

MAPPING TRA DB E ONTOLOGIA

A DL-Lite_A ontology with mappings is characterized by a triple

$O_m = \langle T, M, DB \rangle$ such that:

- T is a DL-Lite_A **TBox**
- DB is a relational database
- M is a set of mapping assertion, partitioned into two sets, M_t and M_a

Where:

- M_t is a set of so-called ***typing mapping assertions***, each one of the form

$$\phi \rightsquigarrow T_i$$

where ϕ is a query of arity 1 over DB denoting the projection of one relation over one of its columns, and T_i is one of the DL-Lite_A data types;

- M_a is a set of ***data-to-object mapping assertions*** (or simply mapping assertions), each one of the form

$$\phi \rightsquigarrow \psi$$

where ϕ is an arbitrary SQL query of arity $n > 0$ over DB , ψ is a conjunctive query over T of arity $n' > 0$ without non distinguished variables, that possibly involves variable terms. A variable term is a term of the same form as the object terms introduced above, with the difference that variables appear as argument of the function. In other words, a variable terms has the form $f(z)$, where f is a function symbol in Λ of arity m , and z denotes an m -tuple of variables.

TYPING MAPPING ASSERTIONS

M_{t1}: SELECT id FROM ACTOR \rightsquigarrow xsd:int

M_{t2}: SELECT name FROM ACTOR \rightsquigarrow xsd:string

M_{t3}: SELECT surname FROM ACTOR \rightsquigarrow xsd:string

M_{t4}: SELECT sex FROM ACTOR \rightsquigarrow xsd:string

M_{t5}: SELECT actor FROM actor2movie \rightsquigarrow xsd:int

M_{t6}: SELECT movie FROM actor2movie \rightsquigarrow xsd:int

M_{t7}: SELECT role FROM actor2movie \rightsquigarrow xsd:string

M_{t8}: SELECT actor FROM actorsaka \rightsquigarrow xsd:int

M_{t9}: SELECT akasurname FROM actorsaka \rightsquigarrow xsd:string

M_{t10}: SELECT akasurname FROM actorsaka \rightsquigarrow xsd:string

M_{t11}: SELECT akaname FROM AKANAME \rightsquigarrow xsd:string

M_{t12}: SELECT akasurname FROM AKANAME \rightsquigarrow xsd:string

M_{t13}: SELECT title FROM AKATITLE \rightsquigarrow xsd:string

M_{t14}: SELECT id FROM ALTVERSION \rightsquigarrow xsd:int

M_{t15}: SELECT version FROM ALTVERSION \rightsquigarrow xsd:string

M_{t16}: SELECT altversion FROM altversion2movie \rightsquigarrow xsd:int

M_{t17}: SELECT movie FROM altversion2movie \rightsquigarrow xsd:int

M_{t18}: SELECT country FROM CERTIFICATE \rightsquigarrow xsd:string

M_{t19}: SELECT movie FROM CERTIFICATE \rightsquigarrow xsd:int

M_{t20}: SELECT type FROM CERTIFICATE \rightsquigarrow xsd:string

M_{t21}: SELECT name FROM CINEMATOGRAPHER \rightsquigarrow xsd:string

M_{t22}: SELECT surname FROM CINEMATOGRAPHER \rightsquigarrow xsd:string

M_{t23}: SELECT movie FROM cinematographyby → xsd:int

M_{t24}: SELECT cinematographerN FROM cinematographyby → xsd:string

M_{t25}: SELECT cinematographerS FROM cinematographyby → xsd:string

M_{t26}: SELECT name FROM COMPOSER → xsd:string

M_{t27}: SELECT surname FROM COMPOSER → xsd:string

M_{t28}: SELECT name FROM COUNTRY → xsd:string

M_{t29}: SELECT sfxcompany FROM country2sfx → xsd:string

M_{t30}: SELECT country FROM country2sfx → xsd:string

M_{t31}: SELECT id FROM CRAZYCREDIT → xsd:int

M_{t32}: SELECT credit FROM CRAZYCREDIT → xsd:string

