SPARQL queries

The following SPARQL queries implement several Competency Questions for the Evdoxus Ontology-Knowledge Graph.

# Return all modules that the book is used, along with the Department and the University

PREFIX evdx: <http://lpis.csd.auth.gr/ontologies/2023/evdoxus.ttl#>

select (?un as ?Πανεπιστήμιο) (?dn as ?Τμήμα) (?mt as ?Μάθημα)

where {

?s a evdx:Book .

VALUES ?code {"94700120"}

?s evdx:hasCode ?code .

?m a evdx:Module .

?m evdx:title ?mt .

?m evdx:hasBook ?s .

?c a evdx:Course .

?c evdx:year 2022 .

?c evdx:hasModule ?m .

?d a evdx:Department .

?d evdx:hasCourse ?c .

?d evdx:name ?dn .

?u a evdx:University .

?u evdx:hasDepartment ?d .

?u evdx:name ?un .

}

Inside VALUES multiple book IDs can be used (e.g. various editions of the same book).

# Return how many modules and all module names (in a string), that the book is used, along with the Department and the University, group by Department

PREFIX evdx: <http://lpis.csd.auth.gr/ontologies/2023/evdoxus.ttl#>

select (?un as ?Πανεπιστήμιο) (?dn as ?Τμήμα) (count(?m) as ?ΑριθμόςΜαθημάτων) (group\_concat(?mt;separator=", ") as ?Μαθήματα)

where {

?m evdx:title ?mt .

{

select DISTINCT ?un ?dn ?m

where {

?s a evdx:Book .

VALUES ?code { "102070469" "13909" }

?s evdx:hasCode ?code .

?m a evdx:Module .

?m evdx:hasBook ?s .

?c a evdx:Course .

?c evdx:year 2022 .

?c evdx:hasModule ?m .

?d a evdx:Department .

?d evdx:hasCourse ?c .

?d evdx:name ?dn .

?u a evdx:University .

?u evdx:hasDepartment ?d .

?u evdx:name ?un .

}

}

} group by ?un ?dn

# Return in how many modules, of how many Departments and how many Universities the book is used

PREFIX evdx: <http://lpis.csd.auth.gr/ontologies/2023/evdoxus.ttl#>

select (count(DISTINCT ?u) as ?Πανεπιστήμια) (count(DISTINCT ?d) as ?Τμήματα) (count(DISTINCT ?m) as ?ΑριθμόςΜαθημάτων)

where {

?s a evdx:Book .

VALUES ?code { "102070469" "13909" }

?s evdx:hasCode ?code .

?m a evdx:Module .

?m evdx:hasBook ?s .

?c a evdx:Course .

?c evdx:year 2022 .

?c evdx:hasModule ?m .

?d a evdx:Department .

?d evdx:hasCourse ?c .

?u a evdx:University .

?u evdx:hasDepartment ?d .

}

# Return in how many modules, of how many Departments and how many Universities the book is used, per year, for a range of years

PREFIX evdx: <http://lpis.csd.auth.gr/ontologies/evdoxus#>

select ?year (count(DISTINCT ?u) as ?Πανεπιστήμια) (count(DISTINCT ?d) as ?Τμήματα) (count(DISTINCT ?m) as ?ΑριθμόςΜαθημάτων)

where {

?s a evdx:Book .

VALUES ?code { "94700120" "12867416" }

?s evdx:hasCode ?code .

?m a evdx:Module .

?m evdx:hasBook ?s .

?c a evdx:Course .

?c evdx:year ?year.

FILTER ((?year>=2019) && (?year<2023)) .

?c evdx:hasModule ?m .

?d a evdx:Department .

?d evdx:hasCourse ?c .

?u a evdx:University .

?u evdx:hasDepartment ?d .

} group by ?year

order by ?year

# Which Departments (including details about University/Modules) have been added in the second academic year compared to the first

PREFIX evdx: <http://lpis.csd.auth.gr/ontologies/2023/evdoxus.ttl#>

select (?un as ?Πανεπιστήμιο) (?dn as ?Τμήμα) (count(?m) as ?ΑριθμόςΜαθημάτων) (group\_concat(?mt;separator=", ") as ?Μαθήματα)

where {

?m evdx:title ?mt .

{

select DISTINCT ?un ?dn ?m

where {

?s a evdx:Book .

VALUES ?code {"102070469" "13909"}

?s evdx:hasCode ?code .

