CS 4433 – Databases

Homework 2

Answer all questions

1. Design a semi-structured model for a genealogy which captures a person's name, their father, mother, and children

2. XML product data is shown below:

```
<Products}
   <Maker name = "A">
        <PC model = "1001" price = "2114">
             <Speed>2.66</Speed>
             <RAM>1024</RAM>
             <HardDisk>250</HardDisk>
        </PC>
        <PC model = "1002" price = "995">
             <Speed>2.10</Speed>
             <RAM>512</RAM>
             <HardDisk>250</HardDisk>
        </PC>
        <Laptop model = "2004" price = "1150">
             <Speed>2.00</Speed>
             <RAM>512</RAM>
             <HardDisk>60</HardDisk>
             <Screen>13.3</Screen>
        </Laptop>
        <Laptop model = "2005" price = "2500">
             <Speed>2.16</Speed>
             <RAM>1024</RAM>
             <HardDisk>120</HardDisk>
             <Screen>17.0</Screen>
        </Laptop>
   </Maker>
```

```
   <Maker name = "E">
        <PC model = "1011" price = "959">
             <Speed>1.86</Speed>
             <RAM>2048</RAM>
             <HardDisk>160</HardDisk>
        </PC>
        <PC model = "1012" price = "649">
             <Speed>2.80</Speed>
             <RAM>1024</RAM>
             <HardDisk>160</HardDisk>
        </PC>
        <Laptop model = "2001" price = "3673">
             <Speed>2.00</Speed>
             <RAM>2048</RAM>
             <HardDisk>240</HardDisk>
             <Screen>20.1</Screen>
        </Laptop>
        <Printer model = "3002" price = "239">
             <Color>false</Color>
             <Type>laser</Type>
        </Printer>
   </Maker>
   <Maker name = "H">
        <Printer model = "3006" price = "100">
             <Color>true</Color>
             <Type>ink-jet</Type>
        </Printer>
        <Printer model = "3007" price = "200">
             <Color>true</Color>
             <Type>laser</Type>
        </Printer>
   </Maker>
</Products>
```

(a) Find the amount of RAM on each PC

(b) Write a XQuery query find the Printer elements with a price less than 100, and produce the sequence of these elements surrounded by a tag `<CheapPrinters>`

3. Given the following sequence of log records

<START S>
<S,A,60>
<COMMIT S>
<START T>
<T,A,10>
<START U>
<U,B,20>
<T,C,30>
<START V >
<U,D,40>
<V,F,70 >
<COMMIT U>
<T,E,50>
<COMMIT T>
<V,B,80>
< COMMIT V>

Suppose that we begin a non-quiescent checkpoint immediately after <T,E,50> log record has been written (in memory).

(a) when is the <END CKPT> record written?
(b) for each possible point at which a crash could occur, how for in the log must we look back to find all possible incomplete transactions?

Deadline: Friday April 29, 2016
Hand in at D2L