"Student Assessment System with Item Analysis"

A PROJECT PROPOSAL FOR IT13

PROFESSIONAL TRACK FOR IT 4

SUBMITTED TO:

MR. XIAN RHEL S. CADIOGAN

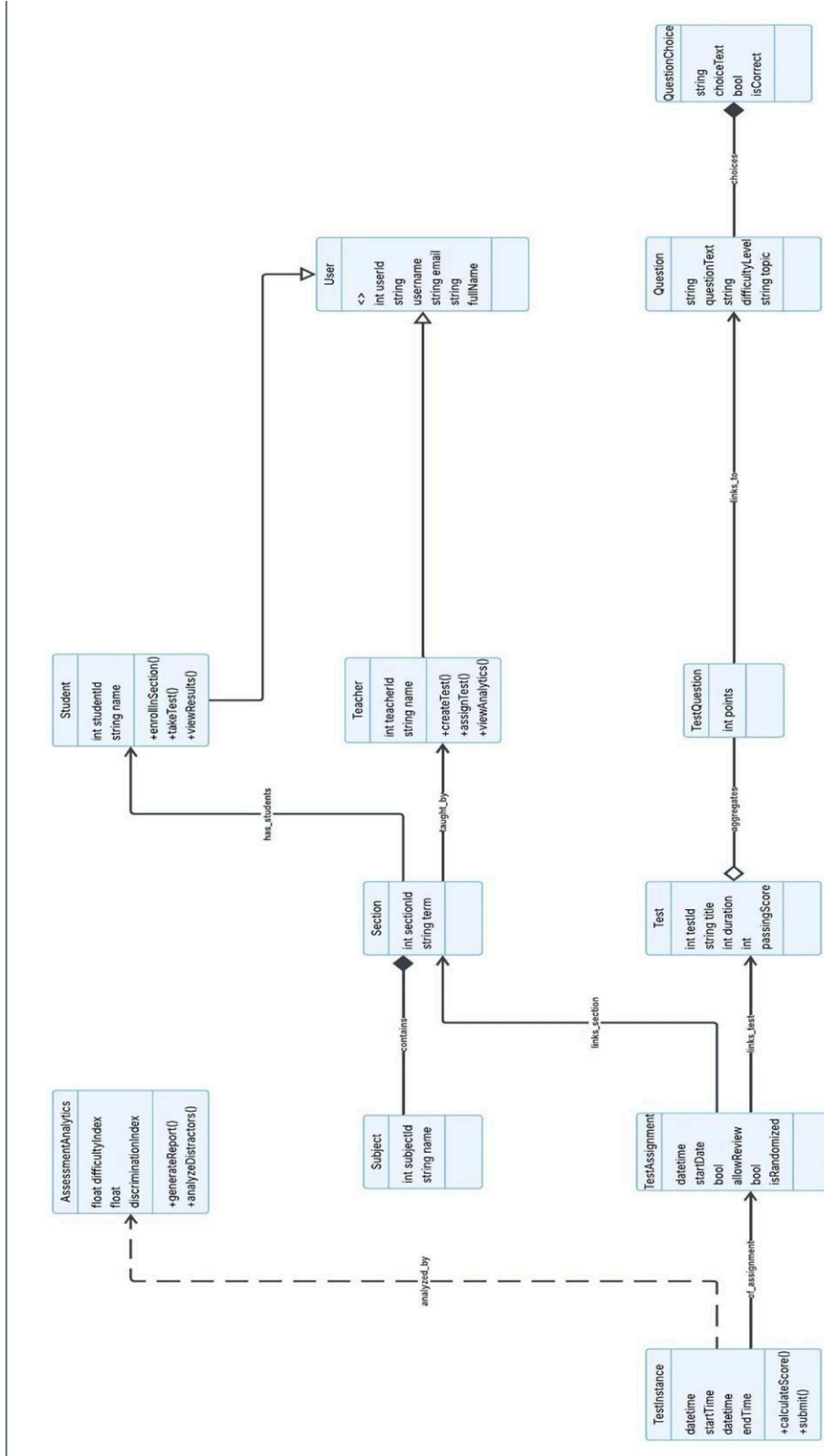SUBMITTED BY:

