

The Admissions Database at Degree4U Public University

IT 214 – Database Fundamentals, Section DL1

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Introduction

Degree4U is a large public university on the east coast of the United States. The Admissions Department is responsible for all admissions activities for US applicants. (There is a separate database and admissions process for international applicants.) Their official admissions season runs from September 1 (when their on-line application becomes active) through May 1 (deadline for all admitted applicants to notify the university of their intent to enroll).

The Admissions Database must keep track of all admissions-related activity throughout the admissions season. This includes maintaining data on applicants, counselors and applications. For applicants, identifying data such as name, address, phone and email must be maintained. For counselors, name, contact information, assigned region and assigned applicants must be maintained. Data on each application must include applicant ID, application number, application type (Freshman, Non-degree, etc.), and current application status. The database must keep a history of all admissions-related actions along with the date of the action for both the applicant (ex. application started, application submitted, etc.) and counselor (ex. application under review, decision made, etc.).

Data Types

This is a preliminary list of potential tables. Not all of these tables will be included in the design.

APPLICANT – This table would hold data about the Applicant (Name, Address, etc.)

APPLICATION – This table would hold data about the Application (Application Number, Date, Type of Admission, etc.)

COUNSELOR – This table would hold data about the Counselor (Name, Contact Information, Assigned Region etc.)

REGION – This table would hold data about the Region (Region ID, Region Name, etc.)

STATE – This table would hold data about the State (State ID, State Name, etc.)

HISTORY – This table will keep track of all activity on the application (Every action the applicant takes and every action the counselor takes along with the date).

MAJOR – This table would hold data about the applicants intended major (Major Code, Major Name, Department, etc.)

HIGH_SCHOOL – This table would hold data about the applicant's high school (High School Name, High School Code, Grading Scale, etc.)

ACTIVITIES – This table would hold data about the applicant's extracurricular activities (Name of Activity, Date of Activity, etc.)

TRAVEL – This table would hold data about the counselor's travel (Counselor ID, Date of Travel, Destination, etc.)

Operations

This is a preliminary list of potential operations. All of these operations may not be included in the final database. Also, additional operations may be identified and added.

ADD AN APPLICANT – Each time a new applicant enters the system, a new applicant instance must be created.

ADD AN APPLICATION - Each time an applicant creates a new application, a new application instance must be created.

UPDATE STATE TO REGION MAPPING – Whenever a state is allocated to a different region, this update must be made in the database.

UPDATE CURRENT APPLICANT ACTION IN APPLICATION - Each time an applicant performs a new action on an application, the applicant current status must be updated.

ADD APPLICANT ACTION TO HISTORY - Each time an applicant performs a new action on an application, the new action must be added to the HISTORY table.

UPDATE CURRENT COUNSELOR ACTION IN APPLICATION - Each time a counselor performs a new action on an application, the counselor current status must be updated.

ADD COUNSELOR ACTION TO HISTORY - Each time a counselor performs a new action on an application, the new action must be added to the HISTORY table.