M_{t33}: SELECT credit FROM crazycredit2movie → xsd:int

M_{t34}: SELECT movie FROM crazycredit2movie → xsd:int

M_{t35}: SELECT name FROM DESIGNER → xsd:string

M_{t36}: SELECT surname FROM DESIGNER → xsd:string

M_{t37}: SELECT movie FROM designer2movie → xsd:int

M_{t38}: SELECT designerN FROM designer2movie → xsd:string

M_{t39}: SELECT designerS FROM designer2movie → xsd:string

M_{t40}: SELECT name FROM DIRECTOR → xsd:string

M_{t41}: SELECT surname FROM DIRECTOR → xsd:string

M_{t42}: SELECT movie FROM directedby → xsd:int

M_{t43}: SELECT directorN FROM directedby → xsd:string

M_{t44}: SELECT directorS FROM directedby → xsd:string

M_{t45}: SELECT distributor FROM distributed → xsd:string

M_{t46}: SELECT movie FROM distributed → xsd:int

M_{t47}: SELECT name FROM DISTRIBUTOR → xsd:string

M_{t48}: SELECT distributor FROM distributor2country → xsd:string

M_{t49}: SELECT country FROM distributor2country → xsd:string

M_{t50}: SELECT name FROM EDITOR ~ xsd:string

M_{t51}: SELECT surname FROM EDITOR ~ xsd:string

M_{t52}: SELECT movie FROM editby ~ xsd:int

M_{t53}: SELECT editorN FROM editby ~ xsd:string

M_{t54}: SELECT editorS FROM editby ~ xsd:string

M_{t55}: SELECT id FROM GOOF ~ xsd:int

M_{t56}: SELECT goof FROM GOOF ~ xsd:string

M_{t57}: SELECT goof FROM goof2movie ~ xsd:int

M_{t58}: SELECT movie FROM goof2movie ~ xsd:int

M_{t59}: SELECT title FROM ITAKATITLE ~ xsd:string

M_{t60}: SELECT word FROM KEYWORD ~ xsd:string

M_{t61}: SELECT keyword FROM key2movie ~ xsd:string

M_{t62}: SELECT movie FROM key2movie ~ xsd:int

M_{t63}: SELECT name FROM LANGUAGE ~ xsd:string

M_{t64}: SELECT language FROM lang2movie ~ xsd:string

M_{t65}: SELECT movie FROM lang2movie ~ xsd:int

M_{t66}: SELECT id FROM LINK ~ xsd:int

M_{t67}: SELECT featured_in FROM LINK ~ xsd:string

M_{t68}: SELECT referenced_in FROM LINK ~ xsd:string

M_{t69}: SELECT spin FROM LINK ~ xsd:string

M_{t70}: SELECT spoofed FROM LINK ~ xsd:string

M_{t71}: SELECT version FROM LINK ~ xsd:string

M_{t72}: SELECT followed FROM LINK ~ xsd:string

M_{t73}: SELECT features FROM LINK ~ xsd:string

M_{t74}: SELECT remake FROM LINK ~ xsd:string

M_{t75}: SELECT follows FROM LINK ~ xsd:string

M_{t76}: SELECT ref FROM LINK ~ xsd:string

M_{t77}: SELECT locationcity FROM located → xsd:string

M_{t78}: SELECT locationcountry FROM located → xsd:string

M_{t79}: SELECT movie FROM located → xsd:int

M_{t80}: SELECT city FROM LOCATION → xsd:string

M_{t81}: SELECT country FROM LOCATION → xsd:string

M_{t82}: SELECT link FROM movielinks → xsd:int

M_{t83}: SELECT movie FROM movielinks → xsd:int

M_{t84}: SELECT id FROM MOVIES → xsd:int

M_{t85}: SELECT title FROM MOVIES → xsd:string

M_{t86}: SELECT year FROM MOVIES → xsd:string

M_{t87}: SELECT runtimes FROM MOVIES → xsd:string

M_{t88}: SELECT sound FROM MOVIES → xsd:string

M_{t89}: SELECT genre FROM MOVIES → xsd:string

M_{t90}: SELECT colortype FROM MOVIES → xsd:string

M_{t91}: SELECT crewcoverage FROM MOVIES → xsd:string

M_{t92}: SELECT castcoverage FROM MOVIES → xsd:string

M_{t93}: SELECT votes FROM MOVIES → xsd:int

M_{t94}: SELECT rank FROM MOVIES → xsd:float

M_{t95}: SELECT mpaa FROM MOVIES → xsd:string

M_{t96}: SELECT akatitle FROM moviesaka → xsd:string

