write an XPath query for the dates of observations that have two or more locations.
- (b) Write an XQuery query for the binomial names of all ferns that have never been observed in March.

Briefly explain why your queries yield the desired results.

[additional space for answering the earlier question]