

## LO53

### Web services

#### Part I: General questions

1. List web services core technologies and explain their relationships.
2. What is the main difference between a DTD and an XML Schema?
3. Does "http://www.mysite.com/toys?id=12345" URL follow REST design recommendations? Why?
4. Define WSDL 1.1 main elements (sub-elements of the root "definitions" element).
5. Is the SOAP 1.2 binding stateful? Justify your answer.

#### Part II: SOA specification, model and design

Let's consider a final web application untitled "*See By Yourself*" which aims at providing users (*i.e.* "clients" when registered) with multimodal transportation, accommodations and points of interest. This application relies on information provided by registered travel companies (train and airplane agencies, car rentals), hotels and local tourists information centers and clients preferences.

The following "*young couple*" example illustrates this web application:  
*A young couple living in Belfort desires to spend a week in Tunis. They type in their final location (Tunis), starting and returning points (Belfort – Belfort) starting and ending dates and other preferences (car rental, five stars hotel with both internal and external swimming-pools, interest in visiting ruins, etc.).*

The system can suggest to take a train to get from Belfort station to the selected airport (Basel) and go by plane (rather than boat...) to Tunis. Either a car may be made available (at the local car rentals area) or a taxi may be reserved at their arrival in Tunis<sup>1</sup>. Another suggestion is computed when returning back to Belfort...

#### Remarks:

- We assume that each client indicates a single final location.
- Starting and returning points may be different (although this does not usually occurs): for example, a client may ask for a trip from Belfort to Tunis, back to Montpellier...
- Pricing and payment should not be taken into account. Selecting the cheapest companies is out of the scope of this version of the "*See By Yourself*" application.

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<sup>1</sup> Note that it is much more convenient (and safer!) to pay a taxi rather than rent a car...

**Question 1:**

Write a UML use cases diagram of this system from the final web application point of view (involved businesses must not be modelled at this stage). Do not forget that a special user may be needed to set up default preferences, manage clients, manage default (pre-arranged) trips and journeys adapted to the type of client (special week-ends, honeymoons, large families, etc.).

**Question 2:**

For each involved business, list the possible preferences (alternatives) that a client can specify (think of a future user interface). Note that clients may not necessarily indicate similar starting and returning points (although the "*young couple*" example used an identical starting and returning point).

**Question 3:**

Depict the main user and client interfaces (no HTML code) of your future system.

**Question 4:**

Describe a possible SOA of this system, including all involved web services. This architecture must support new business actors discovery and update.

**Remark:** a login step may simplify clients preferences usage (set up performed once).

**Preferences examples:**

- *Train: first class, compartment, window seat, etc.*
- *Airplane: company, business class, vegetarian food, etc.*

**Question 5:**

Write all web services APIs using UML class diagrams. Do not forget to use packages to gather related classes together (if needed).

**Question 6:**

Indicate web services calls by means of interactions diagrams (mainly sequence diagrams) to respond to the young couple trip to Tunis (please refer to the "*young couple*" example proposed on previous page).

**Question 7:**

Suggest an XML schema suitable to indicate the final suggestions made by the system (after contacting agencies and tourists information centers) and write an instance of this schema. This instance is used by the application to display computed results from a client's request parameters.

**Question 8:**

Assuming that a SOAP binding is used, write the complete HTTP response built from the previous question's XML instance. This instance can be referred as "block" within the SOAP instance (to avoid rewriting your XML instance).

**Deciding question:**

What would you do to extend the capabilities of your system to support many locations?

*For example, when clients indicate their wish to go and visit Tunis, the application could suggest a visiting tour of Tunisia (involving different travel and accommodation companies)...*

*GOOD WORK!*