Research Higher Degree Logical Model

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# Derive relations

## Strong Entity types

|  |
| --- |
| **Applicant**(applicantID, fName, lName, prefTitle, sex, DOB, streetAddress, suburb, postcode, city, state, addressCountryISOCode, mobile, phone, email, nationalityCountryISOCode, isNZAUCitizen, englishProficient, studentID, dateAdded, enteredByStaffID)  **Primary key** applicantID  **Foreign key** addressCountryISOCode **references** Country(countryISOCode)  **Foreign key** nationalityCountryISOCode **references** Country(countryISOCode)  **Foreign key** enteredByStaffID **references** University Staff Member(staffID) |
| **Document**(docID, title, description, uploadLink)  **Primary key** docD  **Foreign key** docTypeID **references** Document Type(docTypeID)  **Foreign key** docStatID **references** Document Status(docStatID) |
| **Application**(applicationID, proposedStartDate, proposalSummary, requireMoreInfo, dateAdded, dateLastChecked, dateLastModified  **Primary key** applicationID  **Foreign key** filledByStaffID **references** UniversityStaffMember(staffID)  **Foreign key** proposalDocID **references** Document (docID)  **Foreign key** awardTypeID **references** AwardType (awardTypeID)  **Foreign key** loadLocID **references** StudyLoadAndLocation (LoadLocID)  **Foreign key** managedByStaffID **references** UniversityStaffMember(staffID)  **Foreign key** appIicantID **references** Applicant(applicantID) |
| **Type** (type, description)  **Primary key** type |
| **Degree** (name, type, yearCompleted, gpa, institutionName, instituitonCountryISOCode, applicantID, degreeDocID)  **Primary key** name, applicantID  **Foreign key** applicantID **references** Applicant(applicantID)  **Foreign key** InstituitonCountryISOCode **references** Country(countryISOCode)  **Foreign key** degreeDocID **references** Document(docID) |
| **UniStaffMemberGeneralStaffMember** |
| **PaymentMethod**(payMethID, method) // needs to be moved  **Primary key** payMethID |
| **Publication** (pubID, docID, applicantID, title, publication, issueNo, issueDate, onlineLink, otherAuthorsNames, language)  **Primary key** pubID  **Foreign key** docID **references** Document(docID)  **Foreign key** applicantID **references** Applicant(applicantID) |
| **Referee** (refID, applicationID, name, relation, phone, email, profession, academicLink, englishSpeaker, englishLiterate)  **Primary key** refID  **Foreign key** applicationID **references** Application(applicationID) |
| **ResearchArea** (forCode, description, researchArea, generalArea)  **Primary key** forCode |
| **~~RHDStaffMember~~** |
| **StudyLoadAndLocation** (loadLocID, loadLocation)  **Primary key** loadLocID |
| **~~Supervisor~~** |
| **UniversityStaffMember** (staffID, lName, fName, canSupervise)  **Primary key** staffID |
| **Visa** (visaID, docID, applicantID, visaStatID, originCountryISOCode, valIDFrom, valIDTo)  **Primary key** visaID  **Foreign key** applicationID **references** Application(applicationID)  **Foreign key** docD **references** Document (docID)  **Foreign key** originCountryISOCode **references** Country(countryISOCode) |

### Lookup relations

|  |
| --- |
| **ApplicationStatus** (appStatID, status, description)  **Primary key** appStatID |
| **Decision Type** (DecTypeID, type)  **Primary key** DecTypeID |
| **CorrespondenceMethod** (corrMethID, method)  **Primary key** corrMethID |
| **AwardType** (awardTypeID, award, description)  **Primary key** awardTypeID |
| **Payment Method** (PayMethID, Method)  **Primary key** PayMethID |
| **DocumentStatus** (docStatID, status)  **Primary key** docStatID |
| **DocumentType** (docTypeID, type)  **Primary key** docTypeID |
| **Visa Status** (VisaStatID, Status, Description)  **Primary key** VisaStatID |
| **Country** (CountryISOCode, Name)  **Primary key** CountryISOCode |