?m a evdx:Module .

?m evdx:hasBook ?s .

?c a evdx:Course .

?c evdx:year 2022 .

?c evdx:hasModule ?m .

?d a evdx:Department .

?d evdx:hasCourse ?c .

?d evdx:name ?dn .

?u a evdx:University .

?u evdx:hasDepartment ?d .

?u evdx:name ?un .

FILTER NOT EXISTS {

?m1 a evdx:Module .

VALUES ?code1 { "102070469" "13909" }

?s1 evdx:hasCode ?code1 .

?m1 evdx:hasBook ?s1 .

?c1 a evdx:Course .

?c1 evdx:year 2021 .

?c1 evdx:hasModule ?m1 .

?d evdx:hasCourse ?c1 .

}

}

}

} group by ?un ?dn

In the above query if we change the years inside and outside FILTER NOT EXISTS, then we get which Departments (including details about University/Modules) have been deleted from the first academic year compared to the second one.

# Which Universities (including details about Departments/Modules) have been added in the second academic year compared to the first

PREFIX evdx: <http://lpis.csd.auth.gr/ontologies/2023/evdoxus.ttl#>

select (?un as ?Πανεπιστήμιο) (?dn as ?Τμήμα) (count(?m) as ?ΑριθμόςΜαθημάτων) (group\_concat(?mt;separator=", ") as ?Μαθήματα)

where {

?m evdx:title ?mt .

{

select DISTINCT ?un ?dn ?m

where {

?s a evdx:Book .

VALUES ?code { "102070469" "13909" }

?s evdx:hasCode ?code .

?m a evdx:Module .

?m evdx:hasBook ?s .

?c a evdx:Course .

?c evdx:year 2022 .

?c evdx:hasModule ?m .

?d a evdx:Department .

?d evdx:hasCourse ?c .

?d evdx:name ?dn .

?u a evdx:University .

?u evdx:hasDepartment ?d .

?u evdx:name ?un .

FILTER NOT EXISTS {

?m1 a evdx:Module .

VALUES ?code1 { "102070469" "13909" }

?s1 evdx:hasCode ?code1 .

?m1 evdx:hasBook ?s1 .

?c1 a evdx:Course .

?c1 evdx:year 2021 .

?c1 evdx:hasModule ?m1 .

?d1 a evdx:Department .

?d1 evdx:hasCourse ?c1 .

?u evdx:hasDepartment ?d1 .

}

}

}

} group by ?un ?dn

In the above query if we change the years inside and outside FILTER NOT EXISTS, then we get which Universities (including details about Departments/Modules) have been deleted from the first academic year compared to the second one.

# Which Modules (including details about Departments/Universities) have been added in the second academic year compared to the first

PREFIX evdx: <http://lpis.csd.auth.gr/ontologies/2023/evdoxus.ttl#>

select (?un as ?Πανεπιστήμιο) (?dn as ?Τμήμα) (count(?m) as ?ΑριθμόςΜαθημάτων) (group\_concat(?mt;separator=", ") as ?Μαθήματα)

where {

?m evdx:title ?mt .

{

select DISTINCT ?un ?dn ?m

where {

?s a evdx:Book .

VALUES ?code { "102070469" "13909" }

?s evdx:hasCode ?code .

?m a evdx:Module .

?m evdx:hasBook ?s .

?m evdx:title ?mtitle .

?c a evdx:Course .

?c evdx:year 2022 .

?c evdx:hasModule ?m .

?d a evdx:Department .

?d evdx:hasCourse ?c .

?d evdx:name ?dn .

?u a evdx:University .

?u evdx:hasDepartment ?d .

?u evdx:name ?un .

FILTER NOT EXISTS {

?c1 evdx:year 2021 .

?c1 evdx:hasModule ?m1 .

?m1 a evdx:Module .

VALUES ?code1 { "102070469" "13909" }

?s1 evdx:hasCode ?code1 .

?m1 evdx:hasBook ?s1 .

?m1 evdx:title ?mtitle .

?c1 a evdx:Course .

?d evdx:hasCourse ?c1 .

}

}

}

} group by ?un ?dn

In the above query if we change the years inside and outside FILTER NOT EXISTS, then we get which Modules (including details about University/Department) have been deleted from the first academic year compared to the second one.

