

# Report for COM2008/COM3008: Creation and Use of a University System

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## 1 Introduction

Our customer has asked us to provide a system to organise and administer their university students and courses. They have a small number of departments, each offering a limited number of degrees. A department will offer a number of degrees, and some are interdisciplinary, available to two or more departments, but have one lead department.

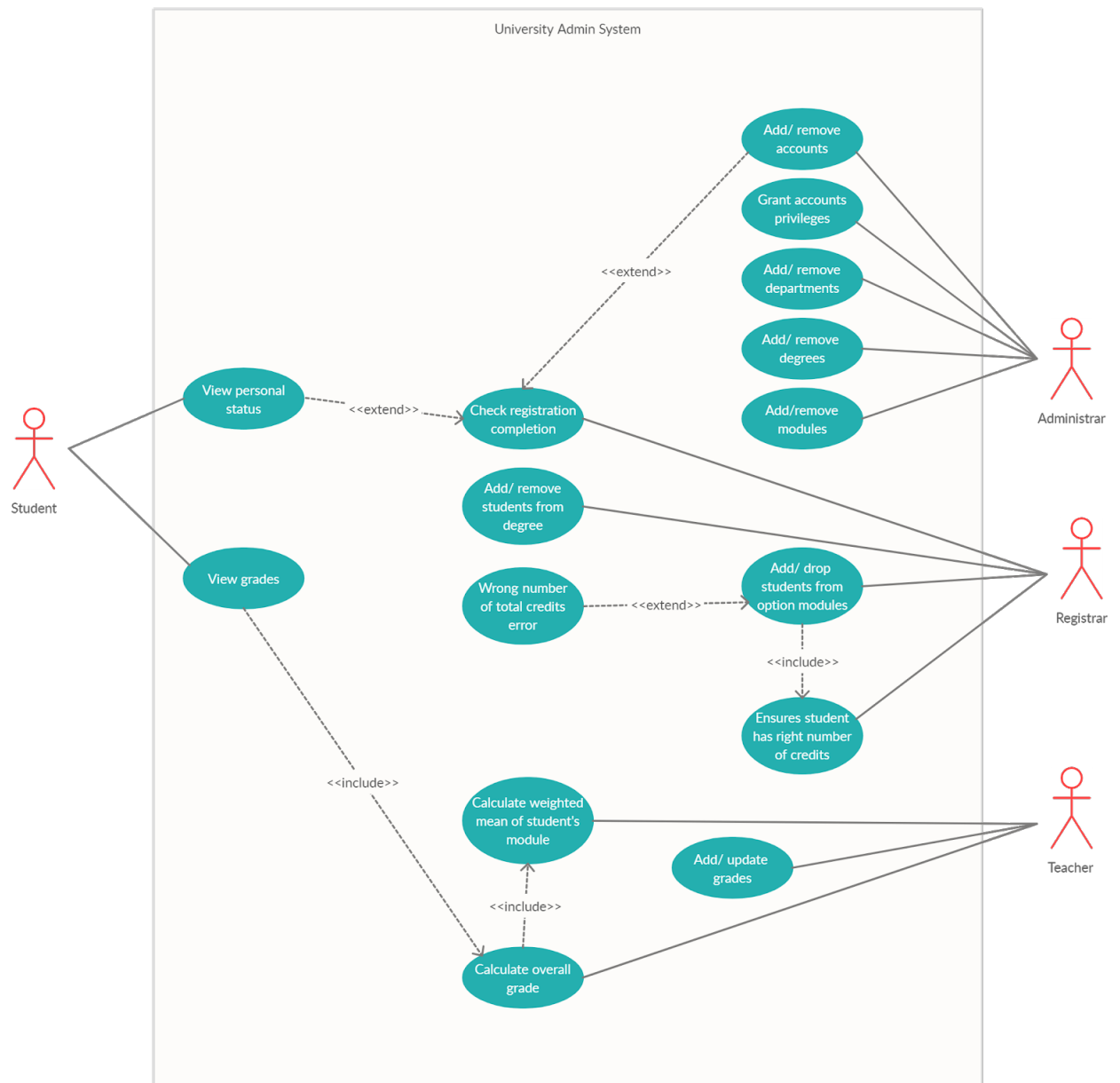
Each department has a full name and an abbreviated code consisting of three letters. Each degree has a full title and an abbreviated code, with the relevant department code as a prefix. A degree may be undergraduate or postgraduate and may or may not have a year in industry. A degree is divided into modules which can be core to the degree. Each module can be taught by a teacher. If the student passes the year and what classification they achieve depends on pre-existing conditions noted in the assignment brief such as current level in the degree and degree type.