## Weak Entity types

|  |
| --- |
| **Checklist** (applicationID, addressConfirmed, degreeConfirmed, visaConfirmed, proposalConfirmed, hasResearchArea, hasPrimarySuper, payMethConfirmed, refrereesConfirmed, engProfConfirmed)  **Primary key** applicationID  **Foreign key** applicationID **references** Application(applicationID) |
| **Correspondence** (corrID, date, summary, message, applicaitID, staffID, corrMethID, toUniversity  **Primary key** corrID  **Foreign key** applicantID **references** Applicant(applicantID)  **Foreign key** appStatID **references** ApplicationStatus(appStatID)  **Foreign key** staffID **references** UniversityStaffMember(staffID) |
| **Decision** (decID, date, comment, applicationID, staffID)  **Foreign key** applicationID **references** Application(applicationID)  **Foreign key** staffID **references** UniversityStaffMember(staffID)  **Foreign key** decTypeID **references** DecisionType |

## One-to-many binary relationships

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Relationship name** | **Rel.ship**  **number** | **Parent relation** | **Parent multiplicity** | **Foreign Keys** | **Child relation** | **Child multiplicity** |
| authored |  | Applicant | 1 | ApplicantID | Publication | 0..\* |
| submits |  | Applicant | 1 | ApplicantID | Application | 0..\* |
| corresponds with (*non-identifying)* |  | Applicant | 1 | ApplicantID | Correspondence | 0..\* |
| corresponds with2 (*non-identifying)* |  | University Staff Member | 1 | StaffID | Correspondence | 0..\* |
| holds |  | Applicant | 1 | ApplicantID | Degree | 0..\* |
| lives in |  | Country | 1 | CountryISOCode | Applicant | 0..\* |
| nationality of |  | Country | 0..1 | CountryISOCode | Applicant | 0..\* |
| has a |  | Visa Status | 1 | VisaID | Visa | 0..\* |
| has a |  | Document Status | 1 | DocStat | Document | 0..\* |
| of |  | Document Type | 1 | DocTypeID | Document | 0..\* |
| will pay using *(non-identifying)* |  | Payment Method | 0..1 | PayMethID | Application | 0..\* |
| has a *(non-identifying)* |  | Application Status | 1 | AppStatusID | Checklist | 0..\* |
| has a *(non-identifying)* |  | Decision Type | 1 | DecTypeID | Decision | 0..\* |
| Decides2 *(non-identifying)* |  | University Staff Member | 1 | StaffID | Decision | 0..\* |
| will supervise |  | Application | 1 | ApplicationID | Supervise as | 0..\* |
| will supervise2 |  | University Staff Member | 1 | StaffID | Supervise as | 0..\* |
| Manages *(non-identifying)* |  | University Staff Member | 0..1 | StaffID → ManagedByStaffID | Application | 0..\* |
| fills out |  | University Staff Member | 1 | StaffID →FilledByStaffID | Application | 0..\* |
| provides (*non-identifying)* |  | Applicant | 1 | ApplicantID | Applicant Document | 0..\* |
| has (*non-identifying)* |  | Applicant | 1 | ApplicantID | Degree | 0..\* |
| enters in |  | University Staff Member | 1 | StaffID | Applicant | 0..\* |

### Lookup relationships

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Relationship name** | **Rel.ship**  **number** | **Parent relation** | **Parent multiplicity** | **Foreign Keys** | **Child relation** | **Child multiplicity** |
| lives in |  | Country | 1 | CountryISOCode | Applicant | 0..\* |
| nationality of |  | Country | 0..1 | CountryISOCode | Applicant | 0..\* |
| has a |  | Visa Status | 1 | VisaID | Visa | 0..\* |
| has a |  | Document Status | 1 | DocStat | Document | 0..\* |
| of |  | Document Type | 1 | DocTypeID | Document | 0..\* |
| will pay using *(non-identifying)* |  | Payment Method | 0..1 | PayMethID | Application | 0..\* |
| has a *(non-identifying)* |  | Application Status | 1 | AppStatusID | Checklist | 0..\* |
| has a *(non-identifying)* |  | Decision Type | 1 | DecTypeID | Decision | 0..\* |
| Decides2 *(non-identifying)* |  | University Staff Member | 1 | StaffID | Decision | 0..\* |
| will supervise |  | Application | 1 | ApplicationID | Supervise as | 0..\* |
| will supervise2 |  | University Staff Member | 1 | StaffID | Supervise as | 0..\* |
| Manages *(non-identifying)* |  | University Staff Member | 0..1 | StaffID → ManagedByStaffID | Application | 0..\* |
| fills out |  | University Staff Member | 1 | StaffID →FilledByStaffID | Application | 0..\* |
| provides (*non-identifying)* |  | Applicant | 1 | ApplicantID | Applicant Document | 0..\* |
| has (*non-identifying)* |  | Applicant | 1 | ApplicantID | Degree | 0..\* |
| enters in |  | University Staff Member | 1 | StaffID | Applicant | 0..\* |

