Laboratory 6

Attendance/Demo
To receive credit for this lab, you must make reasonable progress towards completing the exercises. When you have finished the exercise, call your instructor or a TA, who will review your solution. For those who don't finish early, the TA will ask you to show whatever you have completed, starting at about 15 minutes before the end of the lab period. Finish any exercises that you don't complete on your own time.

You also need to submit your work to cuLearn.

Instructions
Individual work is required during this lab.
Using the class diagram below, define the following constraints using the OCL (recall to define the context of each expression).

Exercise 1
Specify the following in OCL (the context is class Student):
1. What is the collection of courses a student has taken in the Fall of 2013?
2. How many courses a student has taken in the Fall of 2013?
3. What is the total amount of credits the student took in the Fall of 2013?
4. In which years did the student take prerequisite courses for the courses taken in the Fall of 2013?
5. What is the grade a student received for course number 1234? You will assume the student has taken the course only once.

Exercise 2
Specify the following in OCL (the context is CourseOffering):
1. What would be the condition to check that the enrollment in a course offering is smaller than its capacity?
Specify the following class invariant for class Course:
2. A course cannot be offered more than once during a given term and year.

Exercise 3
Specify the class invariant of class Student in OCL:
1. A full time student has to register into strictly more than 2 courses (course offerings) each term.
2. A part time student can't register into more than 2 courses each term.
3. The courses a student has taken or is registered for must not be mutually exclusive courses.
4. The courses a student has taken or is registered for must satisfy the prerequisites.

Exercise 4
The following statements are part of the precondition and postcondition for operation registerCourse(c:Course) of class Student. Specify the precondition and postcondition in OCL:
1. The student has not taken course c before or the student has taken course c but failed.
2. The student has passed the pre-requisite course(s) for course c.
3. The student has to register into course c before the registration deadline.
4. Course c's enrolment limit has not been reached.
5. The student is registered into course c.
6. Course c's enrolment increased by 1.
7. The student is now part of the enrollment of the course.
Note: You will assume that there exists a class named Date (not shown in the class diagram) that has two operations: operation before(d:Date):Boolean returns true if and only if the Data instance on which it is called is

Carleton University
Department of Systems and Computer Engineering
SYSC-3120   **Software Requirements Engineering**   **Winter 2015**
Laboratory 6

before than (or the same as) the Data instance passed as a parameter in the calendar, and false otherwise; operation currentdate():Date returns the current date as a Date instance.

Exercise 5

Operation canGraduate() of class Student returns true if and only if the student can graduate, i.e., if and only if the total of the credits of the courses the student passed is equal or above the degree total of the student's degree.