

## **Sample Midterm Examination**

**INFS 740 – Database Programming for the WWW - Prof. A. Brodsky**

**Student ID:**

**Student Name:**

**Signature:**

**Under the honor code, I will not discuss the content of this exam with any person who has not taken it.**

# INFS 740 – Prof. Brodsky

## Midterm Examination

Provide all your answers in the space provided (use back of pages if necessary). You have 1 hour 45 minutes. You MAY use any books or notes, but NOT computers. You are not allowed to receive help from any other person. Be brief and neat in your answers. Good luck!

Consider the following “Orders-Items-Payments” relational schema:

Order(id: integer, customerName: string, customerNum: integer)

Item(orderID: integer, description: string, cost: real)

Payment(orderID: integer, dueDate: string, amount: real)

Consider also the following “hierarchical orders” XML document:

```
<order id="17">
  <customerName> GMU </customerName>
  <customerNum> 12345 </customerNum>
  <items>
    <item description="notebook" >
      <cost>2.00</cost>
    </item>
    <item description="whiteboard">
      <cost> 45.0</cost>
    </item>
  </items>
  <payments>
    <payment due="1/10/01">
      <amount> 30.00 </amount>
    </payment>
    <payment due="6/10/01">
      <amount> 17.00 </amount>
    </payment>
  </payments>
</order>
...
```

**Problem 1.** Write an XML schema to describe the “hierarchical orders” XML document above as accurately as possible

**Problem 2.** Write an XML schema to describe the default XML representation of the relational tables above (i.e., each relational table will be represented as an element, and each row in a table will be represented as an element etc.)

**Problem 3.** Write an Xquery that, given a “hierarchical orders” XML document, will create the default XML representation of the relational tables, representing the same information.

**Problem 4.** Write XQueries that, given a “hierarchical orders” XML document:

a. For every order, creates an element “total items” with the number of items in that order.

b. For every item of \$50,000 or more, creates an element “customers” that lists all “customer” elements for those customers who have an order with that item.

c. Find all customers who have an order with both the most expensive item (i.e., no item is more expensive) and the least expensive item (i.e., no item is less expensive)

d. Find all customers whose balance is \$1000 or more on 10/15/2004. The balance for a customer is defined as the total price of ordered items minus all the payments that are due before 10/15/2004

e. Finds all orders (orderID's) in which all items are priced \$1000 or more

f. For every customer, gives a list of all payments for that customer (i.e., all payments for the orders made by that customer)