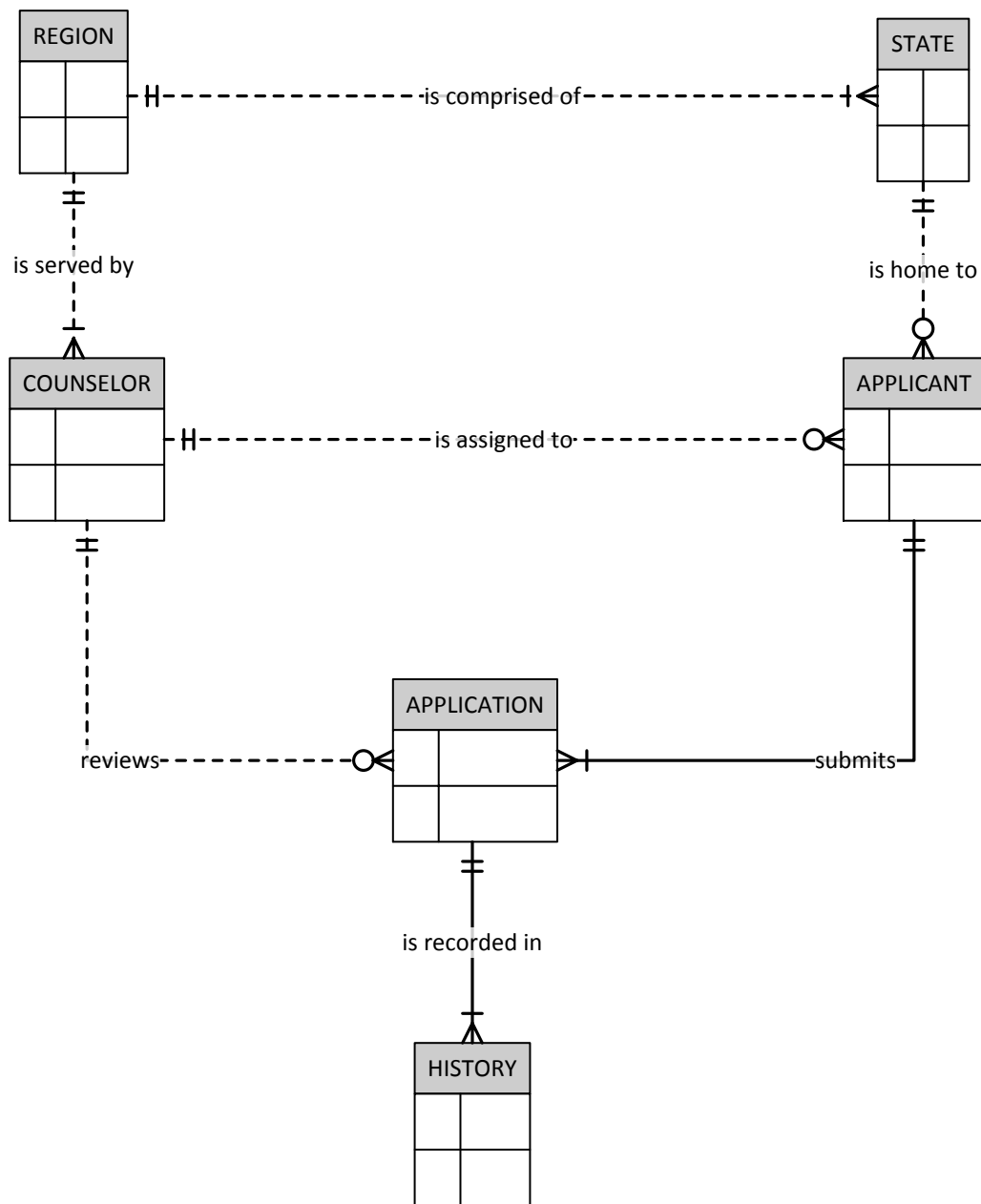
ADD A COUNSELOR - Each time a new counselor is hired, a new counselor instance must be created.

DISPLAY APPLICANTS ASSIGNED TO A COUNSELOR - The counselors will need the ability to see a list of applicants assigned to them.

DISPLAY COUNSELORS ASSIGNED TO A REGION – The admissions staff will need the ability to see a list of counselors assigned to each region.

DISPLAY APPLICANTS FROM A STATE– The admissions staff will need the ability to see a list of applicants from each state.

Preliminary Conceptual Diagram



Business Rules

- (1) This admissions database handles only US students. (There is a separate database and admissions process for international applicants.)*
- (2) For recruiting and admissions purposes, the United States is divided into regions.*
- (3) Each region is comprised of one or more states. Each state belongs to exactly one region.*
- (4) For each region we will keep Region ID and Region Name.*
- (5) For each state we will keep State Code, State Name, State Priority, and the Region to which the State belongs.*
- (6) One or more admissions counselors are assigned to each region. Each counselor is assigned to one region.*
- (7) For each counselor we will keep ID Number, Last Name, First Name, Phone, Email and the Region to which the counselor is assigned.*
- (8) For each applicant we will keep Last Name, First Name, Address (street, city, state, zip), Phone and Email.*
- (9) Each applicant lives in exactly one home state. Each state can be home to many applicants.*
- (10) Each applicant must record their home state. The home state is used to assign a region and admissions counselor to the applicant.*
- (11) Each applicant is assigned exactly one admissions counselor. Each counselor can work with up to 200 applicants over the course of one admissions cycle (from September through April).*
- (12) An applicant can submit a maximum of 3 applications for a term. Each application is associated with exactly one applicant.*
- (13) Each application will keep Applicant ID, Application Number, Date the Application was initiated, Current Status and Date of Applicant Action, Current Status and Date of Current Counselor Action.*
- (14) Each counselor is responsible for reviewing and making decisions on all applications submitted by his assigned applicants. Each application is reviewed and decided by exactly one counselor.*
- (15) The admissions department must keep a history of all admissions-related actions along with the date of the action for both the applicant (ex. application started, application submitted, etc.) and counselor (ex. application under review, decision made, etc.). Data items kept are: Applicant ID, Application Number, History ID, History Date, Historical Applicant Status, and Historical Counselor Status.*
- (16) Each history instance is associated with exactly one application. Each application can have many history instances.*

Entities Description

Entity: REGION

Description: A specific geographic area of the United States

Business Rules:

- (1) For recruiting and admissions purposes, the United States is divided into regions.
- (2) Each region is comprised of one or more states. Each state belongs to exactly one region.
- (3) For each region we will keep Region ID and Region Name.
- (4) One or more admissions counselors are assigned to each region. Each counselor is assigned to one region.
- (5) Each applicant must record their home state. The home state is used to assign a region and admissions counselor to the applicant.

