Exercise 3. Basic SPARQL Queries

Write SPARQL queries for:

a.Retrieve all course titles in the dataset.

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b.Find courses taught by "Dr. Anna Müller".

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c.List all skills taught in courses along with the courses that teach them.

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d.Retrieve courses that have "Machine Learning" as a prerequisite.

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e.Count the total number of courses in the dataset.

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f.Find professors and the number of courses they teach, ordered by course count.

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g.Retrieve research papers published after 2015.

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h.Find courses that are not core requirements.

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i.Get details about the research paper "Attention Is All You Need" and its authors.

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j.List skills with the number of courses that teach each skill.

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Exercise 4. Advanced Analytical Queries

Write SPARQL queries for:

k.Construct a collaboration network of professors who have co-authored research papers together. Show the number of collaborations for each pair.

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l.Find professors who have authored papers in multiple research domains, along with their list of domains.

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m.Identify research papers with abstracts longer than 500 characters.

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n.Find courses taught by only one professor (no co-instructors).

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o.Calculate the average publication year for papers in each research domain.

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p.Identify incomplete course records (courses missing prerequisites or instructors).

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Exercise 5. Career Path Analysis

Write SPARQL queries for:

q.Map courses to career paths by identifying which courses teach skills required for specific careers.

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r.Find career paths that require skills not taught by any current courses.

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s.Identify the most in-demand skills across all career paths.

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t.Suggest complementary courses for students in specific programs based on skill gaps.