M_{t97}: SELECT movie FROM moviesaka → xsd:int

M_{t98}: SELECT itakatitle FROM moviesitaka → xsd:string

M_{t99}: SELECT movie FROM moviesitaka → xsd:int

M_{t100}: SELECT movie FROM musicby → xsd:int

M_{t101}: SELECT composerN FROM musicby → xsd:string

M_{t102}: SELECT composerS FROM musicby → xsd:string

M_{t103}: SELECT id FROM PLOT → xsd:int

M_{t104}: SELECT plot FROM PLOT ~ xsd:string

M_{t105}: SELECT author FROM PLOT ~ xsd:string

M_{t106}: SELECT plot FROM plot2movie ~ xsd:int

M_{t107}: SELECT movie FROM plot2movie ~ xsd:int

M_{t108}: SELECT movie FROM prodby ~ xsd:int

M_{t109}: SELECT producerN FROM prodby ~ xsd:string

M_{t110}: SELECT producerS FROM prodby ~ xsd:string

M_{t111}: SELECT name FROM PRODCOMPANY ~ xsd:string

M_{t112}: SELECT prodcompany FROM prodcompany2country ~ xsd:string

M_{t113}: SELECT country FROM prodcompany2country ~ xsd:string

M_{t114}: SELECT prodcompany FROM prodcompany2movie ~ xsd:string

M_{t115}: SELECT movie FROM prodcompany2movie ~ xsd:string

M_{t116}: SELECT name FROM PRODDESIGNER ~ xsd:string

M_{t117}: SELECT surname FROM PRODDESIGNER ~ xsd:string

M_{t118}: SELECT movie FROM proddesignby ~ xsd:int

M_{t119}: SELECT proddesignerN FROM proddesignby ~ xsd:string

M_{t120}: SELECT proddesignerS FROM proddesignby ~ xsd:string

M_{t121}: SELECT name FROM PRODUCER ~ xsd:string

M_{t122}: SELECT surname FROM PRODUCER ~ xsd:string

M_{t123}: SELECT movie FROM releasein ~ xsd:int

M_{t124}: SELECT country FROM releasein ~ xsd:string

M_{t125}: SELECT date FROM releasein ~ xsd:string

M_{t126}: SELECT movie FROM sfxby ~ xsd:int

M_{t127}: SELECT sfxcompany FROM sfxby ~ xsd:string

M_{t128}: SELECT name FROM SFXCOMPANY ~ xsd:string

M_{t129}: SELECT movie FROM shotin ~ xsd:int

M_{t130}: SELECT country FROM shotin ~ xsd:string

M_{t131}: SELECT year FROM shotin → xsd:string

M_{t132}: SELECT name FROM SOUNDTRACK → xsd:string

M_{t133}: SELECT writer FROM SOUNDTRACK → xsd:string

M_{t134}: SELECT composer FROM SOUNDTRACK → xsd:string

M_{t135}: SELECT musician FROM SOUNDTRACK → xsd:string

M_{t136}: SELECT id FROM TAG → xsd:int

M_{t137}: SELECT tag FROM TAG → xsd:string

M_{t138}: SELECT tag FROM tag2movie → xsd:int

M_{t139}: SELECT movie FROM tag2movie → xsd:int

M_{t140}: SELECT soundtrack FROM SOUNDTRACK → xsd:string

M_{t141}: SELECT movie FROM SOUNDTRACK → xsd:int

M_{t142}: SELECT id FROM TRIVIA → xsd:int

M_{t143}: SELECT trivia FROM TRIVIA → xsd:string

M_{t144}: SELECT trivia FROM trivia2movies → xsd:int

M_{t145}: SELECT movie FROM trivia2movies → xsd:int

M_{t146}: SELECT name FROM WRITER → xsd:int

M_{t147}: SELECT surname FROM WRITER → xsd:string

M_{t148}: SELECT movie FROM writerby → xsd:int

M_{t149}: SELECT writerN FROM writerby → xsd:string

M_{t150}: SELECT writerS FROM writerby → xsd:string

DATA-TO-OBJECT MAPPING ASSERTIONS

Λ (OBJECT VARIABLE

TERMS) = {actor(x),akaname(x,y),akatitle(x),altversion(x),certificate(x),cinematographer(x,y),composer(x,y),country(x),crazycredit(x),designer(x,y),director(x,y),distributor(x),editor(x,y),goof(x),itakatitle(x),keyword(x),language(x),link(x),location(x),movie(x),plot(x),prodcompany(x),proddesigner(x,y),producer(x,y),sfxcompany(x),soundtrack(x),tag(x),trivia(x),writer(x,y)}

