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CS-564

Project 2 - Phase 2

In Project 2 - Phase 1, we made the mistake of using a very incomplete and Conceptual Design Document to base our next part on. Within our EER diagram and the translation to the relational model, there were many discrepancies that could lead to a lack of integrity within the overall database. For Project 2 - Phase 2, we decided to implement the “Alternative CDD” by Andrew Barndt and Phillip Rieman that Dr. Abad-Mota provided for the students with a flawed CDD. The implementation of Project 2 - Phase 2 and the SQL scripts must have an updated relational model that the SQL-made database could be based on, therefore a new relational model was formed by our group based on the alternative CDD. Below you will be able to find our new relational model that we based our SQL scripts and model on.

Please view New Mexico Office of the Medical Investigator: Database Conceptual Design Document (CDD) by Andrew Barndt and Phillip Rieman for the full scope of the OMI database.

Along with this PDF, you will be able to find multiple SQL files. These files will be used to create the tables within the database, drop the tables, insert sample tuples, and test some simple queries out on our database to display integrity. All files should compile with no errors and successfully implement our relational model.

Relational Model

The conceptual schema described in the “Alternative CDD” for the OMI Database is mapped into the Relational Schema presented in this section. All the attributes underlined in the same Relation belong to the primary key. By default all the attributes that do not belong to the primary key may be null, unless explicitly specified that they cannot be null.

BONE: Bone_ID, Case_Number, DNA_Result, Measurement, Unit, Color, Integrity, DNA_Sent, Isotope_Sent, Sample_Type (Isotope_Result), Sample_Result (Isotope_Result)

HEAD: Bone_ID, Head_Features

SKULL: Bone_ID, Skull_Features

TEETH: Bone_ID, Teeth_Features

ARM: Bone_ID, Arm_Features

FOREARM: Bone_ID, Forearm_Features

HAND: Bone_ID, Hand_Features

UPPER ARM: Bone_ID, Upper_Arm_Features

LEG: Bone_ID, Leg_Features

CALF: Bone_ID, Calf_Features

FOOT: Bone_ID, Foot_Features

THIGH: Bone_ID, Thigh_Features

TORSO: Bone_ID, Torso_Features

PELVIS: Bone_ID, Pelvis_Features

RIBS: Bone_ID, Ribs_Features

SPINE: Bone_ID, Spine_Features

RECOVERED: Bone_ID, Part_Recovered

GENERIC: Bone_ID, Belongs_To_Adult

OMI_CASE: Case_Number, Date_Opened, Date_Found, Person_FName (Person_Name),
Person_MName (Person_Name), Person_LName (Person_Name) Person_DOB, Person_SSN,
Person_Feet (Person_Stature), Person_Inches (Person_Stature), Person_Sex, Person_Ancestry,
Person_Number (Person_Location), Street_Name (Person_Location), Zip_Code
(Person_Location), City (Person_Location), County (Person_Location), Environment, Indoors,
Outdoors, Identified, Resolved, Era, Clothes_Found, Body_Orientation, Overall_Decomposition

DAMAGE: Bone_ID, Severity

DECOMPOSITION: Rodent, Insect, Carnivore, Weathering

PATHOLOGY: Disease_Name, Chronic, Disease_Length

TRAUMA: Trauma_Type, Trauma_Time

IMAGE: Image_Name, Body_Area, Image_Type

METHODS: Method_Name, Method_Paper, Method_Measures

apply_to: Bone_ID, Method_Name, Method_Paper, Min_Age (Result), Max_Age,
Age_Confidence (Result), Sex_Estimation (Result), Sex_Confidence (Result), Min_Feet (Result),
Max_Feet (Result), Min_Inches (Result), Max_Inches (Result), Bioaffinity (Result),
Bioaffinity_Confidence (Result), Apply_Ancestry (Result)

Integrity Constraints

1. Case_Number within BONE is a foreign key to CASE.
2. Bone_ID in DAMAGE is a foreign key to BONE.
3. Case_Number in IMAGE is a foreign key to CASE.
4. Bone_ID and Method_Name & Method_Paper in APPLY_TO is a foreign key to BONE and METHODS.
5. Bone_ID in HEAD, ARM, TORSO, LEG, RECOVERED, GENERIC and DAMAGE is a foreign key to BONE
6. DOB must be older than all other dates in a case.

