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.

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.

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

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

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

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

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

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.

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

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

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