Semantic Web Services PS

Exercise Sheet 7 – 13.05.2014

Please answer the following questions. Provide your elaborated answers in a PDF or a plain text file. If you make use of references when elaborating your answers, please add the proper citations to your document. The deadline for submissions to the tutors (ioan.toma@sti2.at and jose.garcia@sti2.at) is 19th May 2014 at 20:00 CET.

Exercise 1 (8 points)

Extend the WSMO ontology available in Listing 1 with other elements that capture knowledge about bus transportation. You should add at least one example of concept, relation, function, concept instance, relation instance and axiom.

Exercise 2 (8 points)

Consider a bus transportation company as one company that provides tourism services as part of the VTA scenario (VTA scenario was introduced in Exercise Sheet 4). Create a WSMO description for the bus transportation service. The resulting description should include description of the capability, including pre-conditions, post-conditions, assumptions and effects. Explain in your own words what is the difference between these elements using your example.

Exercise 3 (4 points)

Discuss differences between a service and a Web service in the WMSO approach. Give an example of service and one of Web service using the hotel booking sub-domain of the VTA scenario.

Listing 1: VTA Ontology

```
namespace {_"http://www.wsmo.org/ontologies/trainConnection",
      dc _"http://purl.org/dc/elements/1.1#",
      dt _"http://www.wsmo.org/ontologies/dateTime",
      prs _"http://www.wsmo.org/2004/d3/d3.3/v0.1/20041008/resources/
           owlPersonMediator.wsml",
      loc _"http://www.wsmo.org/ontologies/location#",
      geo _"http://www.wsmo.org/2004/d3/d3.3/v0.1/20041008/resources/
           owlGeoMediator.wsml#",
      xsd _"http://www.w3.org/2001/XMLSchema#" }


ontology _"http://www.wsmo.org/ontologies/trainConnection"
      annotations
            dc#title hasValue "International Train Connections Ontology"
```

```
            dc#creator hasValue "DERI International"
            dc#subject hasValues {"Train", "Itinerary", "Train Connection",
                "Ticket"}
            dc#description hasValue "International Train Connections"
            dc#publisher hasValue "STI Innsbruck"
            dc#contributor hasValue {"Michael Stollberg"}
    endAnnotations

    importsOntology { _"http://www.wsmo.org/ontologies/dateTime",
            _"http://www.wsmo.org/ontologies/location"}

    usedMediators { _"http://www.wsmo.org/2004/d3/d3.3/v0.1/20041008/
                resources/owlPersonMediator.wsml",
            _"http://www.wsmo.org/2004/d3/d3.3/v0.1/20041008/
                resources/owlFactBookMediator.wsml" }

    concept station subConceptOf geo#geographicLocation
            annotations
                    dc#description hasValue "Train station"
            endAnnotations
            code ofType xsd:string
                    annotations
                            dc#description hasValue "Code of the station"
                    endAnnotations
            borderToCountry ofType loc:border
                    annotations
                    dc#description hasValue "For stations located at the
                            border"
                    endAnnotations

    concept ticket
            annotations
                    dc#description hasValue "a ticket for an itinerary"
            endAnnotations
            itinerary ofType itinerary
            provider ofType po#partnerDescription
            price ofType po#price

    concept itinerary
            annotations
                    dc#description hasValue "An itinerary between two
                            locations"
            endAnnotations
            passenger ofType prs#person
            annotations
                    dc#description hasValue "prs#person is a subset of vCard
                            (http://www.ietf.org/rfc/rfc2425.txt)"
            endAnnotations
            recordLocatorNumber ofType xsd#string
            trip ofType trip

    concept trip
            start ofType loc#location
            end ofType loc#location
            via ofType set loc#location
            departure ofType dt#dateAndTime
            arrival ofType dt#dateAndTime
```

```
        duration ofType dt:#nterval
        distance ofType loc#distance

concept trainTrip subConceptOf trip
        annotations
                dc#description hasValue "A train trip"
        endAnnotations
        start ofType station
        end ofType station
        via ofType set station
        seat ofType xsd#string
        train ofType xsd#string
        class ofType xsd#string

axiom stationCountry
        annotations
                dc#description hasValue "Integrity constraint: if a
                        station is located in a place which is located in a
                        given country, the country of the station is the
                        same"
        endAnnotations
        definedBy
                constraint
                        ?S[
                                locatedIn hasValue ?L,
                                country hasValue ?C
                        ]memberOf station
                        and not ?L[
                                country hasValue ?C
                        ]memberOf loc#location .

axiom departureBeforeArrival
        annotations
                dc#description hasValue "Integrity Constraint: departure
                        has to be before arrival"
        endAnnotations
        definedBy
                constraint
                        ?T[
                                departure hasValue ?D,
                                arrival hasValue ?A
                        ]memberOf trip
                        and ?A <= ?D.

axiom startNotEqualEnd
        annotations
                dc:description hasValue "Integrity Constraint: the start
                        and end of a trip have to be diferent"
        endAnnotations
        definedBy
                constraint
                        ?T[
                                start hasValue ?Start,
                                end hasValue ?End
                        ]memberOf trip
                        and ?Start = ?End.
```