## 2 Stakeholders

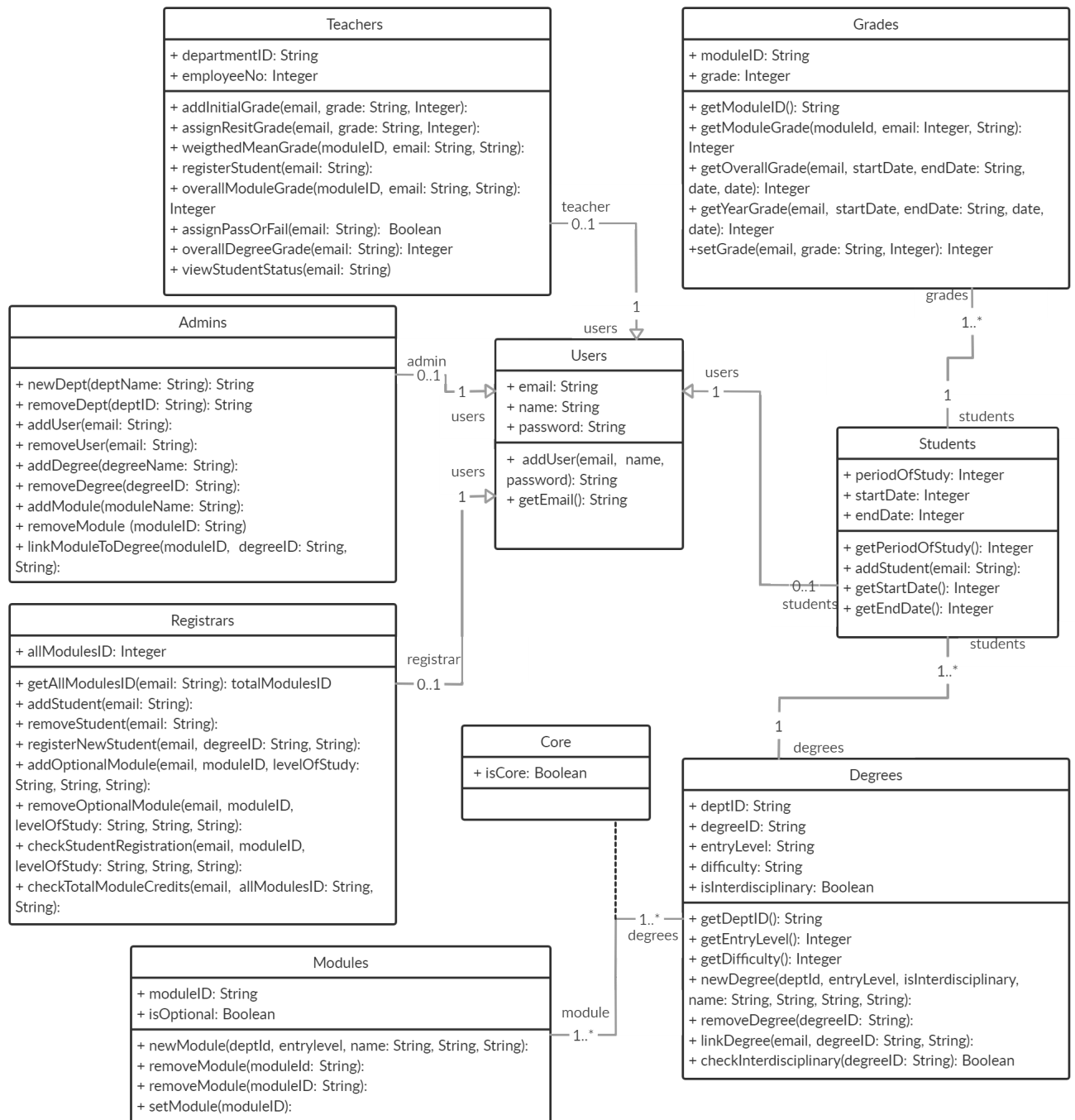
The stakeholders in the project are the university itself, and the users of the software itself, including administrators, registrars, teachers and students. All have different expectations and needs for the system.

