

# NATIONAL UNIVERSITY OF COMPUTER AND EMERGING SCIENCES

## Software Design & Architecture Lab

LAB Instructors: Sobia Iftikhar “Sobia.iftikhar@nu.edu.pk”

### Lab 06

#### Outline

- To Understand Analysis Classes
- Control, Boundary, and Entity
- Robustness Analysis ECB Pattern
- Exercise

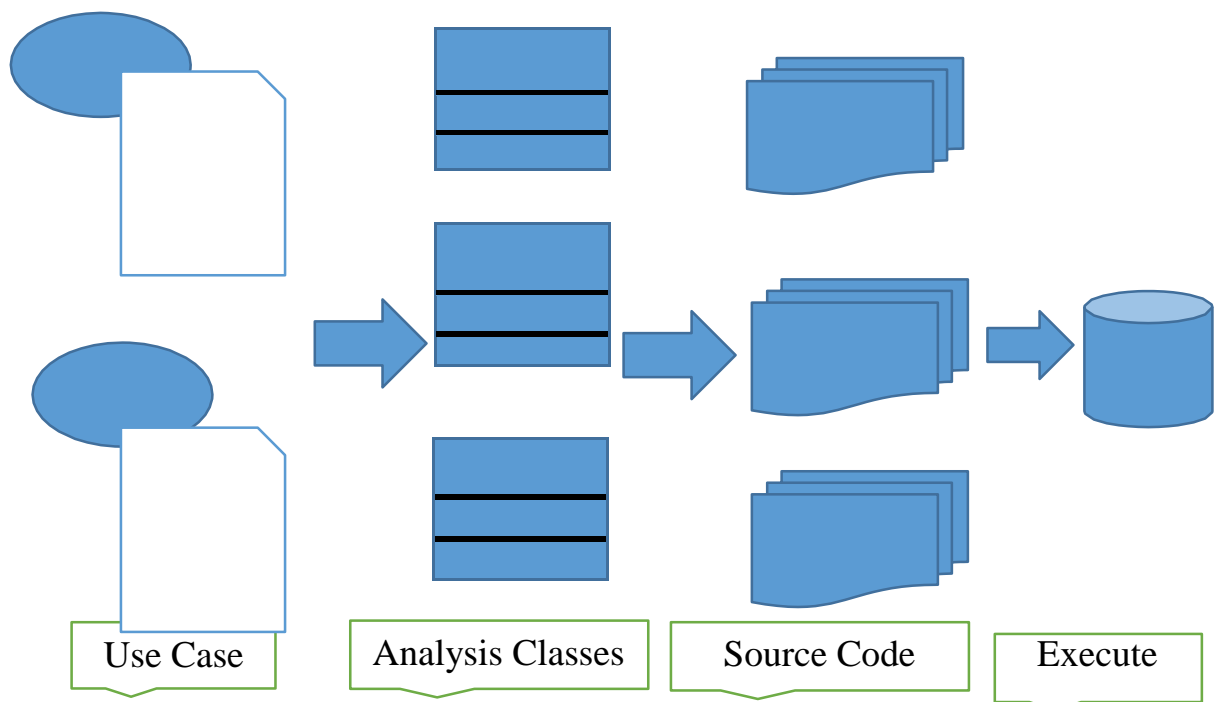
**Analysis Class Stereotypes:** Analysis classes represent an early conceptual model for ‘things in the system which have responsibilities and behavior’. They eventually evolve into classes and subsystems in the Design Model. The purpose of the Find Classes from Use-Case Behavior step is to identify a candidate set of model elements (analysis classes) that will be capable of performing the behavior described in the use case. Analysis classes may be stereotyped as one of the following:

Boundary classes

Control classes

Entity classes

They are based on the model-view-controller concept, where the entity is the model, the control is the controller, and the boundary is the view.