Integrity Constraints Given in “Alternative CDD”

1. Attributes with a domain of {"yes", "no"}:
 - a. BONE entity: DNA Sent, Isotope Sent
 - b. CASE entity: Indoors, Outdoors, Identified, Resolved
 - c. GENERIC entity: Belongs to Adult
 - d. PATHOLOGY entity: Chronic
2. Attributes with a domain of only numbers using 0-9:
 - a. BONE entity: Measurement Value
 - b. CASE entity: Case Number, Date Opened, Date Found, Person DOB, Person SSN, Person Stature Feet, Person Stature Inches, Location Number
 - c. PATHOLOGY entity: Disease Length
3. Attributes with a domain of any combination of letters A-Z and special characters:
 - a. BONE entity: Measurement Unit, Color
 - b. CASE entity: Person Name First, Person Name Middle, Person Name Last, Location City, Location County, Clothes Found, Body Orientation
 - c. DECOMPOSITION entity: Weathering
 - d. METHOD entity: Name
4. Attributes with a domain of both letters A-Z, special characters, and numbers 0-9:
 - a. BONE entity: DNA Result, Isotope Result Result
 - b. CASE entity: Location Street Name
 - c. IMAGE entity: Name, Body Area

- d. METHOD entity: Paper
 - e. PATHOLOGY entity: Name
5. Attributes with a domain of {1,2,3,4,5,6,7,8,9,10}, with 1 indicating little to no presence and 10 indicating very strong presence:
- a. BONE entity: Integrity
 - b. CASE entity: Overall Decomposition
 - c. DAMAGE entity: Severity
 - d. DECOMPOSITION: Rodent, Insect, Carnivore
6. Unique domains:
- a. BONE entity: Isotope Result Sample Type domain is {"Bulk Carbon/Nitrogen", "Strontium/Oxygen", "Radiocarbon", "Other"}
 - b. CASE entity:
 - i. Month attributes must be numbers between 1 and 12.
 - ii. Day attributes must be 1-31 if Month is 1, 3, 5, 7, 8, 10, or 12.
 - iii. Day attributes must be 1-29 if Month is 2.
 - iv. Day attributes must be 1-30 if Month is 4, 6, 9, or 11.
 - v. Year attributes must be no larger than 2022.
 - vi. Person Sex domain is {"Male", "Female"}.
 - vii. Person Ancestry domain is {"White", "Asian", "Hispanic", "African", "Native American"}.
 - ix. Location ZIP Code is all 5-digit numbers from 00000 to 99999.
 - x. Environment domain is {"Clandestine grave", "Surface Scatter", "Fire", "House fire", "Car", "Firepit", "Mass disaster", "Other"}.
 - xii. Era domain is {"Prehistoric", "Historic", "Modern"}.
 - c. IMAGE entity: Type domain is {"Physical", "JPG", "PNG", "PDF", "Other"}.
 - d. METHOD entity: Measures domain is {"Age", "Sex", "Ancestry", "Stature"}.
 - e. TRAUMA entity: Type domain is {"Blunt force", "Sharp force", "Projectile", "Other"}. Time domain is {"Antemortem", "Perimortem"}.
7. For the Result attribute in the apply relationship, the result is about one of four things: age, sex, stature, or ancestry.

- a. Age will consist of one result with three numerical components: Min Age, Max Age, and Confidence. All three must be a number using only 0-9.
- b. Sex will consist of one result with two components: Sex Estimation and Confidence. Sex Estimation has the domain {"Male", "Female"} and Confidence must be a number using only 0-9.
- c. Stature will consist of five numerical components: Min Ft, Min In, Max Ft, Max In, Confidence. All five must be a number using only 0-9.
- d. Ancestry will consist of one result with two components: Bioaffinity and Confidence. Bioaffinity has the domain {"White", "Asian", "Hispanic", "African", "Native American"} and Confidence must be a number using only 0-9.