# Return comparison details and statistics for multiple books for a specific academic year.

PREFIX evdx: <http://lpis.csd.auth.gr/ontologies/2023/evdoxus.ttl#>

select (group\_concat(DISTINCT ?code;separator=", ") as ?Βιβλίο) (count(DISTINCT ?u) as ?Πανεπιστήμια) (count(DISTINCT ?d) as ?Τμήματα) (count(?m) as ?ΑριθμόςΜαθημάτων)

where {

?s a evdx:Book .

VALUES (?book ?code) { (1 "94700120") (1 "12867416") (2 "102070469") (2 "13909")}

?s evdx:hasCode ?code .

?m a evdx:Module .

?m evdx:hasBook ?s .

?c a evdx:Course .

?c evdx:year 2022 .

?c evdx:hasModule ?m .

?d a evdx:Department .

?d evdx:hasCourse ?c .

?u a evdx:University .

?u evdx:hasDepartment ?d .

} group by ?book

# Which modules (including details about Departments/Universities) use only the first book and not the second

PREFIX evdx: <http://lpis.csd.auth.gr/ontologies/2023/evdoxus.ttl#>

select (?un as ?Πανεπιστήμιο) (?dn as ?Τμήμα) (count(?m) as ?ΑριθμόςΜαθημάτων) (group\_concat(?mt;separator=", ") as ?Μαθήματα)

where {

?m evdx:title ?mt .

{

select DISTINCT ?un ?dn ?m

where {

?s a evdx:Book .

VALUES ?code {"102070469" "13909"}

?s evdx:hasCode ?code .

?m a evdx:Module .

?m evdx:hasBook ?s .

?c a evdx:Course .

?c evdx:year 2022 .

?c evdx:hasModule ?m .

?d a evdx:Department .

?d evdx:hasCourse ?c .

?d evdx:name ?dn .

?u a evdx:University .

?u evdx:hasDepartment ?d .

?u evdx:name ?un .

FILTER NOT EXISTS {

VALUES ?code1 {"94700120"}

?s1 evdx:hasCode ?code1 .

?m evdx:hasBook ?s1 .

}

}

}

} group by ?un ?dn

# Which Departments (including details about University/Modules) use only the first book and not the second

PREFIX evdx: <http://lpis.csd.auth.gr/ontologies/2023/evdoxus.ttl#>

select (?un as ?Πανεπιστήμιο) (?dn as ?Τμήμα) (count(?m) as ?ΑριθμόςΜαθημάτων) (group\_concat(?mt;separator=", ") as ?Μαθήματα)

where {

?m evdx:title ?mt .

{

select DISTINCT ?un ?dn ?m

where {

?s a evdx:Book .

VALUES ?code {"94700120"}

?s evdx:hasCode ?code .

?m a evdx:Module .

?m evdx:hasBook ?s .

?c a evdx:Course .

?c evdx:year 2022 .

?c evdx:hasModule ?m .

?d a evdx:Department .

?d evdx:hasCourse ?c .

?d evdx:name ?dn .

?u a evdx:University .

?u evdx:hasDepartment ?d .

?u evdx:name ?un .

FILTER NOT EXISTS {

?m1 a evdx:Module .

VALUES ?code1 {"102070469" "13909"}

?s1 evdx:hasCode ?code1 .

?m1 evdx:hasBook ?s1 .

?c evdx:hasModule ?m1 .

}

}

}

} group by ?un ?dn

# Which Universities (including details about Departments/Modules) use only the first book and not the second

PREFIX evdx: <http://lpis.csd.auth.gr/ontologies/2023/evdoxus.ttl#>

select (?un as ?Πανεπιστήμιο) (?dn as ?Τμήμα) (count(?m) as ?ΑριθμόςΜαθημάτων) (group\_concat(?mt;separator=", ") as ?Μαθήματα)

where {

?m evdx:title ?mt .

{

select DISTINCT ?un ?dn ?m

where {

?s a evdx:Book .

VALUES ?code {"94700120"}

?s evdx:hasCode ?code .

?m a evdx:Module .

?m evdx:hasBook ?s .

?c a evdx:Course .

?c evdx:year 2022 .

?c evdx:hasModule ?m .

?d a evdx:Department .

?d evdx:hasCourse ?c .

?d evdx:name ?dn .

?u a evdx:University .

?u evdx:hasDepartment ?d .

?u evdx:name ?un .

FILTER NOT EXISTS {

?m1 a evdx:Module .