M_{m1}: SELECT *ID, name, surname, sex*
FROM ACTOR



ACTOR(actor(*ID*)), ID(actor(*ID*), *ID*), name(actor(*ID*), *name*),
surname(actor(*ID*), *surname*), sex(actor(*ID*), *sex*)

M_{m2}: SELECT *actor, movie, role*
FROM actor2movie



actor2movie(actor (*actor*), movie (*movie*)), role(actor (*actor*), movie (*movie*), *role*)

M_{m3}: SELECT *actor, akaname, akasurname*
FROM actorsaka



actorsaka(actor (*actor*), akaname (*akaname, akasurname*))

M_{m4}: SELECT *akaname,akasurname*
FROM AKANAME



AKANAME(**akaname** (*akaname,akasurname*)), **akaname** (**akaname** (*akaname,akasurname*), *akaname*), **akasurname** (**akaname** (*akaname,akasurname*), *akasurname*)

M_{m5}: SELECT *title*
FROM AKATITLE



AKATITLE(**akatitle** (*title*)), **title** (**akatitle** (*title*), *title*)

M_{m6}: SELECT *id,version*
FROM ALTVERSION



ALTVERSION(**altversion** (*id*)), **id** (**altversion** (*id*), *id*), **version** (**altversion** (*id*), *version*)

M_{m7}: SELECT *version,movie*
FROM altversion2movie



altversion2movie(**altversion** (*version*),**movie** (*movie*))

M_{m8}: SELECT *country,movie,type*
FROM CERTIFICATE



CERTIFICATE(**country** (*country*),**movie** (*movie*)), **type** (**certificate** (*type*), *type*)

M_{m9}: SELECT *name,surname*
FROM CINEMATOGRAPHER



CINEMATOGRAPHER(**cinematographer** (*name, surname*)), **name** (**cinematographer** (*name, surname*), *name*), **surname** (**cinematographer** (*name, surname*), *surname*)

M_{m10}: SELECT *movie, cinematographerN, cinematographerS*
FROM cinematographyby



cinematographyby(**movie** (*movie*), **cinematographer** (*cinematographerN, cinematographerS*))

M_{m11}: SELECT *name, surname*
FROM COMPOSER



COMPOSER(**composer** (*name, surname*)), name(**composer** (*name, surname*), *name*),
surname(**composer** (*name, surname*), *surname*)

M_{m12}: SELECT *name*
FROM COUNTRY



COUNTRY(**country** (*name*)), name(**country** (*name*), *name*)

M_{m13}: SELECT *sfxcompany, country*
FROM country2sfx



country2sfx(**sfxcompany** (*sfxcompany*), **country** (*country*))

M_{m14}: SELECT *id, credit*
FROM CRAZYCREDIT



CRAZYCREDIT(**crazycredit** (*id*)), id(**crazycredit** (*id*), *id*), credit(**crazycredit** (*id*), *credit*)

M_{m15}: SELECT *credit, movie*
FROM crazycredit2movie



crazycredit2movie(**crazycredit** (*credit*), **movie** (*movie*))

M_{m16}: SELECT *name,surname*
FROM DESIGNER



DESIGNER(**designer** (*name, surname*)), name(**designer** (*name, surname*), *name*),
surname(**designer** (*name, surname*), *surname*)

M_{m17}: SELECT *designerN,designerS,movie*
FROM designer2movie



designer2movie(**designer** (*designerN,designerS*), **movie** (*movie*))

M_{m18}: SELECT *movie,directorN,directorS*
FROM directedby



directedby(**movie** (*movie*), **director** (*directorN,directorS*))

