ASSIGNMENT 3

Due Date: November 26th by 11:59 PM

Individual work only – AI use is not permitted.

BACKGROUND

You are building a management system for Ottawa Metropolitan University (OMU), a Canadian public university with multiple faculties and both in-person and online programs. Your teammate has gathered the information below about OMU. Read the information carefully.

PROGRAMS AND COURSES

OMU offers degree programs delivered in person (on campus) and online (e.g., remote micro-credentials, certificates, etc.).

A student may be enrolled in multiple online programs (e.g., concurrent micro-credentials) but only one in-person degree program at a time. Students can be enrolled in both an in-person degree program and one or more online programs simultaneously.

Each program has a list of courses that students must complete. However, a course may be offered in multiple programs. Each course has a professor. Some courses have one or more teaching assistants, while others have none.

STUDENTS, PROFESSORS, AND ACADEMIC COORDINATORS

Students use the system to register for courses and track their final grades for each course. Each student has one assigned professor who acts as their mentor. A professor can mentor multiple students.

Each program has an academic coordinator. However, due to staff shortages, one academic coordinator can administer multiple programs.

Professors, TAs, and academic coordinators work exclusively within a single faculty. A person can be both an employee (i.e., professor, TA, or academic coordinator) and a student simultaneously. However, an employee cannot hold multiple employee roles at the same time. For instance, a professor cannot also act as a TA or academic coordinator.

OMU is a highly competitive university. Therefore, when a student joins by enrolling in one or more of its programs, they are on probation. Once they pass their first five courses, they are considered in good standing. However, if they fail any of their first five courses, all their studies at OMU are terminated immediately. When a student completes the requirements of any program, even if they are still enrolled in another program, they are considered an alumnus. An alumnus who completes

the requirements of another program is considered a multiple-degree alumnus, which is regarded as a high honor at OMU.

FACULTIES AND UNIVERSITY

Each faculty has a dean. The dean is a professor who serves a five-year term as dean. Once their term expires, they retain the role of professor, and the deanship is passed on to another professor.

EXERCISES

EXERCISE 1 – 25 POINTS

Strictly based on the system's description above, develop four user stories written from the perspective of the **student**.

Use standard user-story formats: - As a ..., I want ... so that ... , or - As a ..., I want ... (only when the reason is obvious).

EXERCISE 2 – 50 POINTS

Using the provided details, develop a UML class diagram domain model. You may use any diagramming tool or submit a hand-drawn version if it's clear and legible.

Your model must include the following design patterns: - Player-Role pattern and Singleton pattern.

In addition to the ones specified in the description above, include logical instance attributes, such as:

- For students and employees: first name, last name, email, ID, and date of birth
- For employees: salary
- For programs: name and total number of credits
- For courses: course code (e.g., SEG 2105), title, credits.

EXERCISE 3 – 25 POINTS

Develop a UML state machine diagram that models the different states a student can be in during their academic journey at OMU University, including the transitions between those states and the events or conditions that trigger them. Assume that the object representing the student can receive the following events:

- FiveCoursesCompleted
- FailedCourse
- CompletedProgramRequirements

SUBMISSION INSTRUCTIONS

Submit a single PDF document containing the solution to all exercises on Brightspace.