VALUES ?code1 {"102070469" "13909"}

?s1 evdx:hasCode ?code1 .

?m1 evdx:hasBook ?s1 .

?c1 a evdx:Course .

?c1 evdx:year 2022 .

?c1 evdx:hasModule ?m1 .

?d1 evdx:hasCourse ?c1 .

?u evdx:hasDepartment ?d1 .

}

}

}

} group by ?un ?dn

# Which modules (including details about Departments/Universities) use both books

PREFIX evdx: <http://lpis.csd.auth.gr/ontologies/2023/evdoxus.ttl#>

select (?un as ?Πανεπιστήμιο) (?dn as ?Τμήμα) (count(?m) as ?ΑριθμόςΜαθημάτων) (group\_concat(?mt;separator=", ") as ?Μαθήματα)

where {

?m evdx:title ?mt .

{

select DISTINCT ?un ?dn ?m

where {

?s a evdx:Book .

VALUES ?code {"102070469" "13909"}

?s evdx:hasCode ?code .

?m a evdx:Module .

?m evdx:hasBook ?s .

?c a evdx:Course .

?c evdx:year 2022 .

?c evdx:hasModule ?m .

?d a evdx:Department .

?d evdx:hasCourse ?c .

?d evdx:name ?dn .

?u a evdx:University .

?u evdx:hasDepartment ?d .

?u evdx:name ?un .

FILTER EXISTS {

VALUES ?code1 {"94700120"}

?s1 evdx:hasCode ?code1 .

?m evdx:hasBook ?s1 .

}

}

}

} group by ?un ?dn

# Which Departments (including details about University/Modules) use both books

PREFIX evdx: <http://lpis.csd.auth.gr/ontologies/2023/evdoxus.ttl#>

select (?un as ?Πανεπιστήμιο) (?dn as ?Τμήμα) (count(?m) as ?ΑριθμόςΜαθημάτων) (group\_concat(?mt;separator=", ") as ?Μαθήματα)

where {

?m evdx:title ?mt .

{

select DISTINCT ?un ?dn ?m

where {

?s a evdx:Book .

VALUES ?code {"102070469" "13909"}

?s evdx:hasCode ?code .

?m a evdx:Module .

?m evdx:hasBook ?s .

?c a evdx:Course .

?c evdx:year 2022 .

?c evdx:hasModule ?m .

?d a evdx:Department .

?d evdx:hasCourse ?c .

?d evdx:name ?dn .

?u a evdx:University .

?u evdx:hasDepartment ?d .

?u evdx:name ?un .

FILTER EXISTS {

?m1 a evdx:Module .

VALUES ?code1 {"94700120"}

?s1 evdx:hasCode ?code1 .

?m1 evdx:hasBook ?s1 .

?c evdx:hasModule ?m1 .

}

}

}

} group by ?un ?dn

# Which Universities (including details about Department/Modules) use both books

PREFIX evdx: <http://lpis.csd.auth.gr/ontologies/2023/evdoxus.ttl#>

select (?un as ?Πανεπιστήμιο) (count(distinct ?d) as ?ΑριθμόςΤμημάτων)(group\_concat(?dn;separator=", ") as ?Τμήματα) (count(?m) as ?ΑριθμόςΜαθημάτων) (group\_concat(?mt;separator=", ") as ?Μαθήματα)

where {

?m evdx:title ?mt .

?d evdx:name ?dn .

{

select DISTINCT ?un ?d ?m

where {

?s a evdx:Book .

VALUES ?code {"102070469" "13909"}

?s evdx:hasCode ?code .

?m a evdx:Module .

?m evdx:hasBook ?s .

?c a evdx:Course .

?c evdx:year 2022 .

?c evdx:hasModule ?m .

?d a evdx:Department .

?d evdx:hasCourse ?c .

?u a evdx:University .

?u evdx:hasDepartment ?d .

?u evdx:name ?un .

FILTER EXISTS {

?m1 a evdx:Module .

VALUES ?code1 {"94700120"}

?s1 evdx:hasCode ?code1 .

?m1 evdx:hasBook ?s1 .

?c1 a evdx:Course .

?c1 evdx:year 2022 .

?c1 evdx:hasModule ?m1 .

?d1 evdx:hasCourse ?c1 .

?u evdx:hasDepartment ?d1 .

}

}

}

} group by ?un