## One-to-one binary relationships

### Mandatory on both sides

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Relationship name** | **Rel.ship**  **number** | **Parent relation** | **Parent multiplicity** | **Foreign Keys** | **Child relation** | **Child multiplicity** |
| Summarised by |  |  |  |  |  |  |
| supported by |  |  |  |  |  |  |

### Mandatory on one side

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Relationship name** | **Rel.ship**  **number** | **Parent relation** | **Parent multiplicity** | **Foreign Keys** | **Child relation** | **Child multiplicity** |
| may have |  | VISA | 0..1 | VISAID | Applicant | 1 |

### Optional on both sides

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Relationship name** | **Rel.ship**  **number** | **Parent relation** | **Parent multiplicity** | **Foreign Keys** | **Child relation** | **Child multiplicity** |
| proves payment method |  | Applicant Document | 0..1 | AppDocID → ProvesPaymentMethodAppDocID2 | Application | 0..1 |
| is an extended proposal for a |  | Applicant Document | 0..1 | AppDocID → ExtendedProposalAppDocID | Application | 0..1 |
| is a |  | Applicant Document | 0..1 | AppDocID | Publication | 0..1 |
| is a academic transcript for |  | Applicant Document | 0..1 | AppDocID | Degree | 0..1 |
| is proof of a |  | Applicant Document | 0..1 | AppDocID | VISA | 0..1 |

## One-to-one recursive relationships

None in this case

## Superclass/subclass relationships

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Relationship name** | **Rel.ship**  **number** | **Parent relation** | **Parent multiplicity** | **Foreign Keys** | **Child relation** | **Child multiplicity** |
|  |  |  |  |  |  |  |

## Many-to-many binary relationship types

### University Staff Member *works in* Research Area

Introduce the following relation:

|  |
| --- |
| **University Staff Member\_Research Area** (StaffID, FORCode)  **Primary key** StaffID, FORCode  **Foreign key** StaffID **references** University Staff Member(StaffID)  **Foreign key** FORCode **references** Research Area(FORCode) |

Introduce the following relationships:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Relationship name** | **Rel.ship**  **number** | **Parent relation** | **Parent multiplicity** | **Foreign Keys** | **Child relation** | **Child multiplicity** |
| works in |  | University Staff Member | 1 | StaffID | University Staff Member\_Research Area | 0..\* |
| works in2 |  | Research Area | 1 | FORCode | University Staff Member\_Research Area | 0..\* |

### University Staff Member *oversees* Research Area

Introduce the following relation:

|  |
| --- |
| **University Staff Member\_Research Area2** (StaffID, FORCode)  **Primary key** StaffID, FORCode  **Foreign key** StaffID **references** University Staff Member(StaffID)  **Foreign key** FORCode **references** Research Area(FORCode) |

Introduce the following relationships:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Relationship name** | **Rel.ship**  **number** | **Parent relation** | **Parent multiplicity** | **Foreign Keys** | **Child relation** | **Child multiplicity** |
| Oversees |  | University Staff Member | 1 | StaffID | University Staff Member\_Research Area | 0..\* |
| Oversees2 |  | Research Area | 1 | FORCode | University Staff Member\_Research Area2 | 0..\* |

### Application *in* Research Area

Introduce the following relation:

|  |
| --- |
| **Application\_Research Area** (ApplicationID, FORCode)  **Primary key** ApplicationID, FORCode  **Foreign key** ApplicationID **references** Application(ApplicationID)  **Foreign key** FORCode **references** Research Area(FORCode) |

Introduce the following relationships:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Relationship name** | **Rel.ship**  **number** | **Parent relation** | **Parent multiplicity** | **Foreign Keys** | **Child relation** | **Child multiplicity** |
| In |  | Application | 1 | ApplicationID | Application\_Research Area | 1..\* |
| in2 |  | Research Area | 1 | FORCode | Application\_Research Area | 0..\* |

### University Staff Member *flags* Application

Introduce the following relation:

|  |
| --- |
| **University Staff Member\_Application** (StaffID, ApplicationID)  **Primary key** StaffID, ApplicationID  **Foreign key** StaffID **references** University Staff Member(StaffID)  **Foreign key** ApplicationID **references** Application(ApplicationID) |

Introduce the following relationships:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Relationship name** | **Rel.ship**  **number** | **Parent relation** | **Parent multiplicity** | **Foreign Keys** | **Child relation** | **Child multiplicity** |
| flags |  | University Staff Member | 1 | StaffID | University Staff Member\_Application | 0..\* |
| flags2 |  | Application | 1 | ApplicationID | University Staff Member\_Application | 0..\* |

