NIE-PDB | **Advanced Database Systems** | 2024/25 Winter

Assignment **02** – **SPARQL**

Assignment

- Create a **TTL document** with sample RDF triples within your individual topic
  - Use the Turtle notation in particular
  - Work with mutually interlinked resources of at least **3 different types** (e.g., lines, flights, tickets)
    - Use `rdf:type` properties to associate the type information
  - Insert data about at least **15 particular resources** (e.g., 3 lines, 4 flights, 8 tickets)
- Use each of the following constructs at least once
  - Object list or predicate-object list
  - Blank nodes (either using `_` prefix or brackets `[]`)
- Create expressions for exactly **5 different SPARQL queries** (`SELECT` query form in particular)
- Use each of the following constructs at least once
  - Basic graph pattern
  - Group graph pattern
  - Optional graph pattern (`OPTIONAL`)
  - Alternative graph pattern (`UNION`)
  - Difference graph pattern (`MINUS`)
  - Filter constraint (`FILTER`)
  - Aggregation (`GROUP BY` with or without `HAVING` clause)
  - Sorting (`ORDER BY` clause)

Requirements

- Both the TTL document and queries must be **well-formed** (i.e., syntactically correct)
- Put each SPARQL query expression into a standalone file (e.g., `query1.sparql`)
- Always add a comment describing the intended **query meaning in natural language**
  - Comments are written as `# comment`
- Each query expression must be evaluated to a **non-empty solution sequence**
- Both the data file a query files must contain declarations of all prefixes used (including `rdf:`)
  - Use `@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .` in your data file
  - Use `PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>` in your query file
- Do not use `FROM` clauses in your queries, the input data file will automatically be accessible as the default graph

Submission

- **data.ttl**: TTL document with your RDF data to be queried
- **query1.sparql**, …, **query5.sparql**: files with SPARQL query expressions

Execution

- Execute the following shell command to evaluate each individual SPARQL query expression
  - `sparql --data $DataFile --query $QueryFile`
    - `$DataFile` is the input RDF document to be queried, i.e., `data.ttl`
    - `$QueryFile` is a file with query expression to be evaluated, e.g., `query1.sparql`
- Note that you need to work with our NoSQL server nosql.kti.in.fit.cvut.cz within this assignment
  - I.e., the Virtuoso database https://nosql.opendata.cz/ we used during the lab cannot be used

Tools

- **IDLab Turtle Validator** – http://ttl.summerofcode.be/

References

- **RDF 1.1 Concepts and Abstract Syntax**
  - W3C Recommendation (25 February 2014) – https://www.w3.org/TR/rdf11-concepts/
- **RDF 1.1 Turtle: Terse RDF Triple Language**
  - W3C Recommendation (25 February 2014) – https://www.w3.org/TR/turtle/
- **SPARQL 1.1 Query Language**
  - W3C Recommendation (21 March 2013) – https://www.w3.org/TR/sparql11-query/