M_{m19}: SELECT *name,surname*
FROM DIRECTOR



DIRECTOR(**director** (*name, surname*)), name(**director** (*name, surname*), *name*),
surname(**director** (*name, surname*), *surname*)

M_{m20}: SELECT *name*
FROM DISTRIBUTOR



DISTRIBUTOR(**distributor** (*name*)), name(**distributor** (*name*), *name*)

M_{m21}: SELECT *distributor, movie*
FROM distributed



distributed(**distributor** (*distributor*), **movie** (*movie*))

M_{m22}: SELECT *distributor, country*
FROM distributor2country



distributor2country (**distributor** (*distributor*), **country** (*country*))

M_{m23}: SELECT *movie, editorN, editorS*
FROM editby



editby(**movie** (*movie*), **editor** (*editorN, editorS*))

M_{m24}: SELECT *name, surname*
FROM EDITOR



EDITOR(**editor** (*name, surname*)), name(**editor** (*name, surname*), *name*), surname(**editor** (*name, surname*), *surname*)

M_{m25}: SELECT *id, goof*
FROM GOOF



GOOF (**goof** (*id*)), id(**goof** (*id*), *id*, goof(**goof** (*id*), *goof*))

M_{m26}: SELECT *goof, movie*
FROM *goof2movie*



goof2movie(goof(goof), movie (movie))

M_{m27}: SELECT *title*
FROM *ITAKATITLE*



ITAKATITLE(itakatitle (title)), title(itakatitle (title), title)

M_{m28}: SELECT *word*
FROM *KEYWORD*



KEYWORD(keyword (word)), word(keyword (word), word)

M_{m29}: SELECT *keyword, movie*
FROM *key2movie*



key2movie(movie (movie), keyword(keyword))

M_{m30}: SELECT *name*
FROM *LANGUAGE*



LANGUAGE(language(name)), name(language(name), name)

M_{m31}: SELECT *movie, language*
FROM *lang2movie*



lang2movie(movie (movie), language(language))

M_{m32}: SELECT

id, featured_in, referenced_in, spin, spoofed, version, followed, features, remake, follows, ref
FROM link

LINK(link (*id*)), id(link (*id*), *id*), featured_in(link (*id*), *featured_in*), referenced_in(link (*id*),
referenced_in), spin(link (*id*), *spin*), spoofed(link (*id*), *spoofed*), version(link (*id*), *version*),
followed(link (*id*), *followed*), features(link (*id*), *features*), remake(link (*id*), *remake*), follows(link
(*id*), *follows*), ref(link (*id*), *ref*)

M_{m33}: SELECT *locationcity, locationcountry, movie*

FROM located



located(**country**(*locationcity*), **location**(*locationcountry*), **movie**(*movie*))

M_{m34}: SELECT *link, movie*

FROM movielinks



movielinks(**link** (*link*), **movie**(*movie*))

M_{m35}: SELECT

id, title, year, runtimes, sound, genre, colortype, crewcoverage, castcoverage, votes, rank, mpaa
FROM MOVIES



MOVIES(**movie**(*id*)), id(**movie**(*id*), *id*), title(**movie** (*id*), *title*), year(**movie** (*id*), *year*),
runtimes(**movie** (*id*), *runtimes*), sound(**movie** (*id*), *sound*), genre(**movie** (*id*), *genre*),
colortype(**movie** (*id*), *colortype*), crewcoverage(**movie** (*id*), *crewcoverage*), castcoverage(**movie**
(*id*), *castcoverage*), votes(**movie** (*id*), *votes*), rank(**movie** (*id*), *rank*), mpaa(**movie** (*id*), *mpaa*)

M_{m36}: SELECT *akatitle*,*movie*
FROM moviesaka



moviesaka(**akatitle** (*akatitle*),**movie**(*movie*))

M_{m37}: SELECT *itakatitle*,*movie*
FROM moviesitaka



moviesitaka(**itakatitle**(*itakatitle*),**movie**(*movie*))

M_{m38}: SELECT *composerN*,*composerS*,*movie*
FROM musicby



musicby(**composer** (*composerN*,*composerS*),**movie** (*movie*))

