

# Project One

## Electronic Medical Records Database

### Important Dates

- Due Date: October 7, 2019
- Cutoff Date: October 12, 2019
- Projects are submitted on or before the due date.
- No projects will be accepted after the cutoff date.
- 5 points will be deducted for each calendar day a project is submitted after the due date.

### Objective

- Create a database to manage patient medical records.
- Create a UML diagram
- Create searches and output using relational algebra

### Database Design

Your design must include at least the following:

- *Patient*
  - Definition: The patient has a medical condition that requires medical staff to diagnosis and perform treatments.
  - Attributes: Identify the patient name, address, age, gender, phone and email.
  - Rules: If a patient is a child, identify the parent.
- *Staff*
  - Definition: Staff perform the diagnosis and procedures during a patient visit.
  - Attributes: Identify the staff name and title.
  - Example: Nurse, nurse practitioner, physician assistant, doctor, technician, biller, etc.
- *Diagnosis*
  - Definition: Diagnosis is the identification of the patients disease, disorder or medical condition.
  - Rules: The diagnosis is performed by staff. A patient can have many diagnosis's identified during a visit.
  - Attributes: Identify the diagnosis name, diagnosis date and who performed the diagnosis.
  - Example: If the symptoms are a crooked finger and the patient is in pain, the diagnosis is a broken finger.
- *Procedures*
  - Definition: Procedures performed by staff assist in the diagnosis or is necessary for the treatment.
  - Rules: Procedures are performed by staff. Patients can have many procedures during a visit.
  - Attributes: Identify the procedure name, procedure date, who performed the procedure and procedure cost.
  - Example: Staff performed several procedures for the patient during a visit on Monday including an x-ray, immobilizing the finger with a cast and prescribing medication for the pain.
- *Visits*
  - Definition: A visit is a meeting between the staff and patient to determine a diagnosis or perform a procedures.
  - Attributes: Identify the patient, date of visit and staff.
  - Rule: A patient can have many visits.

- Allergies
  - Definition: Needs to be tracked to insure allergies don't interfere with treatment and assist with a diagnosis.
  - Rules: Allergies are diagnosed by staff. A patient can have many allergies.
  - Example: A patient can have an allergy to a pain medication used in a procedure.

Identify and create the following in your database design:

- A UML diagram will include all attributes types including single value, multi value, composite and derived.
- Relations
- Degree
- Primary and foreign keys
- Domains
- Relationship between entities
- Relationship type
- Attributes
- Cardinality
- Tuples
- Convert the UML diagram to relations in the format of: relation(attribute1, attribute2, attribute3). For instance, book(ISBN, title, author, price).
- Identify all primary and foreign keys in the UML and relations.

You must include at least eight relations and at least two attributes for each relation.

Include at least three multi-value attributes in your design.

### Formatting

- Your project must be typed.
- The UML design must include the same attribute names as your relational algebra.
- Your project must include the question and relational algebra operations to answer the question
- Use appropriate terminology.
- UML designs must be illustrated using software such as Microsoft Word, Microsoft Visio, LucidChart or another application.
- All pages of your output must include your name, class, date and project number in the header of each page.
- The first page of your project must include your name, the last four digits of your student id, class, the submission date and the project number.

## Relational Algebra

- Generate relational algebra to answer the queries below.
  - Use standard notation and replace the underlined terms with your own values and maintain the intent of the search. For instance: replace three months with another date range.
  - Create descriptive attribute labels.
1. Identify procedures performed for patient Thomas Brady's visit this month. Display the patient name, procedure name, date of procedure and procedure cost.
  2. Identify patients that have never received the measles immunization. Display the patient name age, date of birth and address.
  3. Identify the procedures performed by a Physicians Assistant last month. Display the procedure name, procedure date and patient name.
  4. Identify patients with an abnormal white cell count today. Display the patient name, procedure name and procedure result.
  5. Identify patients who were diagnosed with cancer in the last year and are being treated with chemotherapy. Display the patient name and treatment.
  6. Identify staff who have not performed any procedures in the last month. Display the staff name.
  7. Identify patients who have not visited with medical staff in the last 5 years. Display the patient name and email.
  8. Identify the number of procedures performed in the last year. Display two columns: procedure name and number of procedures. Display one row for each distinct procedure name. Use an aggregate function and grouping operation to answer this question.
  9. Identify the number of patients who had procedures in the last 5 years. Display three columns: patient name, number of procedures and total cost. Display one row for each distinct patient name. Use an aggregate function and grouping operation to answer this question.
  10. Identify the revenue generated by each procedure in the last year. Display three columns: procedure name, number of procedures and total cost. Display one row for each distinct patient name. Use an aggregate function and grouping operation to answer this question.

### Submission

- Review the grading rubric on Blackboard to identify how the project will be evaluated and graded.
- Projects are due on the due date. No projects will be accepted after the cutoff date. Five points will be deducted for each calendar day, including weekends a project is submitted after the due date.
- An electronic copy of your project will be submitted to Blackboard on or before the due date. The file name uploaded to Blackboard will be in the format: [last name] [first name] Project1.docx. For example, *Smith Sally Project1.docx*
- Submit one MS Word file. Don't submit separate files for the UML, relational algebra and questions.
- No projects will be accepted if sent to my email, left in my office mailbox or delivered to any other member of the department.
- If you submit multiple projects, the last submitted project will be graded. A project submitted before the due date and re-submitted after the due date is late.
- Unless you receive prior approval, projects submitted after the due date will be considered late.
- Projects not in compliance with the submission requirements will be rejected and not graded.

### Academic Integrity

Projects and examinations must represent your own work. Group projects and exams are not permitted. Although you are encouraged to ask other students for information, you should neither copy another student's project nor permit another student to see your work. You can be asked to perform specific procedures and operations in the presence of the instructor. A student who submits a project that is too similar to another student's work will receive a ZERO for the project. Additional penalties may be imposed. Students found guilty of any form of academic dishonesty such as plagiarism or cheating on an exam or computer project are subject to discipline, including, but not limited to, failure in the course and suspension or dismissal from the College. You are required to comply with the [CUNY Policy on Academic Integrity](#).