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## Lab 03

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**Exercise 01:** Write a valid XML file against the following DTD

```
<!ELEMENT directory (person)+>
<!ELEMENT person(lastname, firstname, email+, tel*)>
<!ATTLIST person profession (student | professor | assistant) "student">
<!ELEMENT lastname (#PCDATA)>
<!ELEMENT firstname (#PCDATA)>
<!ELEMENT email (#PCDATA)>
<!ELEMENT tel (#PCDATA)>
<!ATTLIST tel type (fixed | portable) #REQUIRED>
```

**Note:**

1. You can link this DTD with your XML file using:

```
<!DOCTYPE Racine SYSTEM "file.dtd">
```

2. Verify that your file is well-formed and valid using the command:

```
xmllint --noout --valid file.xml
```

Or

```
xmllint --noout --dtdvalid file.dtd file.xml
```

(This command displays nothing if the file is well-formed and valid and displays errors otherwise).

**Exercise 02:** Propose a dtd file defining the XML file which was described in Lab 01 exercise 01.

**Exercise 03:** Propose a BibTex.dtd file allowing the definition of XML documents representing Bibtex files (as described in Lab 02 exercise 03).

**Exercise 04:** We consider XML documents that describe the internal organization of a company. Such a document is structured according to the following rules:

- The root tag is organization.
- The root tag has two child elements, departments and employees (in that order).
- The departments tag contains a child element named department for each department described in the document.
- The employees tag contains a child element named employee for each employee described in the document.

Each department is described as follows:

- It has an attribute named *num* serving as its identifier.
- It contains a child element specifying its name (for example; Management, Accounting, Communication, ...).
- It may contain an empty child element named manager with an attribute name, referencing an employee.

Each employee is described as follows:

- He has an id attribute serving as its identifier.
- He has a name element containing their family name.
- He may have a first name element.
- He has an activities element describing the departments they work in. This element contains empty activity elements, each with an attribute referencing a department defined elsewhere.
- He may have an optional details element, which can include age and gender elements (each optional).

1. Provide a DTD describing the XML documents used for company organization.