# Use Case Modeling Example

### Source: Rational Software Corporation, Object Oriented Analysis and Design with C++, Instructor Manual, Product #4100-05479, V3.6

Reference: Course Registration Case Study, *A Rational Approach to Software Development,* http://www/rational.com/products/whitepapers/293.jsp

# Course Registration Example

### At the beginning of each semester students may request a course catalogue containing a list of course offerings for the semester. Information about each course, such as professor, department, and prerequisites will be included to help students make informed decisions.

### The new system will allow students to select four course offerings for the coming semester. In addition, each student will indicate two alternative choices in case the student cannot be assigned to a primary selection. Course offerings will have a maximum of ten students and a minimum of three students. A course offering with fewer than three students will be canceled. Once the registration process is completed for a student, the registration system sends information to the billing system so the student can be billed for the semester.

### Professors must be able to access the on-line system to indicate which courses they will be teaching. They will also need to see which students signed up for their course offerings.

### For each semester, there is a period of time that students can change their schedule. Students must be able to access the system during this time to add or drop courses.

# Use Case Diagram

Billing System

Request Course Roster

Register for Courses

Professor

Select Courses to Teach

Student

Maintain

Professor Info

Maintain Course Info

Maintain Student Info

Generate Catalogue

Registrar

# Brief Description -- Register for Courses Use Case

### 1.1 Brief Description

### This use case is initiated by a student. It provides the capability for the student to create, delete, modify and/or review a course schedule for a given semester.

# Flow of Events -- Register for Courses Use Case

## 2.1 Pre-conditions

## None

## 2.2 Main Flow

## This use case begins when the student enters the student id number. The system verifies that the student id number is valid (E-1) and prompts the student to select the current semester or a future semester (E-2). The student enters the desired semester. The system prompts the student to select the desired activity: CREATE, REVIEW, MODIFY, PRINT, DELETE, or QUIT.

## If the activity selected is

## CREATE, the A-1: Create a New Schedule subflow is performed.

## REVIEW, the A-2: Review a Schedule subflow is performed.

## MODIFY, the A-3: Modify a Schedule subflow is performed.

## PRINT, the A-4: Print a Schedule subflow is performed .

## DELETE, the A-5: Delete a Schedule subflow is performed.

## QUIT, the use case ends.

## 2.3 Subflows

## A-1: Create a New Schedule

## The system displays a blank schedule screen. The student enters 4 primary course offering numbers and 2 alternate course offering numbers (E-3). The student then submits the request for courses. For each primary course selected the system will check that prerequisites are satisfied (E-4) and add the student to the course offering if the course offering is open (E-5). The system prints the student schedule (E-6) and sends billing information to the billing system for processing (E-7). The use case then begins again.

## A-2: Review a Schedule

## The system retrieves (E-8) displays the following information for all all course offerings for which the student is registered: course name, course number, course offering number, days of the week, time, location, and number of credit hours. When the user indicates that s/he’s through reviewing, the use case begins again.

## A-3: Modify a Schedule

## The system checks that the final date for changes has not been exceeded (E-9). The system retrieves (E-8) and displays the following information for all all course offerings for which the student is registered: course name, course number, course offering number, days of the week, time, location, and number of credit hours. The system prompts the user to select the desired activity: DELETE A COURSE OFFERING, ADD A COURSE OFFERING, or QUIT.

## If the activity selected is

## DELETE A COURSE OFFERING, the A-6: Delete a Course Offering subflow is performed.

## ADD A COURSE OFFERING, the A-7: Add a Course Offering subflow is performed.

## QUIT, the system prints the student schedule (E-6) and the use case then begins again.

## A-4: Print a Schedule

## The system prints the student schedule (E-6). The use case begins again.

## A-5: Delete a Schedule

## The system retrieves (E-8) and displays current schedule information. The system asks to user to confirm the delete of the schedule. If accepted, the schedule is removed from the system. If the delete is not confirmed, the operation is canceled and the use case begins again.

## A-6: Delete a Course Offering

## The student enters the number of the offering to delete. The system asks to user to confirm the delete of the course offering. If accepted, the course offering is removed from the student schedule. If the delete is not confirmed, the operation is canceled and the use case alternate flow begins again.

## 

## A-7: Add a Course Offering

## The student enters the course offering to add. The system will check that prerequisites are satisfied (E-4) and add the student to the course offering if the course offering is open (E-5). The use case alternate flow begins again.

## Exception Flows

## E-1: An invalid student id number is entered. The user can re-enter a student id number or terminate the use case.

## E-2: An invalid semester is entered. The user can re-enter the semester or terminate the use case.

## E-3: The entered course offering number is not valid (format). The user can re-enter a valid number or terminate the use case.

## E-4: The user has not satisfied all pre-requisite requirements. The user is informed that a course can not be scheduled and why. If possible, an alternate course is substituted. The use case continues.

## E-5: The user is informed that a selected course offering is closed. If possible, an alternate course is substituted. The use case continues.

## E-6: The schedule cannot be printed. The information is saved and the user is informed that a print schedule request must be re-submitted. The use case continues.

## E-7: The system will save all billing information and re-submit it to the billing system at a later date. The use case continues

## E-8: The system cannot retrieve schedule information. The use can then starts at the beginning.

## E-9: The system informs the user that a schedule cannot be modified. The use case then starts at the beginning.

## 

# One Scenario for the “Register for Courses” Use Case

## John enters the student ID number 369 52 3449 and the system validates the number. The system asks which semester. John indicates the current semester and chooses create a new schedule.

## From a list of available courses, John selects the primary courses English 101, Geology 110, World History 200, and College Algebra 110. He then selects the alternate courses Music Theory 110 and Introduction to Java Programming 180.

## The system determines that John has all the necessary prerequisites and adds him to the course rosters.

## The system indicates that the activity is complete. The system prints the student schedule and sends billing information for four courses to the billing system for processing.

# Secondary Scenarios

### Some secondary scenarios to consider are:

#### Student does not select 4 primary courses

#### Primary course is not available

#### Primary and secondary courses are not available

#### Cannot add student to the course roster

#### Cannot create the student schedule

# How Many Scenarios Are Needed?

### Simple answer: as many as one needs to understand the system being developed

### Rule of thumb:

#### Primary scenarios

##### Elaborate approximately 80% of these scenarios

#### Secondary scenarios

##### Elaborate a few of the interesting and high-risk secondary scenarios