

Semantic Web

Exercise sheet 2

Semantic Web Architecture

Exercise 1 (On2Broker) (4 points)

Explain in your own words what is On2Broker. Focus on its architecture and functionality covered by constituent components. (min $\frac{3}{4}$ pages, max 1 page).

Exercise 2 (Semantic Web stack) (4 points)

Illustrate Semantic Web stack (a.k.a. Semantic Web Layered Cake) and briefly explain purpose of each layer. (min $\frac{3}{4}$ pages, max 1 page).

Exercise 3 (Characters encoding) (2 points)

Explain difference between ASCII and UNICODE. (min $\frac{1}{4}$ pages, max 0.5 page).

Exercise 4 (Resource identifiers on the Web) (2 points)

Explain difference and relationship between URN, URL and URI. Additionally, explain URI syntax and provide an example of the full form URI (min $\frac{1}{4}$ pages, max 0.5 page).

Exercise 5 (XML Schema) (8 points)

Represent the following model described in the free text form as XML Schema model (min 1 page, max 2 page, or whatever space is needed to properly represent the schema).

UIBK information system has three main data types: Teacher, Student and Course.

- **Teacher** has the following properties:
 - **teacherId**, of type String; up to 10 characters long,

- **position**, which can take one of the following values: assistant, assistant professor, full professor,
 - **firstName**, of type String, up to 10 characters long,
 - **lastName**, of type String, up to 12 characters long,
 - **birthDate**, of type Date, only values starting from 01.01.1900 are acceptable,
 - **emailAddress**, of type String, with the appropriate regular expression constraining the value to the format name@domain.com.
- **Course** has the following properties:
 - **courseId**, of type numerical, fixed length to 8 numbers,
 - **courseName**, of type String, up to 15 characters long,
 - **courseTrack**, enumeration which can take one of the values: bachelor, master, doctoral.
- **Student** has the following properties:
 - **studentId**, of type String, up to 10 characters long,
 - **firstName**, of type String, up to 10 characters long,
 - **lastName**, of type String, up to 12 characters long,
 - **birthDate**, of type Date, only values starting from 01.01.1980. are acceptable,
 - **address**, which is an inner data type consisting of the following properties:
 - **streetName**, of type string, up to 30 characters long,
 - **streetNumber**, of type number, cannot be less than 0,
 - **postcode**, 4 digits number,
 - **city**, of type string, up to 15 characters long.

Additionally, following statements must be supported through the structures:

- **Curriculum** is a sequence of **courses** which has following properties:
 - **curriculumName**, of type String, up to 20 characters long,
 - **list of courses**, more than 2, less than 10.
- **Students** are **attending courses**, up to five of them.
- **Professor** can **teach** up to 3 **courses**.