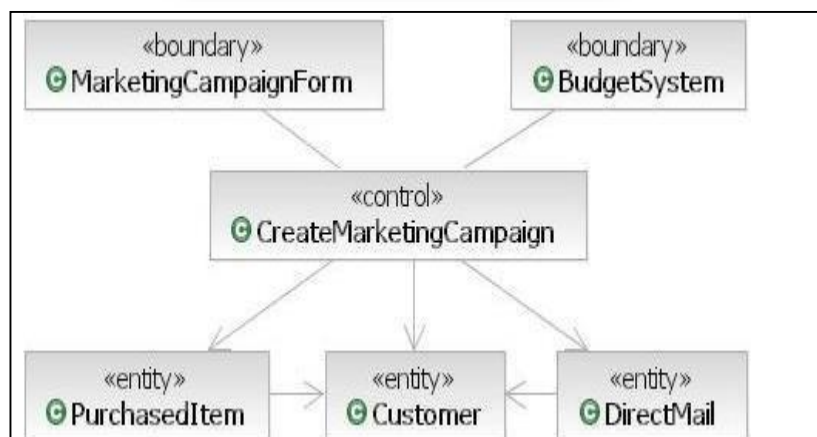
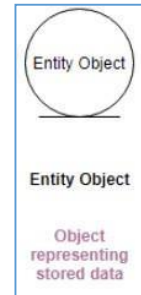
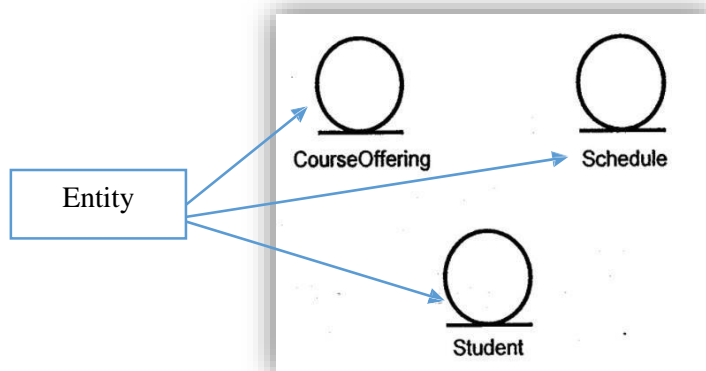


## Entity Class

The Role of an Entity Class: The main responsibilities of entity classes are to store and manage information in the system.

Entity Class always as environment independent.

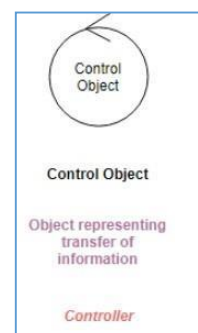
**Example: Register for Courses (Create Schedule)**



## Control Class

Control objects (also known as controllers in MVC), which serve as the “glue” between boundary objects and entity objects

**Example:** CreateMarketingCapmaign is an example of a control element for a customer service application. This design element would be responsive to certain frontend boundary elements and would collaborate with other entities, control elements, and backend boundary elements to support the creation of a marketing campaign.

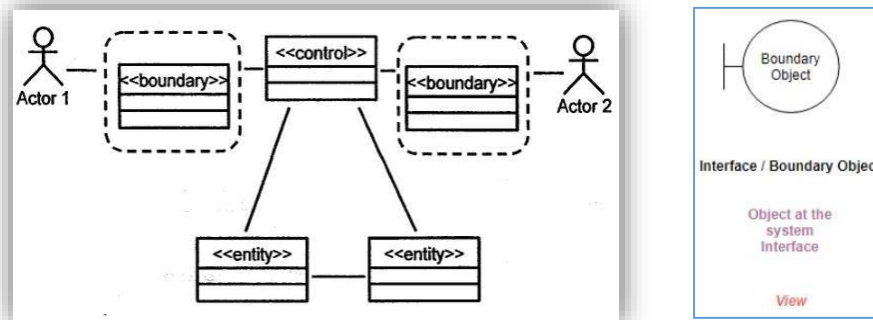


## Boundary Class

A boundary class intermediates between the interface and something outside the system. Boundary classes insulate the system from changes in the surroundings.

(for example, changes in interfaces to other systems and changes in user requirements), keeping these changes from affecting the rest of the system.

