

## Semantic Web

## Exercise sheet 12

# Semantic Web Services

### Exercise 1 (Concept of a Semantic Web Service) (5 points)

Explain in your own words what is a Semantic Web Service, which are the Web service usage tasks which can be automated by applying SWS techniques? (min 0.5 pages, max 1 page).

### Exercise 2 (WSML) (8 points)

Consider a bus transportation company as one company that provides tourism services as part of the VTA scenario introduced in [1].

The VTA scenario is build around a Virtual Traveling Agency, called VTA for short, which is an end user service providing eTourism services to customers. These services can cover all kinds of information services concerned with tourism information - from information about events and sights in an area to services that support booking of flights, hotels, rental cars, etc. online. The partners of the VTA are integrated via conventional B2B integration. A customer submits her/his request to the VTA service which in turn provides a response to the customer by aggregating and invoking various Web services offered by tourism service providers.

Let's consider an imaginary hotel company, called The Blue Hotel that allows its clients to check for room availability using the BlueHotelService. The WSLD description of the BlueHotelService is available in the listing given below.

1. Create a WSML ontology for the description of the hotel domain and a service description for the Blue Hotel. Include also the choreography definition in the service description.
2. Define a goal for booking a double room for non smokers according to the modeled ontology.

```

<?xml version="1.0" encoding="utf-8" ?>
<description
  xmlns="http://www.w3.org/ns/wsd1"
  targetNamespace="http://www.bluehotel.com/wsd1/BlueHotelService"
  xmlns:tns="http://www.bluehotel.com/wsd1/BlueHotelService"
  xmlns:bhns="http://www.bluehotel.com/schemas/BlueHotelService"
  xmlns:wssoap="http://www.w3.org/ns/wsd1/soap"
  xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
  xmlns:wsd1x="http://www.w3.org/ns/wsd1-extensions">

  <documentation>
    This document describes the Blue Hotel Web service.
  </documentation>

  <types>
    <xs:schema
      xmlns:xs="http://www.w3.org/2001/XMLSchema"
      targetNamespace="http://www.bluehotel.com/schemas/BlueHotelService"
      xmlns="http://www.bluehotel.com/schemas/BlueHotelService">
      <xs:element name="checkAvailability" type="tCheckAvailability"/>
      <xs:complexType>
        <xs:sequence>
          <xs:element name="checkInDate" type="xs:date"/>
          <xs:element name="checkOutDate" type="xs:date"/>
          <xs:element name="roomType" type="xs:string"/>
        </xs:sequence>
      </xs:complexType>
      </xs:element>

      <xs:element name="checkAvailabilityResponse" type="tCheckAvailabilityResponse"/>
      <xs:complexType>
        <xs:sequence>
          <xs:element name="roomType" type="xs:string"/>
          <xs:element name="rateType" type="xs:string"/>
          <xs:element name="rate" type="xs:double"/>
        </xs:sequence>
      </xs:complexType>
      </xs:element>

      <xs:element name="invalidDataError" type="xs:string"/>
    </xs:schema>
  </types>

  <interface name="BlueServiceInterface">
    <fault name="invalidDataFault" element="bhns:invalidDataError"/>

    <operation name="opCheckAvailability"
      pattern="http://www.w3.org/ns/wsd1/in@out"
      style="http://www.w3.org/ns/wsd1/style/iri"
      wsdlx:safe="true">
      <input messageLabel="In" element="bhns:checkAvailability"/>
      <output messageLabel="Out" element="bhns:checkAvailabilityResponse"/>
      <outfault ref="tns:invalidDataFault" messageLabel="Out"/>
    </operation>
  </interface>

  <binding name="BlueServiceSOAPBinding"
    interface="tns:BlueServiceInterface"
    type="http://www.w3.org/ns/wsd1/soap"
    wssoap:protocol="http://www.w3.org/2003/05/soap/bindings/HTTP/">
    <fault ref="tns:invalidDataFault" wssoap:code="soap:Sender"/>
    <operation ref="tns:opCheckAvailability"
      wssoap:mep="http://www.w3.org/2003/05/soap/mep/soap@response"/>
  </binding>

  <service name="BlueService" interface="tns:BlueServiceInterface">
    <endpoint name="reservationEndpoint"
      binding="tns:BlueServiceSOAPBinding"
      address="http://www.bluehotel.com/BlueService"/>
  </service>
</description>

```

### **Exercise 3 (SAWSDL and WSMO-Lite) (7 points)**

Extend the WSDL description of the BlueHotelService given above by including SA-WSDL annotations. Use concepts from the created ontology. Transform the WSMO description obtained in Exercise 2 into the WSMO-Lite RDFS form. The WSMO-Lite representation should include models for the capability of the service and at least one non-functional property (e.g. price of the service).