## Complex relationship types

None in this case

## Multi-valued attributes

None in this case

## Discussion DELETE THIS

Should we add an Application to Document relation to deal with nonspecific documents?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Entity Name 1** | **multiplicity** | **Relationship Name** | **multiplicity** | **Entity Name 2** | **Rel#** |
| **Application** | 1 | Has a non-specific | 0..\* | Document | **2.5** |

Maybe it would be better to add a single document relation that matches a document (that includes its applicant) to an application and remove all other document relations

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Entity Name 1** | **multiplicity** | **Relationship Name** | **multiplicity** | **Entity Name 2** | **Rel#** |
| **Application** | 1 | Confirmed by | 0..\* | **ApplicationDocument** | **2.5** |
| **ApplicationDocument** | 1 | Confirmed by2 | 0..\* | **Document** | **27.1** |
| **Applicant** | 1 | Details by | 0..\* | **Document** | **1.6** |

?

# Data dictionary

# Normalisation

|  |  |  |
| --- | --- | --- |
| **Relation** | **Functional Dependencies** | **Remarks** |
| Applicant | ApplicantID → EnteredByStaffID, FName, LName, PrefTitle, Sex, DOB, StreetAddress, Suburb, Postcode, City, State, AddressCountryISOCode, Mobile, Phone, Email, NationalityCountryISOCode, isNZAUCitizen, EnglishProficient, StudentID, DateAdded | No repeating groups.  No partial dependencies.  No transitive dependencies.  ⇒ in 3NF |
| Application | ApplicationID →FilledByStaffID, ProposalDocID, AwardTypeID, LoadLocId, ManagedByStaffID, ApplicantID, VersionNumber, ProposedStartDate, ProposedSummary, RequireMoreInfo, DateAdded, DateLastChecked, DateLastModified, PayDocID, PayMethID | No repeating groups.  No partial dependencies.  No transitive dependencies.  ⇒ in 3NF |
| Document | *docID → title, description, uploadLink*  *uploadLink →title, description*  uploadLink → title, description | Original (in grey, italics) had PK docID and unique uploadLink attribute. This introduced transitive dependencies. Replaced with the simpler relation shown, which is 3NF. |
| ApplicationStatus | *appStatID → status, description*  *status → description*  appStatID → status, description | Original (in grey, italics) had PK appStatID and unique status. This introduced transitive dependencies. Replaced with the simpler relation shown, with is 3NF. |
| AwardType | awardTypeID → award, description  award →awardTypeID, description |  |
| CorrespondenceMethod | corrMethID → method  method → corrMethID |  |
| Degree | name, applicantID → type, yearCompleted, gpa, institutionName, instituitonCountryISOCode, degreeDocID |  |
| **DocumentStatus** | docStatID → status  status → docStatusID |  |
| **DocumentType** | docTypeID → type |  |
| **PaymentMethod** | payMethID → method  method → payMethID |  |
| **Publication** | pubID → docID, applicantID, title, publication, issueNo, issueDate, onlineLink, otherAuthorsNames, language | Attributes publication, issueNo, issueDate, onlineLink and otherAuthorsNames are optional, therefore cannot form a candidate key. |
| **Referee** | refID → applicationID, name, relation, phone, email, profession, academicLink, englishSpeaker, englishLiterate |  |
| **ResearchArea** | forCode → description, researchArea, generalArea |  |
| **StudyLoadAndLocation** | loadLocID → loadLocation |  |
| **UniversityStaffMember** | staffID → lName, fName, canSupervise |  |
| **Visa** | visaID → visaDocID, applicantID, visaStatID, originCountryISOCode, valIDFrom, valIDTo  visaDocID → visaID, applicantID, visaStatID, originCountryISOCode, valIDFrom, valIDTo  applicantID → visaDocID, visaID, visaStatID, originCountryISOCode, valIDFrom, valIDTo |  |
| **Checklist** | applicationID → addressConfirmed, degreeConfirmed, visaConfirmed, proposalConfirmed, hasResearchArea, hasPrimarySuper, payMethConfirmed, refrereesConfirmed, engProfConfirmed |  |
| **Correspondence** | corrID → date, summary, message, applicaitID, staffID, corrMethID, toUniversity |  |
| **Decision** | decID → date, comment, applicationID, staffID |  |