The university would like some software to streamline its information database of current students and courses. The software should be useful to its current employees and make interactions with the information system as easy and smooth as possible.

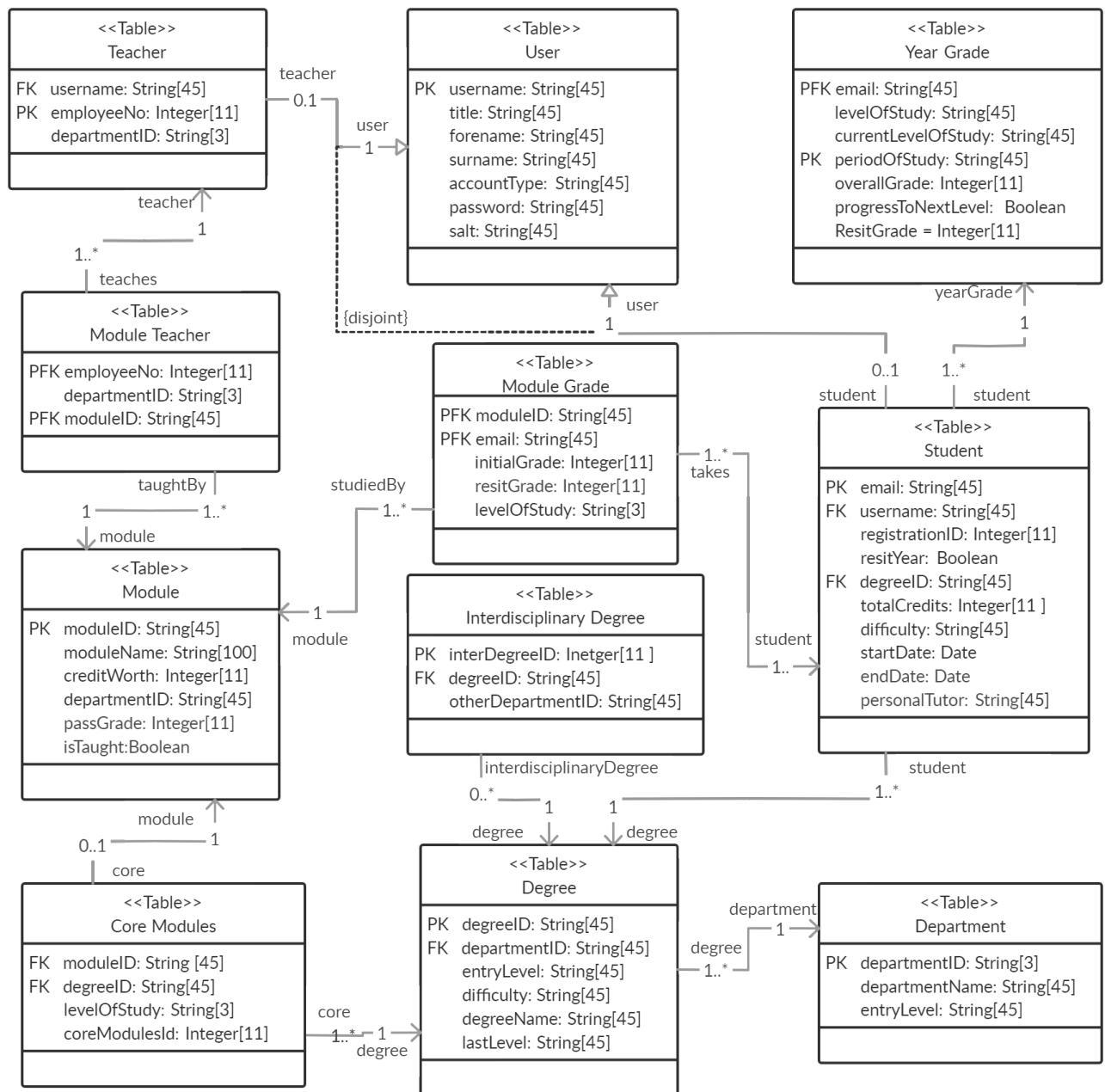
### 3 Use Cases



## 4 UML Class Diagram



## 5 UML Database



## 6 Best Aspects

### 6.1 Add Modules to Teacher Quickly

Assign teacher to a module Back

Teacher Info

Forename: teach

Surname: mcteach

Employee No: 30

Department: Business S...

Modules:

Module ID	Module name	Department ID
BUS1001	Accounting and Finance for Managers	BUS
BUS1002	Business Management in Context	BUS
BUS1003	Futures First: Professional Self Management	BUS
BUS1004	Management Themes and Perspectives	BUS
BUS1005	Business Economics	BUS
BUS1006	Introduction to Behaviour at Work	BUS
BUS1007	Analysis for Decision Making A	BUS
BUS1008	Analysis for Decision Making B	BUS
BUS1201	Business in a Global Context	BUS
BUS2001	Business Strategy	BUS
BUS2002	Essentials of Marketing	BUS
BUS2003	Organisational Behaviour	BUS
BUS2004	Principles of Operations Management	BUS
BUS2005	Enterprise and Entrepreneurship	BUS
BUS2006	Business Statistics	BUS
BUS3001	Corporate Social Responsibility	BUS
BUS3002	Digital Marketing	BUS
BUS3003	International Business	BUS

BUS1001 BUS1001

Assign Module Un-assign Module

Assign teacher to a module Back

Teacher Info

Forename: teach

Surname: mcteach

Employee No: 30

Department: Business S...

Modules:

Module ID	Module name	Department ID
BUS1002	Business Management in Context	BUS
