

TEAM MEMBERS

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Our Constraints

- a) For every tuple in Artifact, a tuple with the same species must be present in the relation Species; an artifact cannot have a species which is not recorded in the relation.
- b) The attribute rank in relation Staff must contain a value belonging to the following set: {'technician', 'student', 'pre-tenure', 'tenure'}, in order to ensure that every staff member has a rank and the rank can only be one of the abovementioned ranks since no other rank exists in the museum.
- c) The value of attribute Family in relation Species must be such that there exists a tuple in COL with that specific value, as the relation COL contains all the families we know so it makes sense that the attribute genus in relation GENUS belongs to a known family.
- d) This is a foreign key constraint which implies that all values for attribute genus in relation Species must be present in the relation Genus since the relation Genus records all the values of the attribute genus we know.
- e) Each CID corresponds to one field trip by a staff member on a certain date, and must also have one or more artifacts collected on that date by that staff member - i.e. a field trip is only recorded by its CID if one or more artifacts were found.
- f) Each artifact number in the Collected relation corresponds to an artifact number in the Artifact relation; this means that each artifact has a species, type, location, Staff ID, and Collection ID associated with it.
- g) Every SID in the Collection relation is present in the Staff relation; this means that the only people who can go out on collection field trips

and collect artifacts are staff of the zoological institute, but not all staff of the institute need to necessarily go on field trips.

- h) Every SID in the Artifact relation is present in the Staff relation; this means that every artifact is maintained by a staff member of the zoological institute, but not all staff of the institute need to necessarily maintain artifacts.
- i) The attribute type in relation Artifact must contain a value belonging to the following set: {'tissue', 'image', 'model', 'live'} - this means that there are only 4 types of artifacts that the institute collects and archives, so no other types are valid.
- j) Every Artifact number in the Published relation is present in the Artifact relation; this means that every artifact which has appeared in a publication must have been found and categorized earlier, but not all artifacts which are found by the institute will necessarily appear in a publication.

Your Constraints

a) $\text{nameSpecies}(\text{names}) := \Pi_{\text{species}}(\text{Species})$

nameSpecies contains all the names of species under the

attribute names

$\text{nameGenus}(\text{names}) := \Pi_{\text{genus}}(\text{Genus})$

nameGenus contains all the names of Genus under the attribute

names

$\text{commonNames} := \text{nameSpecies} \cap \text{nameGenus}$

commonNames contains all the names common to both

nameSpecies and name Genus

commonNames = \emptyset

the resulting intersection must be empty, i.e relation of names
which is both a species and a genus must be empty

b) T1 := Genus

T2 := Genus

T3 := T1 \times T2

T3 contains a self-join of relation Genus with itself

atLeastTwo := $\Pi_{T1.genus} (\sigma_{T1.genus=T2.genus \wedge T1.family \neq T2.family} (T3))$

atLeastTwo contains all the genus which belong to 2 or more

families.

AtLeastTwo = \emptyset

atLeastTwo is set to null, i.e the relation containing all the genus

with two or more families must be empty

c) publishedDate(CID,cDate) = $\Pi_{CID,date} (\text{Published} \bowtie \text{Collected})$

publishedDate contains the CID and the date it was published

collectedDate(CID,pDate) = $\Pi_{CID,date} (\text{Collection})$

collectedDate contains the CID and the date it was collected

$T1 := \text{publishedDate} \bowtie \text{collectedDate}$

T1 contains the CID of the collection, date it was collected and
date it was published

$\text{Answer} := \Pi_{\text{CID}} (\sigma_{pDate < cDate} (T1))$

Answer contains all the CIDs such that its publish date was
before its collected Date.

$\text{Answer} := \emptyset$

The relation containing CIDs whose publish date is before the
collected date must be Empty

d) $\text{artifactsStudents} := \Pi_{\text{AN}, \text{type}, \text{rank}} (\text{Artifact} \bowtie \text{Staff})$

artifactStudents contains the attributes AN,type,rank after a
natural join of Artifact and Staff

$\text{Answer} := \Pi_{\text{AN}} (\sigma_{\text{rank} = 'student' \wedge \text{type} = 'live'} (\text{artifactStudents}))$

Answer contains all the artifact IDs collected by a student whose
type is live

$\text{Answer} = \emptyset$

The relation containing Live Artifacts collected by students must
be empty

