B4M36DS2, BE4M36DS2: **Database Systems 2**

http://www.ksi.mff.cuni.cz/~svoboda/courses/191-B4M36DS2/

Practical Class 1
Formats

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XML

Sample XML Document

```xml
<?xml version="1.1" encoding="UTF-8"?>
<movie year="2007">
  <title>Medvídek</title>
  <actors>
    <actor>
      <firstname>Jiří</firstname>
      <lastname>Macháček</lastname>
    </actor>
    <actor>
      <firstname>Ivan</firstname>
      <lastname>Trojan</lastname>
    </actor>
  </actors>
  <director>
    <firstname>Jan</firstname>
    <lastname>Hřebejk</lastname>
  </director>
</movie>
```

Exercise 1

Create a new XML document for data of a simple social network

- Use, e.g., the following editor and validator
  - https://codebeautify.org/xmlvalidator
- **Add the following basic constructs**
  - XML prologue
  - Root element `friends`
  - Its only empty element `users`

Exercise 2

Extend the previous XML document

- **Add data about one particular *user***
    - Id: `u121`
    - Name: `Peter`
    - Age: `35`
    - Email: `peter@friends.cz`
- Use attributes for id and age, use elements otherwise

Exercise 3

Extend the previous XML document

- **Add data about two additional users**
    - Id `u654`, name `Rachel`, 25 years
    - Id `u357`, name `John`, 30 years,
      email addresses `john@friends.cz` and
      `u357@users.friends.cz`,
      phone number +420 777 555 111

Exercise 4

Extend the previous XML document

- Create `groups` element after the existing `users` element
- **Add data about the following two *groups***
  - Id `g11`, name `Photographers`
  - Id `g24`, name `Librarians`
- Note that **groups can be recursively nested into each other**
- Add the following group as a sub-group of group `g11`
  - Id `g15`, name `Landscape Photographers`

Exercise 5

Extend the previous XML document

- **Add *friend* relationships between individual users**
  - User `u654` knows users `u121` and `u357`
  - User `u357` knows user `u987`
- **Add *member* relationships between groups and users**
  - Group `g15` contains users `u121` and `u357`
  - Group `g24` contains user `u121`

Exercise 6

Extend the previous XML document

- Create `posts` element after the existing `groups` element
- **Add the following *posts*** published by user `u121`
  - Id `p530035`, datetime `2018-10-08 09:30:00`,
    title `New trends in libraries`
  - Id `p530045`, datetime `2018-10-08 09:45:00`,
    title `Great photos of my family`

JSON

Sample JSON Document

```json
{
  "title" : "Medvídek",
  "year" : 2007,
  "actors" : [
    {
      "firstname" : "Jiří",
      "lastname" : "Macháček"
    },
    {
      "firstname" : "Ivan",
      "lastname" : "Trojan"
    }
  ],
  "director" : {
    "firstname" : "Jan",
    "lastname" : "Hřebejk"
  }
}
```

Exercise 7

Create a new JSON document for data of our social network

- Use, e.g., the following editor and validator
  - https://codebeautify.org/jsonvalidator
- **Add the following properties of the main object**
  - `users`, `groups`, and `posts`
  - Associate all of them with empty values (`null`)

Exercise 8

Extend the previous JSON document

- **Add data about our three users**
  - Id: `u121`, name `Peter`, age 35,
    email address `peter@friends.cz`
  - Id `u654`, name `Rachel`, 25 years
  - Id `u357`, name `John`, 30 years,
    email addresses `john@friends.cz` and
    `u357@users.friends.cz`,
    phone number `+420 777 555 111`

- **Also add all friendships**
  - User `u654` knows users `u121` and `u357`
  - User `u357` knows user `u987`

Exercise 9

Extend the previous JSON document

- **Add data about the following groups**
  - Id g11, name `Photographers`
  - Id g15, sub-group of *g11*, name `Landscape Photographers`
  - Id g24, name `Librarians`
- **Also add all memberships**
  - Group g15 contains users `u121` and `u357`
  - Group g24 contains user `u121`

Exercise 10

Extend the previous JSON document

- **Add the following posts** published by user `u121`
  - Id `p530035`, datetime `2018-10-08 09:30:00`, title `New trends in libraries`
  - Id `p530045`, datetime `2018-10-08 09:45:00`, title `Great photos of my family`

RDF

Sample RDF Document

```
<http://db.cz/movies/medvidek>
  <http://db.cz/terms#actor> <http://db.cz/actors/machacek> .

<http://db.cz/movies/medvidek>
  <http://db.cz/terms#actor> <http://db.cz/actors/trojan> .

<http://db.cz/movies/medvidek>
  <http://db.cz/terms#year> "2007" .

<http://db.cz/movies/medvidek>
  <http://db.cz/terms#director> _:n18 .

_:n18
  <http://db.cz/terms#firstname> "Jan" .

_:n18
  <http://db.cz/terms#lastname> "Hřebejk" .
```

Exercise 11

Create a new RDF document for our data

- Use, e.g., the following editor and validator
  - http://ttl.summerofcode.be/
- **Add statements about the following user**
  - Name Peter, age 35, email peter@friends.cz
  - Use http://www.friends.cz/users/u121
    as an IRI identifier for this user
  - Assume all properties (e.g. name, …) belong to a prefix
    http://www.friends.cz/schema#
  - Also add an RDF type description, i.e. associate our user with
    http://www.friends.cz/schema#User using property
    http://www.w3.org/1999/02/22-rdf-syntax-ns#type
- Only use full triples and IRI identifiers

Exercise 12

Modify the previous RDF document

- **Define and use prefix declarations** provided by Turtle
  - `rdf` for `http://www.w3.org/1999/02/22-rdf-syntax-ns#`
  - `schema` for `http://www.friends.cz/schema#`
  - `user` for `http://www.friends.cz/users/`

Exercise 13

Extend the previous RDF document

- **Add data about the following users**
  - Id `u654`, name `Rachel`, 25 years
  - Id `u357`, name `John`, 30 years,
    email addresses `john@friends.cz` and
    `u357@users.friends.cz`,
    phone number +420 777 555 111
- Include `rdf:type` statements as well

Exercise 14

Modify the previous RDF document

- **Compact all your statements** using *object* and
  predicate-object lists

Exercise 15

Extend the previous RDF document

- **Add data about the following groups**
  - Id g11, name `Photographers`
  - Id g15, sub-group of *g11*, name `Landscape Photographers`
  - Id g24, name `Librarians`
- Use the following prefix for groups
  `http://www.friends.cz/groups/`

Exercise 16

Extend the previous RDF document

- **Add the following friendships**
  - User `u654` knows users `u121` and `u357`
  - User `u357` knows user `u987`
- **Also add the following memberships**
  - Group `g15` contains users `u121` and `u357`
  - Group `g24` contains user `u121`

Exercise 17

Extend the previous RDF document

- **Add the following posts** published by user `u121`
  - Id `p530035`, datetime `2018-10-08 09:30:00`, title `New trends in libraries`
  - Id `p530045`, datetime `2018-10-08 09:45:00`, title `Great photos of my family`
- Represent both the post as **blank nodes**
  - Use `_:...` approach for the first one
  - Use `[ ... ]` Turtle shortcut for the second one