Flores, Hannah Lee E.
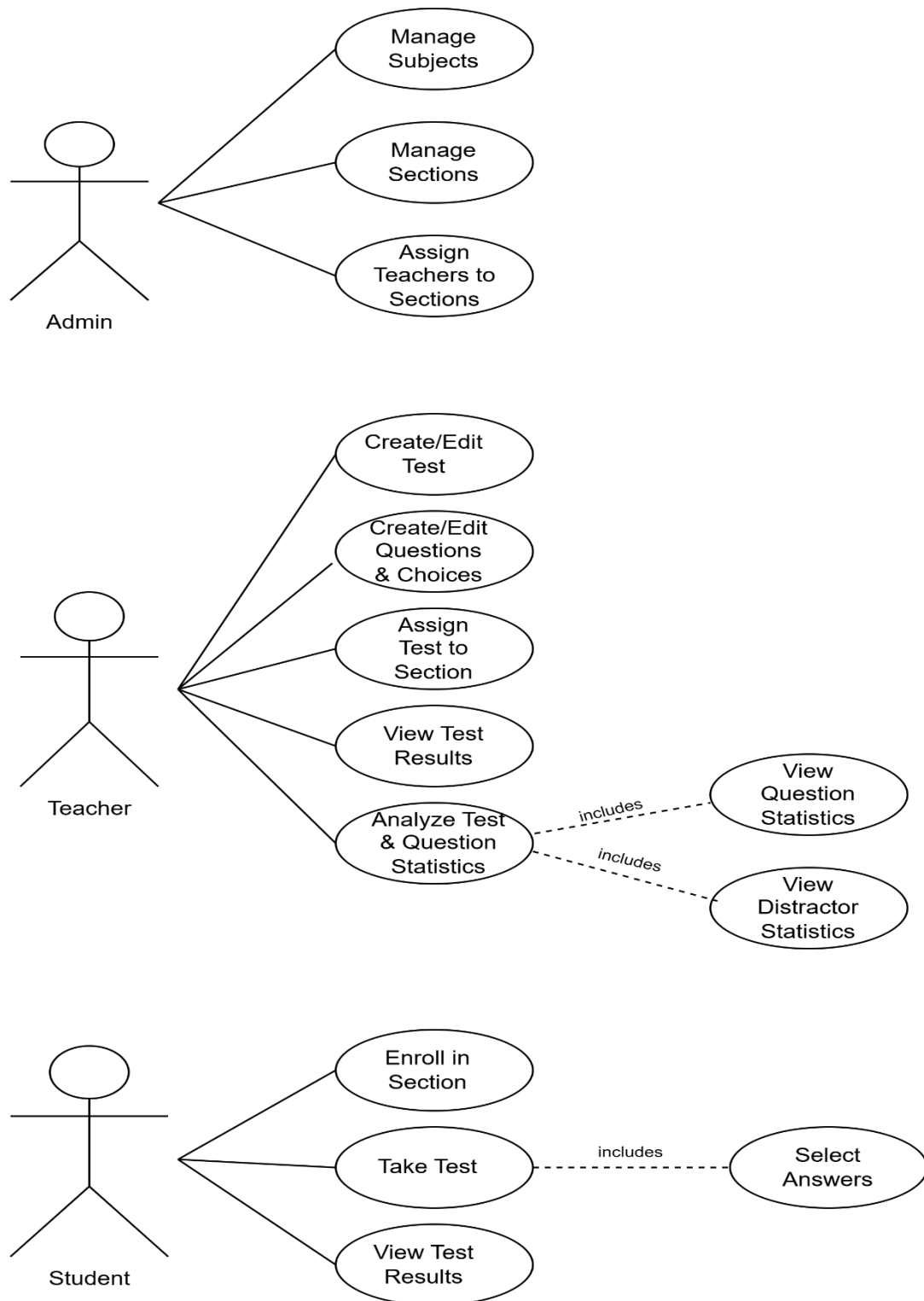
Lamoste, Nicole Anne