# 

# User transaction validation

University Staff Members

|  |  |
| --- | --- |
| # | pathway |
|  | Look up applicant + publications + degrees + visa Status + Associated documents by applicant name |
|  | Look up applicant’s applications by applicant name |
|  | Look up applicant’s applications by applicant email |
|  | Look up incomplete applications |
|  | Look up all correspondences relevant to an application |
|  | Insert Applicant |
|  | Look up who edited an Applicant/Application last |
|  | Create new applicant and associated application records |
|  | Look up an existing application and attach a new standard type document to an application |
|  | Look up an existing application and attached a new exceptional type document to an application |
|  | Look up an existing application and list outstanding information (checklist). |
|  | Elevate the certainty status flag of a piece of information relating to an existing application |
|  | Retrieve all on-going applications for which the user has made the most recent correspondence |
|  | Record making a decision about an application |
|  | Update the status of an application |

Academic Staff

|  |  |
| --- | --- |
| # | pathway |
|  | Look up, add to, and delete from own current research areas |
|  | Search for all applications in certain research areas that have been added since a certain time |
|  | Flag interest in an application |

RHD Co-ordination Staff

|  |  |
| --- | --- |
| # | pathway |
|  | Who edited the Applicant/Application last |
|  | Retrieve all ongoing applications |

# Check integrity constraints (Sam)

The following type of integrity constraints have been added to the logical model to protect the database from becoming incomplete, inaccurate, or inconsistent.

## Required data

The not null attributes identified in section 3 of the conceptual Documentation have been specified in the diagram. Since by default attributes in VP UML are null-able the specific null-able attributes changed are:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Applicant** | | **Degree** | | **ResearchArea** | | |
| fName | 1.1 | name | 4.1 | FORCode | | 9.1 |
| sex | 1.4 | type | 4.2 | Description | | 9.2 |
| email | 1.15 |  |  | researchArea | | 9.3 |
| dateAdded | 1.20 |  |  | generalArea | | 9.4 |
| **Application** | |  |  | **University Staff Member** | | |
| dateAdded | 2.3 |  |  | staffID | | 12.1 |
| dateLastChecked | 2.4 | **Document** | | lName | | 12.3 |
| dateLastModified | 2.5 | Title | 5.1 |  | |  |
| awardType | 2.7 | uploadLink | 5.3 | **Visa** | | |
| **Checklist** | | documentType | 5.4 | VisaStatus | | 13.3 |
| applicationStatus | 3.1 | documentStatus | 5.5 | **Correspondence** | | |
| addressConfirmed | 3.2 | **Publication** | | date | | 14.1 |
| degreeConfirmed | 3.3 | title | 7.1 | Summary/message | | 14.2 |
| visaConfirmed | 3.4 | publisher | 7.3 | corrMeth | | 14.4 |
| proposalConfirmed | 3.5 | issueDate | 7.5 | toStaff | 14.5 | |
| engProfConfirmed | 3.6 |  |  | **Decision** | | |
| hasResearchAreas | 3.7 |  |  | date | | 15.1 |
| hasPrimarySuper | 3.8 | **Referee** | | decType | 15.2 | |
| payMethConfirmed | 3.9 | name | 8.1 | **SuperviseAs** | | |
| refereesConfirmed | 3.10 | relation | 8.2 | primarySupervisor | | 16.1 |
|  |  | email | 8.4 |  | |  |
|  |  | Profession | 8.5 |  | |  |

Note that some of these attributes are moved to separate entities in the next section, in these cases the foreign key will be not null. Furthermore any attributes added to one of these entities will also be not null-able and unique.

## Attribute domain constraints

The attribute domains as identified in section 4 of the conceptual documentation have been added to the diagram in the form of the following new entities.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Entity Name** | **Aliases** | **Description** | **Occurrences (select multiplicities)** | **Entity #** |
| Application status | - | A list of application status and who manages the application | a set number of predefined status reusable by all Applications | 17 |
| Award Type | - | The Award sought by the Application | a set number of predefined Award types reusable by all Applications | 18 |
| Correspondence Method | - | How the applicant and staff member corresponded | set number of predefined correspondence methods reusable by all correspondences | 19 |
| Country | - | A list of possible countries the application can live in or be a citizen of. | A set number of predefined countries reusable by all applicants | 20 |
| Decision Type | Change Type | The types of decisions a RHD Staff Member can make about an Application | A set number of predefined decisions types reusable by all decisions | 21 |
| Document status | - | Official and translation status of a document associated to an Applicant | a set number of predefined documents status reusable by all Documents | 22 |
| Document Type | - | The type of document | a set number of predefined document types reusable by all Documents | 23 |
| Payment Method | - | The proposed method of payment for the RHD | a set number of predefined payment methods reusable by all Applications | 24 |
| Study Load and Location | - | The proposed study load for the RHD and the location of the RHD | a set number of predefined study loads and locations reusable by all Applications | 25 |
| Visa status | - | The applicants visa status | a set number of predefined visa status reusable by all Visas | 26 |

Attributes were added to each entity such that,

* Status entities have a status and a description attribute,
* Type entities have a type and a description attribute,
* Method entities have a method attribute and
* The Country entity has a name attribute while Study Load and Location has a LoadLocation attribute.

