

CSE 462: Project #3 (due 12/9/05)

Problem 1

Suppose you have to represent the information about parts. Each part has a name (unique), and a textual description. Parts may be simple or complex. A simple part has a color but no children subparts. A complex part has a number of children subparts (which can be simple or complex), each of which may be repeated. (E.g., a car has 4 wheels.) A complex part has no color.

You can assume that each part can be a child subpart of at most one other part (so each part, together with its subparts, can be viewed as a tree). Do not assume any fixed number of levels of part composition.

1. Define the schema of XML documents containing part information using (a) DTDs, and (b) XML Schema.
2. Give an example of a document instance which is valid under the DTDs and the XML schema above.
3. Write the following queries in XQuery:
 - (a) **Q1**: *find the names of all the parts that have a yellow part as a child subpart;*
 - (b) **Q2**: *find all the simple parts that belong to at least 3 distinct complex parts;*
 - (c) **Q3**: *find all the parts containing a descendant subpart named “sensor” and not containing a descendant subpart named “switch”.*
4. Define a relational schema in which the part information may be represented. Use the interval encoding. Using the relational schema, write the query **Q1** in SQL.

Extra credit (up to 5% of the final grade)

Assume now that parts may be child subparts of multiple complex parts. Design a representation for parts which will be redundancy-free. Provide an appropriate DTD or XML Schema. Write the query **Q1** in XQuery using this representation.

The solution has to be submitted using `submit_cse462` as *one PDF file*. The first page of the file needs to list the name and the person#.