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Data base Techniques
(XML)

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HOME WORK 5

Q1:

```xml
<bank>
    <account>
        <account_number> A-101 </account_number>
        <branch_name> Downtown </branch_name>
        <balance> 500 </balance>
    </account>
    <account>
        <account_number> A-102 </account_number>
        <branch_name> Perryridge</branch_name>
        <balance>   400 </balance>
    </account>
    <account>
        <account_number> A-201</account_number>
        <branch_name>Brighton </branch_name>
        <balance> 900  </balance>
    </account>
    <customer>
        <customer_name> Johnson </ customer_name >
        <customer_street> Aima </ customer_street >
        <customer_city> Palo Aito </ customer_city >
    </customer>
    <customer>
        <customer_name> Hayes </ customer_name >
        <customer_street>Main </ customer_street >
        <customer_city> Harrison </ customer_city >
    </customer>
    <depositor>
        <account_number> A-101 </account_number>
        <customer_name> Johnson </customer_name>
    </depositor>
    <depositor>
```
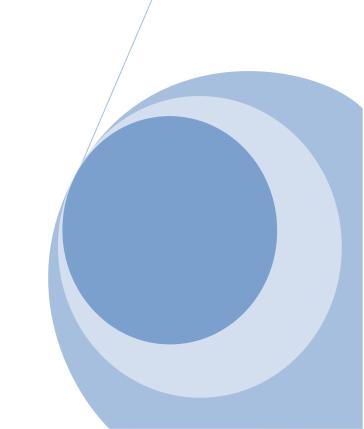
```
                <account_number> A-201 </account_number>
                <customer_name> Johnson </customer_name>
        </depositor>
        <depositor>
                <account_number> A-102 </account_number>
                <customer_name> Hayes </customer_name>
        </depositor>
    </bank>
  Figure 3.1
```

1. Give an alternative representation of bank information containing the same data as in **Firgure3.1**, but using attributes instead of sub-elements. Also give the DTD for this representation.

ANSWER:

Alternative representation of the bank information using attributes instead of sub-elements,

```
<bank-1>
    <account acct-type = "checking" >
            <account-number> A-101 </account-number>
            <branch-name> Downtown </branch-name>
            <balance> 500 </balance>
     </account>
    <account acct-type = "saving" >
            <account-number> A-102 </account-number>
            <branch-name> Perryridge </branch-name>
            <balance> 400 </balance>
     </account>
    <account acct-type = "checking" >
            <account-number> A-201 </account-number>
            <branch-name> Brighton </branch-name>
            <balance> 900 </balance>
```

```
        </account>

        <customer>
                <customer_name> Johnson </ customer_name >
                <customer_street> Aima </ customer_street >
                <customer_city> Palo Aito </ customer_city >
        </customer>
        <customer>
                <customer_name> Hayes </ customer_name >
                <customer_street>Main </ customer_street >
                <customer_city> Harrison </ customer_city >
        </customer>
        <depositor>
                <account_number> A-101 </account_number>
                <customer_name> Johnson </customer_name>
        </depositor>
        <depositor>
                <account_number> A-201 </account_number>
                <customer_name> Johnson </customer_name>
        </depositor>
        <depositor>
                <account_number> A-102 </account_number>
                <customer_name> Hayes </customer_name>
        </depositor>
      </bank-1>
```

DTD representation of the bank scheme:

```
    <!DOCTYPE bank  [
        <!ELEMENT bank (account|customer|depositor)+)>

        <!ELEMENT account (account_number branch_name balance)>
```

<!ELEMENT customer   (customer_name   customer_street customer_city)>

<!ELEMENT depositor (customer_name account_number)>

<!ELEMENT account_number(#PCDATA)>

<!ELEMENT branch_name(#PCDATA)>

<!ELEMENT balance(#PCDATA)>

<!ELEMENT customer_name(#PCDATA)>

<!ELEMENT customer_street(#PCDATA)>

<!ELEMENT customer_city(#PCDATA)>
] >

Q 2: Give the DTD for an XML representation of the following nested-relational schema.

Emp=(ename, ChildrenSet multiset(Children), SkillSet multiset(Skills))

Children = (name, birthday)

Birthday = (day, month, year)

Skills = (type, ExmSet setoff(Exams))

Exams = (year, city)

ANSWER:

<!DOCTYPE db [

<!ELEMENT emp (ename, children*, skills*)>

<!ELEMENT children (name, birthday)>

<!ELEMENT birthday (day, month, year)>

<!ELEMENT skills (type, exams+)>

<!ELEMENT exams (year, city)>

<!ELEMENT ename(#PCDATA)>

<!ELEMENT name(#PCDATA)>

<!ELEMENT day(#PCDATA)>

<!ELEMENT month(#PCDATA)>

<!ELEMENT year(#PCDATA)>

<!ELEMENT type(#PCDATA)>

<!ELEMENT city(#PCDATA)>
] >

Q 3: Write a query in Xpath on the DTD of exercise 2(last one) to list all skill types in Emp.

ANSWER:

For $t in distinct-values (doc (emp.xml)/db/emp/skills/type)
Return $t.

Write a query in Xquery on the XML representation in Figure 3.1 to find the total balance, across all accounts, at each branch.

ANSWER:

For $b in distinct (doc(emp.xml)/bank/account/branch-name)
return

<branch-total>

<branch-name> $b/text() </branch-name>

let $s := sum (doc(emp.xml)/bank/account[branch-name=$b]/balance)

return <total-balance> $s </total-balance>

</branch-total>

<!DOCTYPE bibliography [

    <!ELEMENT book (title, author+, year, publisher, place?)>

    <!ELEMENT article (title, author+, journal, year, number, volume, pages?)>

    <!ELEMENT author (last-name, first-name) >

    <!ELEMENT title (#PCDATA)>
    ???similar PCDATA declarations for year, publisher, place, journal, year,

    number, volume, pages, last-name and first-name
] >

Q 5: Write the following queries in X query, assuming the DTD from exercise 2.
(A). Find the name of all employees whi have a child who has a birthday in March.

(B). Find those employees who took an examination for the skill type "typing" in the city "Dayton".

(C). List all skill types in Emp.

(A): Find the name of all employees which have a child who has a birthday in March.

ANSWER:

for $e in doc(emp.xml)/db/emp,

$m in distinct($e/children/birthday/month)

where $m = 'March'

return $e/ename

(B). Find those employees who took an examination for the skill type "typing" in the city "Dayton".

ANSWER:

for $e in doc(emp.xml)/db/emp

$s in $e/skills[type='typing']

$exam in $s/exams

where $exam/city= 'Dayton'

return $e/ename

(C). List all skill types in Emp.

ANSWER: for $t in distinct-values (doc(emp.xml)/db/emp/skills/type)
return $t.