## Multiplicity

The multiplicities identified in section 2 of the conceptual documentation have been added to the diagram. The additional multiplicities for the attribute domain entities identified in section 4.2 have identified in the following table and added to the diagram.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Entity Name 1** | **multiplicity** | **Relationship Name** | **multiplicity** | **Entity Name 2** | **Rel#** |
| **Applicant** | 0..\* | Lives in | 0..1 | Country | **1.6** |
| 0..\* | Nationality of | 0..1 | Country | **1.7** |
| **Application** | 0..\* | Seeks | 0..1 | Award Type | **2.5** |
| 0..\* | will pay using | 0..1 | Payment Method | **2.6** |
| 0..\* | Study using | 0..1 | Study Load and Location | **2.7** |
| **Checklist** | 0..\* | Has a | 1 | Application status | **3.1** |
| **Correspondence** | 0..\* | Using | 1 | Correspondence Method | **14.1** |
| **Decision** | 0..\* | Has a | 1 | Decision Type | **15.1** |
| **Document** | 0..\* | Has a | 1 | Document status | **5.6** |
| 0..\* | of | 1 | Document Type | **5.7** |
| **Visa** | 0..\* | Has a | 1 | Visa Status | 13.1 |

## Entity integrity

The primary keys identified in section 5 of the conceptual documentation have been added to/updated in the diagram. The additional primary keys for the attribute domain entities identified in section 4.2 have been identified in the following table and added to the diagram

|  |  |  |  |
| --- | --- | --- | --- |
| **Entity Name** | **Primary Key** | **Alternative Key** | **Entity#** |
| Application status | appStatusID | status, description | 17 |
| Award Type | awardTypeID | award, description | 18 |
| Correspondence Method | corrMethID | method | 19 |
| Country | CountryISOCode | name | 20 |
| Decision Type | decTypeID | type | 21 |
| Document status | docStatID | status, description | 22 |
| Document Type | docTypeID | type, description | 23 |
| Payment Method | payMethID | method | 24 |
| Study Load and Location | loadLocID | loadLocation | 25 |
| Visa status | visaStatID | status | 26 |

## Referential integrity

The primary key of each child relation (called entity name 2) has been added to the parent relation (called entity name 1) in the form of a foreign key as specified by the entity relationship table in section 2 of the conceptual documentation and the entity relationship table in the above section 4.3.

It should be noted however that the attribute domain relations Identified in section 4.1 that replace null-able attributes will add their primary key as a null-able foreign keys in the parent relation. More specifically Award Type, Country, Payment Method and Study Load and Location can all be null in the applicant/applicant entities because they may not be known at the time of the initial input of the entry. Similarly anything that can be potentially backed by a document will have a null document ID foreign key.

## General constraints.

Currently there are no high level constraints that will affect the validity of the logical model. There are however pseudo constraints through the checklist whereby an application cannot have certain application statuses unless the corresponding checklist attributes are true.

# Review logical data model ()

The Logical data model will be reviewed with Paul, the head of the Research Higher Degree Office to ensure that I meets all their requirements and is a true (or as close to possible) representation of the data requirements as specified by the Research Higher Degree Office and the staff members who will use the database.

# Check for future growth ()

The initial setup for the database has been considered in the context of the minimal amount of information required to define an entry for any of the strong entitles Identified in section 1 of the conceptual documentation. This is primarily expressed through the choice of null-able attributes and null-able foreign keys that is foreign keys from 0.. relationships.

The entities, their relationships and the diagram itself have been considered from a growth perspective. That is, applicants will submit different applications, their details may change and this needs to be reflected in previous applications.

Deletions and updates …

# Develop Test Plan

# Section

## Subsection

### Subsubsection

Diagram improvements

* Add data types
* ID names

Make GPA decimal (1,2)

Only have one primary supervisor

Publication may need date or issue no# not null