BUS1003	Futures First: Professional Self Management	BUS
BUS1004	Management Themes and Perspectives	BUS
BUS1005	Business Economics	BUS
BUS1006	Introduction to Behaviour at Work	BUS
BUS1007	Analysis for Decision Making A	BUS
BUS1008	Analysis for Decision Making B	BUS
BUS1201	Business in a Global Context	BUS
BUS2001	Business Strategy	BUS
BUS2002	Essentials of Marketing	BUS
BUS2003	Organisational Behaviour	BUS
BUS2004	Principles of Operations Management	BUS
BUS2005	Enterprise and Entrepreneurship	BUS
BUS2006	Business Statistics	BUS
BUS3001	Corporate Social Responsibility	BUS
BUS3002	Digital Marketing	BUS
BUS3003	International Business	BUS

BUS1001 BUS1001

Assign Module Un-assign Module

Module ID	Module name	Department ID
BUS1001	Accounting and Finance for Managers	BUS
BUS1002	Business Management in Context	BUS
BUS1003	Futures First: Professional Self Management	BUS
BUS1004	Management Themes and Perspectives	BUS

## 6.2 Login Screen

Login

Username

T

Password

.....

Login

Teacher Page

E-mails of students:

infStudent

Edit module grades

Check Student Degree

Progress Student

## 7 Security Features

### 7.1 Role Restrictions

Our solution enforces role restrictions. Each user is assigned a role-type that dictates the information that they can see and change. This is achieved by using private java classes and methods to change and view the data, and constructors to create instances that can access these methods and classes when the user signs in. This means that other users cannot use these methods; i.e. a student cannot add or delete modules but an admin can.