Attributes:

Attribute Name	Required?	Data Type	Description
REG_ID	Required	Number	Unique number assigned to each region
REG_NAME	Required	Character	Region name

Simple primary key: REG_ID

Foreign keys: There are no foreign keys in this table.

Entity: STATE

Description: *The geographic state (in the United States)*

Business Rules:

- (1) Each region is comprised of one or more states. Each state belongs to exactly one region.*
- (2) For each state we will keep State Code, State Name, State Priority, and the Region to which the State belongs.*
- (3) Each applicant lives in exactly one home state. Each state can be home to many applicants.*
- (4) Each applicant must record their home state. The home state is used to assign a region and admissions counselor to the applicant.*

Attributes:

Attribute Name	Required?	Data Type	Description
ST_CODE	Required	Character	<i>Unique code assigned to each state</i>
ST_NAME		Character	<i>Name of state</i>
ST_PRIORITY		Character	<i>State priority (high, medium, or low)</i>
REG_ID	Required	Number	<i>Unique number assigned to the associated region</i>

Simple primary key: **ST_CODE**

Foreign keys: **REG_ID** is foreign key related to **REGION**

Entity: APPLICANT

Description: The prospective student who is applying to the university

Business Rules:

(1) For each applicant we will keep first name, last name, address (street, city, state, zip), phone and email.

(2) Each applicant lives in exactly one home state. Each state can be home to many applicants.

(3) Each applicant must record their home state. The home state is used to assign a region and admissions counselor to the applicant.

(4) Each applicant is assigned exactly one admissions counselor. Each counselor can work with up to 200 applicants over the course of one admissions cycle (from September through April).

(5) An applicant can submit a maximum of 3 applications for a term. Each application is associated with exactly one applicant.

(6) The admissions department must keep a history of all admissions-related actions along with the date of the action for both the applicant (ex. application started, application submitted, etc.) and counselor (ex. application under review, decision made, etc.). Data items kept are: Applicant ID, Application Number, History ID, History Date, Historical Applicant Status, and Historical Counselor Status.

Attributes:

Attribute Name	Required?	Data Type	Description
APLNT_ID	Required	Number	Unique number assigned to each applicant
APLNT_LNAME	Required	Character	Applicant last name
APLNT_FNAME	Required	Character	Applicant first name
APLNT_STREET	Required	Character	Applicant street address
APLNT_CITY	Required	Character	Applicant city address
APLNT_ZIP		Character	Applicant zip code
APLNT_PHONE		Character	Applicant phone number
APLNT_EMAIL	Required	Character	Applicant email
ST_CODE	Required	Character	State code
COUNS_ID		Number	ID of applicant's assigned counselor

Simple primary key: APLNT_ID

Foreign keys: ST_CODE is foreign key related to STATE

COUNS_ID is foreign key related to COUNSELOR

Entity: COUNSELOR

Description: The member of the admissions staff who advises applicants and reviews applications

Business Rules:

- (1) One or more admissions counselors are assigned to each region. Each counselor is assigned to one region.
- (2) For each counselor we will keep ID Number, Last Name, First Name, Phone, Email and the Region to which the counselor is assigned.
- (3) Each applicant must record their home state. The home state is used to assign a region and admissions counselor to the applicant.
- (4) Each applicant is assigned exactly one admissions counselor. Each counselor can work with up to 200 applicants over the course of one admissions cycle (from September through April).
- (5) Each counselor is responsible for reviewing and making decisions on all applications submitted by his assigned applicants. Each application is reviewed and decided by exactly one counselor.
- (6) The admissions department must keep a history of all admissions-related actions along with the date of the action for both the applicant (ex. application started, application submitted, etc.) and counselor (ex. application under review, decision made, etc.). Data items kept are: Applicant ID, Application Number, History ID, History Date, Historical Applicant Status, and Historical Counselor Status.

