Web Services

Document allowed: any paper document.

First part – XML (10 points)

Consider the following XML data:

```xml
<?xml version="1.0"?>
<message>
        <to>Morgane</to>
        <from>Loic</from>
        <content>
                <header>1251251155</header>
                <body>How are you?</body>
        </content>
</message>
```

Where header is a timestamp measured in milliseconds.

Question 1
Explain in few sentences the difference/link between DTD and XML Schema.

Question 2
Deduce from the above XML description a DTD and an XML Schema

Question 3
How to ensure that an element is unique in an XML document? Modify the XML schema so all elements are unique.

Question 4
Define in JSon a data structure equivalent to:

```xml
<?xml version="1.0"?>
<message>
        <to>Morgane</to>
        <from>Loic</from>
        <content>
                <header>1251251155</header>
                <body>How are you?</body>
        </content>
</message>
```

Web Services

The aim of this second part is to design an application based on a Rest Web Service. This service must manage bank accounts. From a client, a user can:

- Consult the balance of his account. A customer may have many accounts
- Transfer money between accounts

Question 5: define the protocol (no Java code is needed) for such an application: which URI, which http requests, how the server reacts to those requests and finally, what are the exchanged data structures (here you must define the data structure using JSon).