

### Problem #1

UML changes:

1. In class Student, the currentCourse attribute has been rename to currentEnrolledCourses, and its type has been changed to Set to make it more clear that it is a collection of all the current enrolled courses.

OCL statements:

**Context** Student **inv**:

Self.currentEnrolledCourses->**size()** <= 5

### Problem #2

UML changes:

1. In class Program, added the new method called getRecord, which takes courseId and studentId as input arguments and returns the corresponding academic report.
2. In class Student, changed the type of academicReports from list to set which is a collection of courseIds for all the courses the student has taken.
3. In class Student, changed the return type of addCourse to be Boolean.
4. In class Student, added the new attribute program is the singleton class Program.
5. In class Student, added the new method called getRecord, which takes courseId as input and returns the academic report.
6. In class Student, added the new method called getCourseGrade which takes courseId as input and returns the course grade.
7. In calss Report, added the new method called getGrade which returns the course grade.
8. In class Course, added the new attribute prerequisites which is a set of course ids.

OCL statements:

**Context** Student::addCourse(courseId: String)

**pre**:

**exists**(id : Program.courses |  
    Id = courseId) **and**  
Self.academicRecords.contains(courseId) = False **and**  
toBeAddedCourse.isOffered = True **and**  
toBeAddedCourse.prerequisites->**iterate** (  
    p: prerequisites |  
        Self.academicRecords.contains(p) = True **and**  
        Self.getCourseGrade(p) = "A" **or**  
        Self.getCourseGrade(p) = "B" **or**  
        Self.getCourseGrade(p) = "C")

**post**:

**exists**(id: self.currentEnrolledCourses |  
    id = courseId)

### Problem #3

UML changes:

1. In class Course, added the new attribute courseSize which is the maximum number of students the course can accommodate.
2. In class Course, changed the name of currentStudents to currentEnrolledStudents to make it more clear.

OCL statements:

Context Student::addCourse(courseId: String)

**Pre:**

toBeAddedCourse.currentEnrolledStudents->**size()** <  
toBeAddedCourse.courseSize

**post:**

**exists**(id: self.currentEnrolledCourses |  
id = courseId)