

## MDK: Modern Database Concepts

<http://www.ksi.mff.cuni.cz/~svoboda/courses/192-MDK/>

Practical Class 1

# Formats

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**XML**

# Sample XML Document

```
<?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

```
{
  "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