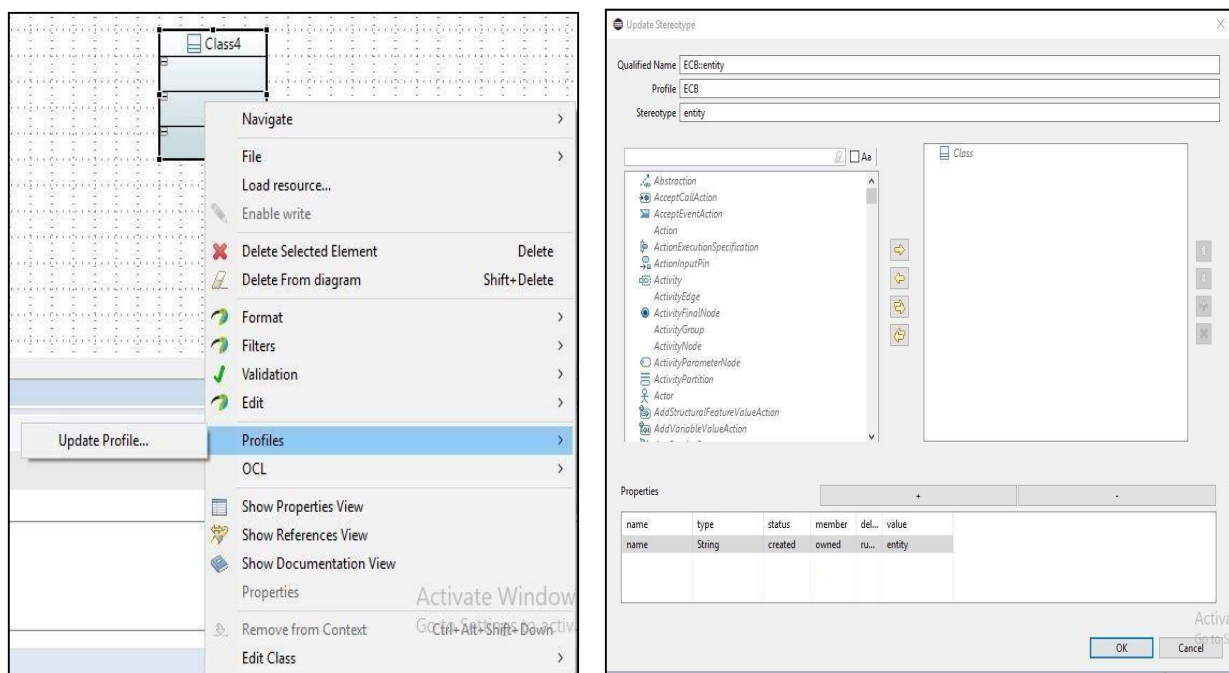
The Role of a Boundary Class: A boundary class is used to model interaction between the system's surroundings and it's inner workings.



### How to Create ECB Diagram in Papyrus

- 1) Create a papyrus class diagram as discussed in the previous lab. To include the stereotypes of the ECB pattern, click on the right click on the class in the class diagram and go to

### Profiles Update profile option



- 2) Suppose you want to create a class of entity stereotype. Under the update stereotype window, type "entity" in qualified name and enter "ECB" in profile. When you do this, the entity will automatically appear in the stereotype and qualified name will automatically change to "ECB::entity".

Finally, click on + sign beside properties heading and change the name to “name” and value to “entity” and click on ‘Ok’ as shown in the image below:

### **Example 01**

#### **Design a system for organizing championships of table games.**

##### **Requirements: verbal requirements.**

**British University Management System** is a smart, flexible, and affordable solution that covers all aspects of **Universities**, Colleges or Schools. It's a complete end-to-end solution that covers every minute aspect of a **university** workflow which we had used to perform manually.

There are four most important users who behave as Staff, Faculty, Administrator, and Student.

Student will use the system for course registration after proper login with credentials student can also apply for scholarship on the basis on their financial status and merit.

Office Staff are responsible for making class schedule for faculty members, then faculty members run their classes according to defined scheduled

Faculty are responsible for assigning the grades and maintain the student's attendance with proper credentials, they can also provide the suggestion/feedback form their account for associated subject. Then all suitable changes are implemented from administration for upcoming semester.

Administrator who are responsible to control all the operations that are performed by different users.

