

CS 405G: Introduction to database systems

Assignment 6

Assigned: Nov. 14, 2007

Due: Nov .28, 2007

Submission instructions: Please try to prepare the assignment in word document (hand-written homework is also acceptable). Print and bring them to class on the due date. Put the course number and your name at the top left corner of the first page of your homework. Please follow the rules in the course syllabus regarding late homework and plagiarism.

1. [50 points] Determine which of the following XML documents is well-formed. If a document is well-formed, show its corresponding tree model. If it is not well-formed, explain why not. You may assume that each of these documents are intended to be XML 1.0 documents, and thus the declaration is not needed.

- 1) `<a><a>`
- 2) `<a>foo<a>bar`
- 3) `<a>foobar`
- 4) `<a><c>foobar</c>`
- 5) `<a/>foobar`
- 6) `<a><c>foo</c>baz<c>bar</c>`
- 7) `foo`
- 8) `<b x="2">foo`
- 9) `foo`
- 10) `<a><b x="3"><c y="1">foo</c><c>bar</c>`

2. [25 points] Consider the following DTD.

```
<!ELEMENT p (q, r?, s*)>
<!ELEMENT q (u+ | v)>
<!ELEMENT r (#PCDATA)>
<!ELEMENT s EMPTY>
<!ELEMENT u EMPTY>
<!ELEMENT v EMPTY>
```

Which of the following documents are valid with respect to this DTD? For each document that is not valid, explain your answer.

- 1) `<p><q><u/></q><s/></p>`
- 2) `<p><q><v/></q><r>hi</r><s/></p>`
- 3) `<p><q><u>it</u></q><s/><s/></p>`
- 4) `<p><q><v></v></q></p>`
- 5) `<p><q><u/></q><r>blah</r><r>ack</r></p>`

3. [20 points] Please use one of the mapping we learned in class to map the above DTD into a relational database.

4. [15 points] Consider the following XML document.

```
<A >  
<B foo="3">one</B>  
<B foo="2">  
<C>two</C>  
</B>  
<B foo="1">  
<C>three</C>  
</B>  
</A>
```

For each of the XPath expressions below, describe what nodes of the tree will be selected. For clarity, you should give the complete text of each node. For example, if an element is selected, show its start tag, contents and end tag.

- 1) /A/B[2]
- 2) /A/B[@foo="1"]
- 3) //C