

Clayton School of Information Technology
CSE4213 Assignment 1
Student Enrolment: Basic Specification

Due Date: 12noon, 04 Apr 2007

This assignment is about building a simple specification of students enrolling in units.

Within a given semester, there is a set of students who are enrolled in some set of units (there may be other students who are **not** enrolled in any unit during the semester), and each unit offered during that semester has some set of students enrolled in it (there may be some units **not** offered in this particular semester). It is important to note that the sets described here may be all different.

In a given semester, various units are offered, and enrolled students must chose units from those offered, and enrol in those units in order to continue their course. This exercise is about defining a formal specification of the enrolment relation between students and units.

Every (enrolled) student is enrolled in 1 or more units; every unit has 0 or more enrolled students. Assume that enrolled students are drawn from a universal set of STUDENTS, and that offered units are drawn from a universal set of UNITS.

Using the BTools package, define an abstract machine called *Enrol1* to specify these relationships (as part of some larger software system).

You must define data structures and their associated variables that model *enrolled* (the set of enrolled students), *offered* (the set of offered units), and *enrolment*, a set that defines which enrolled students are enrolled in which offered units. Your specification must have three operations:

newEnrolment(student, unit) which makes *student* enrolled in *unit*;

units \leftarrow *StudentEnrolment(student)* which returns the set of *units* in which *student* is enrolled;
and

class \leftarrow *ClassList(unit)* which returns a set of students enrolled in a particular *unit*.

1. Code up your specification, using the ASCII form, and use the B Toolkit to analyse it. Submit for assessment a publication format listing.

(10 marks)

2. Generate the proof obligations, and submit the publication form of the proofs that show the discharge of all proof obligations.

(5 marks)

3. Animate your solution, and run the two scripts following. (Before you run test2, make sure you turn on the “display invariant” flag.)

```
Enrol1.test1.anm
Enrol1.test2.anm
```

These scripts can be found in the directory:

<http://www.csse.monash.edu.au/~ajh/teaching/cse4213/2007/assessment/assignment1/>

Print the resultant outputs and include them in your submission.

(5 marks)