Attributes:

Attribute Name	Required?	Data Type	Description
COUNS_ID	Required	Number	Unique number assigned to each counselor
COUNS_LNAME	Required	Character	Counselor last name
COUNS_FNAME	Required	Character	Counselor first name
COUNS_PHONE	Required	Character	Counselor phone number
COUNS_EMAIL	Required	Character	Counselor email
REG_ID		Number	Unique number assigned to counselor's region

Simple primary key: COUNS_ID

Foreign keys: REG_ID is foreign key related to REGION

Entity: APPLICATION

Description: The university admissions application for United States students

Business Rules:

(1) This admissions database handles only US students. (There is a separate database and admissions process for international applicants.)

(2) Each applicant must record their home state. The home state is used to assign a region and admissions counselor to the applicant.

(3) An applicant can submit a maximum of 3 applications for a term. Each application is associated with exactly one applicant.

(4) Each application will keep Applicant ID, Application Number, Date the Application was initiated, Current Status and Date of Applicant Action, Current Status and Date of Current Counselor Action.

(5) Each counselor is responsible for reviewing and making decisions on all applications submitted by his assigned applicants. Each application is reviewed and decided by exactly one counselor.

(6) The admissions department must keep a history of all admissions-related actions along with the date of the action for both the applicant (ex. application started, application submitted, etc.) and counselor (ex. application under review, decision made, etc.). Data items kept are: Applicant ID, Application Number, History ID, History Date, Historical Applicant Status, and Historical Counselor Status.

Attributes:

Attribute Name	Required?	Data Type	Description
APLNT_ID	Required	Number	Unique number assigned to each applicant
APP_NUM	Required	Number	Unique number assigned to each application for an applicant
APP_DATE_INIT	Required	Date	Date applicant started application
APP_CURR_STAT_A	Required	Character	Current status of applicant's activity
APP_CURR_STAT_A_DATE	Required	Date	Date of current status of applicant's activity
APP_CURR_STAT_C		Character	Current status of counselor's activity
APP_CURR_STAT_C_DATE		Date	Date of current status of counselor's activity
COUNS_ID		Number	ID of applicant's assigned counselor

Composite primary key: APLNT_ID + APP_NUM

Foreign keys:

COUNS_ID is foreign key related to COUNSELOR

APLNT_ID is foreign key related to APPLICANT

Entity: HISTORY

Description: The history of all applicant and counselor activity on an application

Business Rules:

(1) The admissions department must keep a history of all admissions-related actions along with the date of the action for both the applicant (ex. application started, application submitted, etc.) and counselor (ex. application under review, decision made, etc.). Data items kept are: Applicant ID, Application Number, History ID, History Date, Historical Applicant Status, and Historical Counselor Status.

Attributes:

Attribute Name	Required?	Data Type	Description
APLNT_ID	Required	Number	Unique number assigned to each applicant
APP_NUM	Required	Number	Unique number assigned to each application for an applicant
HIST_REC_CNT	Required	Number	A counter of history records for each application
HIST_DATE	Required	Date	Date applicant started application
HIST_STAT_A	Required	Character	Current status of applicant's activity
HIST_STAT_C		Character	Current status of counselor's activity

Composite primary key: APLNT_ID + APP_NUM+HIST_REC_CNT

Foreign keys: APLNT_ID is foreign key related to APPLICATION

APP_NUM is foreign key related to APPLICATION

RELATIONSHIPS Description

RELATIONSHIP: REGION is comprised of STATE

Description: For each region, indicates which US states are contained in the region

Business Rules:

(1) Each region is comprised of one or more states. Each state belongs to exactly one region.

Type: This is a one-to-many relationship because one region can have many states, but a state can belong to only one region.

Cardinality: A region is comprised of 1 or more states (1,M). A state belongs to exactly one region (1,1).

Entities Participation:

REGION has mandatory participation because a STATE will always be assigned to one REGION.

STATE has mandatory participation because a REGION will always have at least one STATE.

Relationship Strength: The relationship is weak because the PK of STATE does not contain a component of the PK of REGION.

RELATIONSHIP: REGION is served by COUNSELOR

Description: For each region, indicates which counselors serve the region

Business Rules:

(1) One or more admissions counselors are assigned to each region. Each counselor is assigned to one region.

Type: This is a one-to-many relationship because one region can be served by many counselors, but a counselor can serve only one region.

Cardinality: A region is served by 1 or more counselors (1,M). A counselor serves 0 or 1 regions (0,1).

Entities Participation:

REGION has optional participation because a COUNSELOR might not always be assigned to a REGION (a new employee, for example).

COUNSELOR has mandatory participation because a REGION will always have at least one COUNSELOR assigned.

Relationship Strength: The relationship is weak because the PK of COUNSELOR does not contain a component of the PK of REGION.