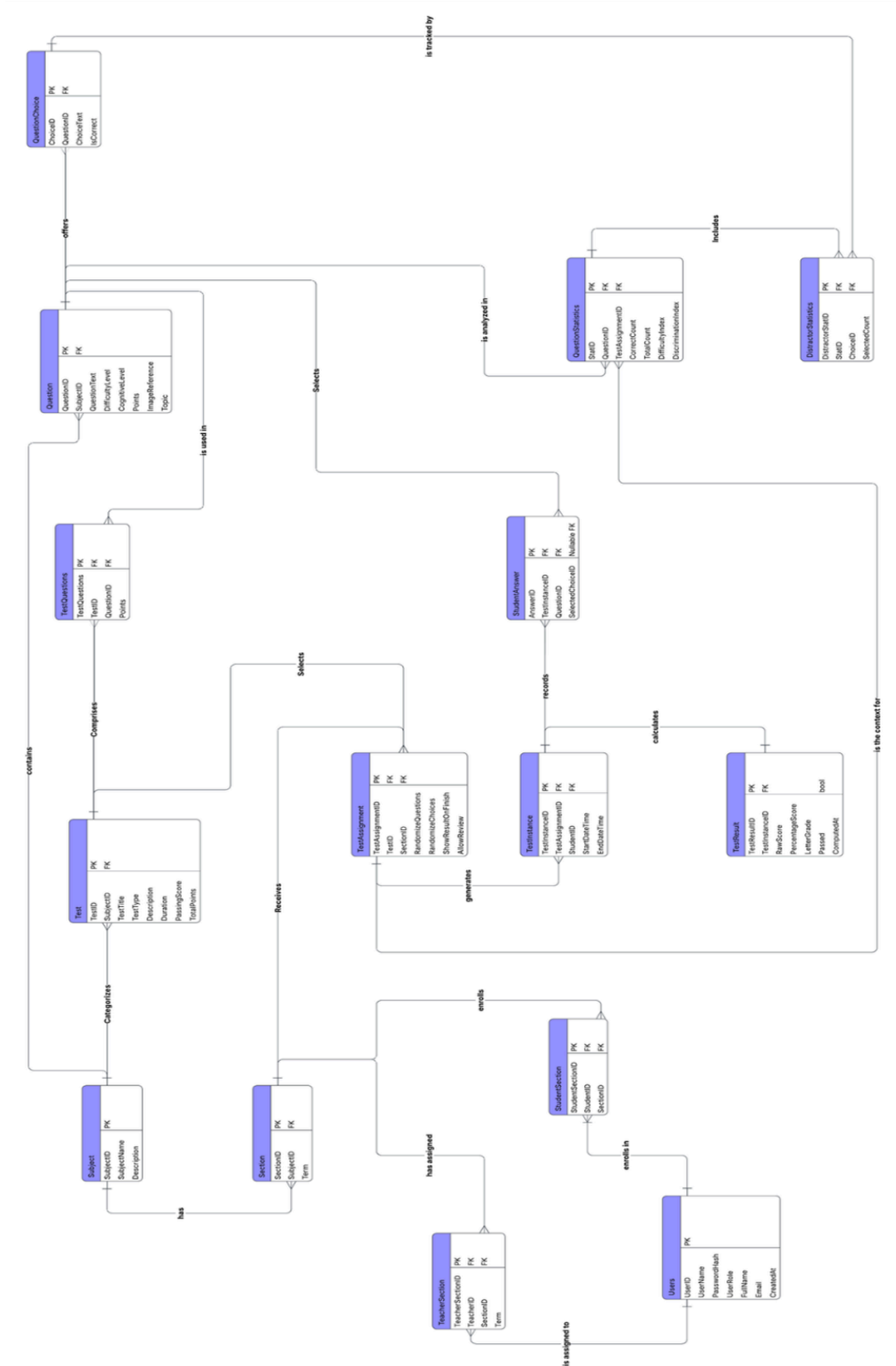Villena, Lexi C.

DECEMBER 2025

UML DIAGRAMS

Class Diagram

QuestionChoice
string choiceText
bool isCorrect

Question
string questionText
string difficultyLevel
string topic

User
<>
int userId
string username
string email
string fullName

Student
int studentId
string name
+enrollInSection()
+takeTest()
+viewResults()

Teacher
int teacherId
string name
+createTest()
+assignTest()
+viewAnalytics()

TestQuestion
int points

Section
int sectionId
string term

Test
int testId
string title
int duration
int passingScore

AssessmentAnalytics
float difficultyIndex
float discriminationIndex
+generateReport()
+analyzeDistractors()

Subject
int subjectId
string name

TestAssignment
datetime startDate
bool allowReview
bool isRandomized

TestInstance
datetime startTime
datetime endTime
+calculateScore()
+submit()

choices
links_to
has_students
taught_by
aggregates
contains
links_section
links_test
analyzed_by
of_assignment

Case Diagram

Admin
- Manage Subjects
- Manage Sections
- Assign Teachers to Sections

Teacher
- Create/Edit Test
- Create/Edit Questions & Choices
- Assign Test to Section
- View Test Results
- Analyze Test & Question Statistics
  - *includes* → View Question Statistics
  - *includes* → View Distractor Statistics

Student
- Enroll in Section
- Take Test
  - *includes* → Select Answers
- View Test Results

Entity Relationship Diagram

Project Description

      The Student Assessment System with Item Analysis is a comprehensive Windows Desktop Application developed using C# .NET Framework WinForms that aims to modernize or update and improve the way educational institutions conduct, evaluate, and analyze student assessments. The system is designed to support the departmental test assessments by providing some centralized platform where the administrators, teachers, and students can interact securely based on their assigned roles. The system enables the creation, administration, and automatic scoring of digital assessments while maintaining the accurate records of the student performance and academic data through a structured database system. A major strength of the project scope in its item analysis and statistical evaluation capabilities, which are grounded in Classical Test Theory. The system computes key indicators such as the Difficulty Index and supports detailed analysis reports that help the educators evaluate the test quality and item validity. By identifying the easy, moderate, difficult, and problematic items, the system assists teachers in refining the test questions, improving the instructional strategies, and ensuring that it has fair and reliable assessments. Performance analytics additionally provide some insights into individual and class-level achievements, highlighting the strengths, weaknesses, and students who may need academic intervention. From a software engineering perspective, the project emphasizes the application of Object-Oriented Programming (OOP) concepts, SOLID principles, and proper software architecture and design patterns. It also includes well-defined class structures, modular manager components, and optional analysis classes to ensure the scalability, maintainability, and reusability of code. The system demonstrates the professional development

practices through GitHub version control, comprehensive documentation (UML diagrams, ERD, and project reports), and a user-friendly interface tailored for educational use. Overall, this system or project serves as both a functional academic assessment tool and a showcase of robust software design and implementation skills.