Student Page

Forename:

a

Surname:

a

Registration ID:

1624

Degree:

COM

Logout

Module ID	Initial Grade	Resit Grade	Module Name	Credits Worth	Department ID	Pass Grade
COM1005	0	0	Machines and Intelligence	20	COM	40
COM1006	81	0	Devices and Networks	20	COM	40
COM1101	0	0	Fundamental of Information Systems	20	COM	40
COM1001	0	0	Introduction to Software Engineering	20	COM	40
COM1002	0	0	Foundations of Computer Science	20	COM	40
COM1003	0	0	Java Programming	20	COM	40

The user, student, has access to limited data, and cannot edit it.

```

public void displayDegree(String email) throws SQLException { ...5 lines }

public void displayTotalGrade(String email) throws SQLException { ...31 lines }
public static Boolean getProgressToNextLevel(String email) throws SQLException { ...32 lines }

public static String getPeriodOfStudy(String email) throws SQLException { ...31 lines }

public static String nextPeriodOfStudy(String email) throws SQLException { ...31 lines }

public void updatePeriodOfStudy(String email) throws SQLException { ...30 lines }

```

## 7.2 Password Protection

Each user is provided a personal password when their account is created. Salt is randomly generated and stored in the users table. Each salt is unique for each account so reverse engineering the password from the hashed password is made much more difficult to do en-masse. To login, the user provides their own username and password, and the plain-text password is rehashed with their own salt to see if the two values match and if they can login.

```
this.password = PasswordGen.generateSecurePassword(password, salt);
```

username	title	forename	surname	account_type	password	salt
student	ms	Jane	Doe	Unassigned	Ff+gHvyb3NyDUWja25Bm3OqdqXMN+QMZ5JF...	hWQM9KeVHn1Bg6PkLiz16ExmIvvOwO
stuff	ms	Doe	Jane Erin	Unassigned	w+dkIoL0ZvWGG3576rc98S+5vJdboabaeISnjQ...	iFZxWjIExwjWf27PYJSP3inO1sxJfg
T	Mr	teach	mteach	Teacher	X3w7DCgEKAggh595u0HuG6mpYj3b9E4DFUmn...	BtmyTnwtK6QzX9GOvr6kMI2zQA50KY
test	Mr	t	t	Registrar	9XrRq6+htn+BfxsTisUD7+ACwR+7NluxVZ/P5b...	wn1bDpeJuCYWPik7hyI1ScXBUPbUbs
underbusi...	Miss	Jena	Pixel	Student	pjPEBPnTK/OJv57Z5EJt/nC0nIE0aAMaVpysmLx...	YmVW14QefRpk4p4nInU64QM3LypeSFI
underpsch...	Mr	Tom	Johnson	Student	flU0+/o/5Ve1rUvpFYT5jKcgQsLZ1P9qPKJu33so...	joGxcXGbJGQkbMvPi7q1w6uTMY6HeR
v	Mr	s	f	Admin	ED1NrAY0K/sOvylLEIL0LadVvZwOJOFCDRGSQU...	vl5Ztnxrb4JnrFUsbEzxK76pJYoFKL
z	Mrs	fs	f	Student	8PqGgCYutQbh7mGL2dXrXpXmwpcI7zQ0nN5R...	cdhca0LgNxZ79N4YfhCm2voYHzDzm

## 7.3 Resistant to Privilege Escalation

There are only two roles that have access to methods that modify a user's own role; admins and registrars. Admins have access to all the users' information and can change the type of a user at any point; e.g from registrar to admin. Registrars can do two role changes; they can register unassigned (temporary) users as a student and they can add a user as a teacher as well.

## 7.4 Prepared Statements

All the SQL statements needed to fetch and change the data are prepared first. Then the user's inputs are turned into their expected data types; e.g. String, Integer or Boolean. These are added in after the statement has been prepared and then the statement is executed. The use of prepared statements should limit or outright block the effectiveness of a SQL injection task.

## 8 Contribution

Names	Specific contributions	Points (100)
Sangamithra Bala	User statements, UML class diagram, database setup, student and grades classes, admin frame and panels, last minute code fixes	33
Laney Deveson	User statements, UML database diagram, admin teacher and modules classes, data importation for testing, teachers frame and panels, report write up	33
Barbara Ding	User statements, UML use case diagram, user, registrar and degrees, students and registrars frame and panels, last minute code fixes	33

### Sign off

Sangamithra Bala

Laney Deveson

Barbara Ding