RELATIONSHIP: STATE is home to APPLICANT

Description: For each state, indicates which applicants live in that home state

Business Rules:

(1) Each applicant lives in exactly one home state. Each state can be home to many applicants.

(2) Each applicant must record their home state. The home state is used to assign a region and admissions counselor to the applicant.

Type: This is a one-to-many relationship because one state can be home to many applicants, but each applicant can indicate only one home state.

Cardinality: A state is home to 0 or more applicants (0,M). An applicant lives in exactly one home state (1,1).

Entities Participation:

STATE has mandatory participation because an APPLICANT must indicate one STATE.

APPLICANT has optional participation because there can be a STATE with no applicants.

Relationship Strength: The relationship is weak because the PK of APPLICANT does not contain a component of the PK of STATE.

RELATIONSHIP: COUNSELOR is assigned to APPLICANT

Description: For each counselor, indicates which applicants are assigned to that counselor

Business Rules:

(1) Each applicant is assigned exactly one admissions counselor. Each counselor can work with up to 200 applicants over the course of one admissions cycle (from September through April).

Type: This is a one-to-many relationship because one counselor can be assigned to many applicants, but each applicant can have only one counselor.

Cardinality: An applicant has 0 or 1 counselors (0, 1). A counselor is assigned to 0 to 200 applicants (0,200).

Entities Participation:

COUNSELOR has optional participation because an APPLICANT will not initially have a COUNSELOR (until a COUNSELOR is assigned).

APPLICANT has optional participation because there can be a COUNSELOR with no applicants assigned (at the beginning of the recruitment season, for example).

Relationship Strength: The relationship is weak because the PK of APPLICANT does not contain a component of the PK of COUNSELOR.

RELATIONSHIP: COUNSELOR reviews APPLICATION

Description: For each counselor, this links to the applications that the counselor must review

Business Rules:

(1) Each counselor is responsible for reviewing and making decisions on all applications submitted by his assigned applicants. Each application is reviewed and decided by exactly one counselor.

Type: This is a one-to-many relationship because one counselor can review many applications, but each application will be reviewed by only one counselor.

Cardinality: An application is under review by 0 or 1 counselor (0,1). A counselor reviews 0 to many applications (0,M).

Entities Participation:

COUNSELOR has optional participation because an APPLICATION might not initially have a COUNSELOR (until a COUNSELOR is assigned to the APPLICANT).

APPLICATION has optional participation because there can be a COUNSELOR with no applicants (and consequently, no APPLICATION) assigned (at the beginning of the recruitment season, for example).

Relationship Strength: The relationship is weak because the PK of APPLICATION does not contain a component of the PK of COUNSELOR.

RELATIONSHIP: APPLICANT submits APPLICATION

Description: For each applicant, this links to the applications that the applicant submits

Business Rules:

(1) An applicant can submit a maximum of 3 applications for a term. Each application is associated with exactly one applicant.

Type: This is a one-to-many relationship because one applicant can submit many applications, but each application will be submitted by only one applicant.

Cardinality: An application is submitted by exactly 1 applicant (1, 1). An applicant can submit a maximum of 3 applications (1,3).

Entities Participation:

APPLICANT has mandatory participation because an APPLICATION must have an APPLICANT that submits the APPLICATION.

APPLICATION has mandatory participation because an APPLICANT cannot exist in the system without a least one APPLICATION.

Relationship Strength: The relationship is strong because the PK of APPLICATION contains a component of the PK of APPLICANT (PK=APLNT_ID).

RELATIONSHIP: APPLICATION is recorded in HISTORY

Description: For each application, the history of all applicant and counselor activity will be permanently recorded in the history entity

Business Rules:

(1) The admissions department must keep a history of all admissions-related actions along with the date of the action for both the applicant (ex. application started, application submitted, etc.) and counselor (ex. application under review, decision made, etc.). Data items kept are: Applicant ID, Application Number, History ID, History Date, Historical Applicant Status, and Historical Counselor Status.

(2) Each history instance is associated with exactly one application. Each application can have many history instances.

Type: This is a one-to-many relationship because each application can result in many actions and thus, many history instances, but each history instance will refer to only one application.

Cardinality: A history instance refers to exactly 1 application (1, 1). An application can record one or more history instances (1, M).

Entities Participation:

HISTORY has mandatory participation because an APPLICATION will always have a related HISTORY instance.

APPLICATION has mandatory participation because a HISTORY instance cannot exist in the system without an associated APPLICATION.

Relationship Strength: The relationship is strong because the PK of HISTORY contains a component of the PK of APPLICATION (PK=APLNT_ID + APP_NUM).

Crow's Foot Entity Relationship Diagram