M_{m39}: SELECT *id*,*plot*,*author*
FROM PLOT



PLOT **plot** (*id*), **id**(**plot** (*id*),*id*), **plot**(**plot** (*id*), *plot*), **author**(**plot** (*id*), *author*)

M_{m40}: SELECT *plot*,*movie*
FROM plot2movie



plot2movie(**plot**(*plot*), **movie** (*movie*))

M_{m41}: SELECT *producerN*,*producerS*,*movie*
FROM prodby



prodby(**producer** (*producerN*,*producerS*),**movie** (*movie*))

M_{m42}: SELECT *name*
FROM PRODCOMPANY



PRODCOMPANY (**prodcompany**(*name*)), **name**(**prodcompany**(*name*), *name*)

M_{m43}: SELECT *prodcompany, country*
FROM prodcompany2country



prodcompany2country (**prodcompany** (*prodcompany*), **country** (*country*))

M_{m44}: SELECT *prodcompany, movie*
FROM prodcompany2movie



prodcompany2movie (**prodcompany** (*prodcompany*), **movie** (*movie*))

M_{m45}: SELECT *movie, proddesignerN, proddesignerS*
FROM proddesignby



proddesignby(**movie** (*movie*), **proddesigner** (*proddesignerN, proddesignerS*))

M_{m46}: SELECT *name, surname*
FROM PRODDESIGNER



PRODDESIGNER(**proddesigner** (*name, surname*)), **name**(**proddesigner** (*name, surname*), *name*), **surname**(**proddesigner** (*name, surname*), *surname*)

M_{m47}: SELECT *name, surname*
FROM PRODUCER



PRODUCER(**producer** (*name, surname*)), **name**(**producer** (*name, surname*), *name*), **surname**(**producer** (*name, surname*), *surname*)

M_{m48}: SELECT *movie, country, date*
FROM *releasein*



releasein(**movie** (*movie*), **country** (*country*)), **date**(**movie** (*movie*),**country** (*country*),*date*)

M_{m49}: SELECT *sfxcompany, movie*
FROM *sfxby*



sfxby(**sfxcompany**(*sfxcompany*), **movie** (*movie*))

M_{m50}: SELECT *country, movie, year*
FROM *shotin*



shotin(**country** (*country*), **movie** (*movie*), **year**(**movie** (*movie*),**country** (*country*),*year*))

M_{m51}: SELECT *name, writer, composer, musician*
FROM *SOUNDTRACK*



SOUNDTRACK(**soundtrack** (*name*)), **name**(**soundtrack** (*name*), *name*),
writer(**soundtrack** (*name*), *writer*), **composer**(**soundtrack** (*name*), *composer*),
musician(**soundtrack** (*name*), *musician*)

M_{m52}: SELECT *id, tag*
FROM *TAG*



TAG(**tag**(*id*)), **id**(**tag**(*id*), *id*), **tag**(**tag** (*id*), *tag*)

M_{m53}: SELECT *tag, movie*
FROM tag2movie



tag2movie(**tag** (*tag*), **movie** (*movie*))

M_{m54}: SELECT *soundtrack, movie*
FROM tracklist



tracklist(**soundtrack** (*soundtrack*), **movie** (*movie*))

M_{m55}: SELECT *id, trivia*
FROM TRIVIA



TRIVIA(**trivia** (*id*)), **id**(**trivia** (*id*), *id*), **trivia**(**trivia** (*id*), *trivia*))

M_{m56}: SELECT *trivia, movie*
FROM trivia2movie



trivia2movie(**trivia** (*trivia*), **movie** (*movie*))

M_{m57}: SELECT *name, surname*
FROM WRITER



WRITER(**writer** (*name, surname*)), **name**(**writer** (*name, surname*), *name*),
surname(**writer** (*name, surname*), *surname*)

M_{m58}: SELECT *writerN, writerS, movie*,
FROM writerby



writerby(**writer** (*writerN, writerS*), **movie** (*movie*))

M_{m59}: SELECT *city, country*
FROM LOCATION



LOCATION(**location** (*city*)), **city**(**location** (*city*), *city*), **country**(*country*)

M_{m60}: SELECT *name*
FROM SFXCOMPANY



SFXCOMPANY(**sfxcompany** (*name*)), **name**(**sfxcompany** (*name*), *name*)