#### **British University Management System USE CASE Diagram**

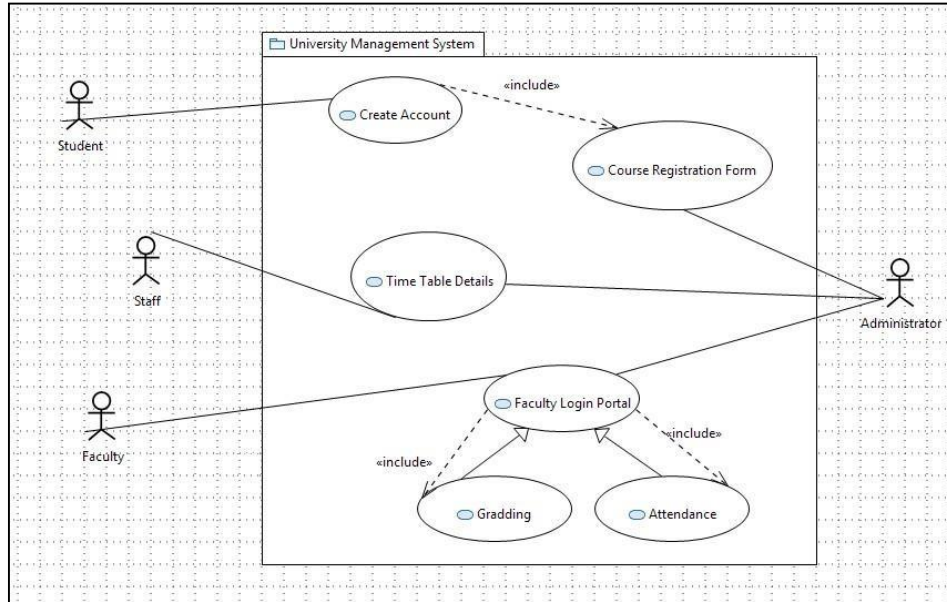
##### **Actors:**

**Student**

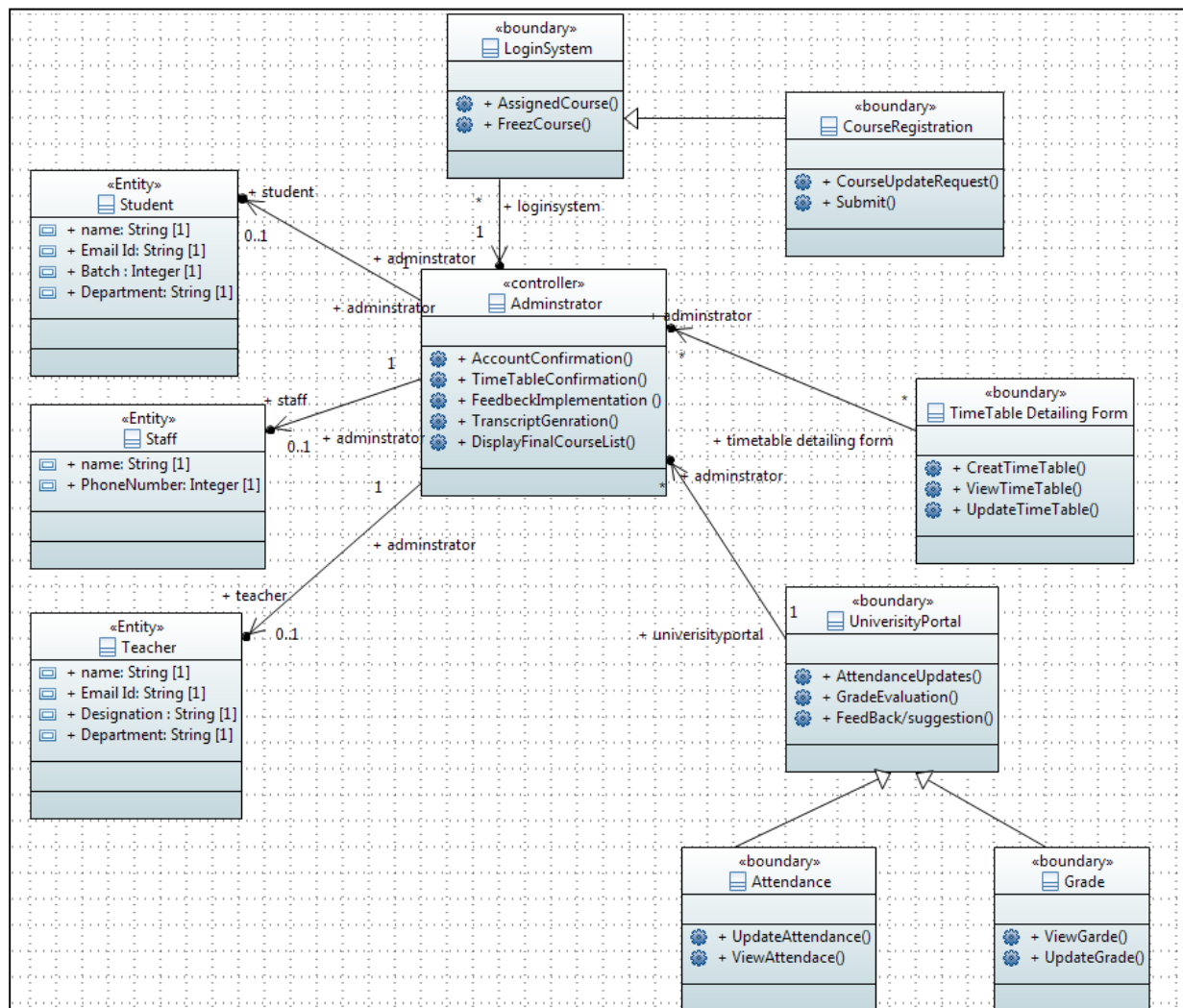
**Staff**

**Faculty**

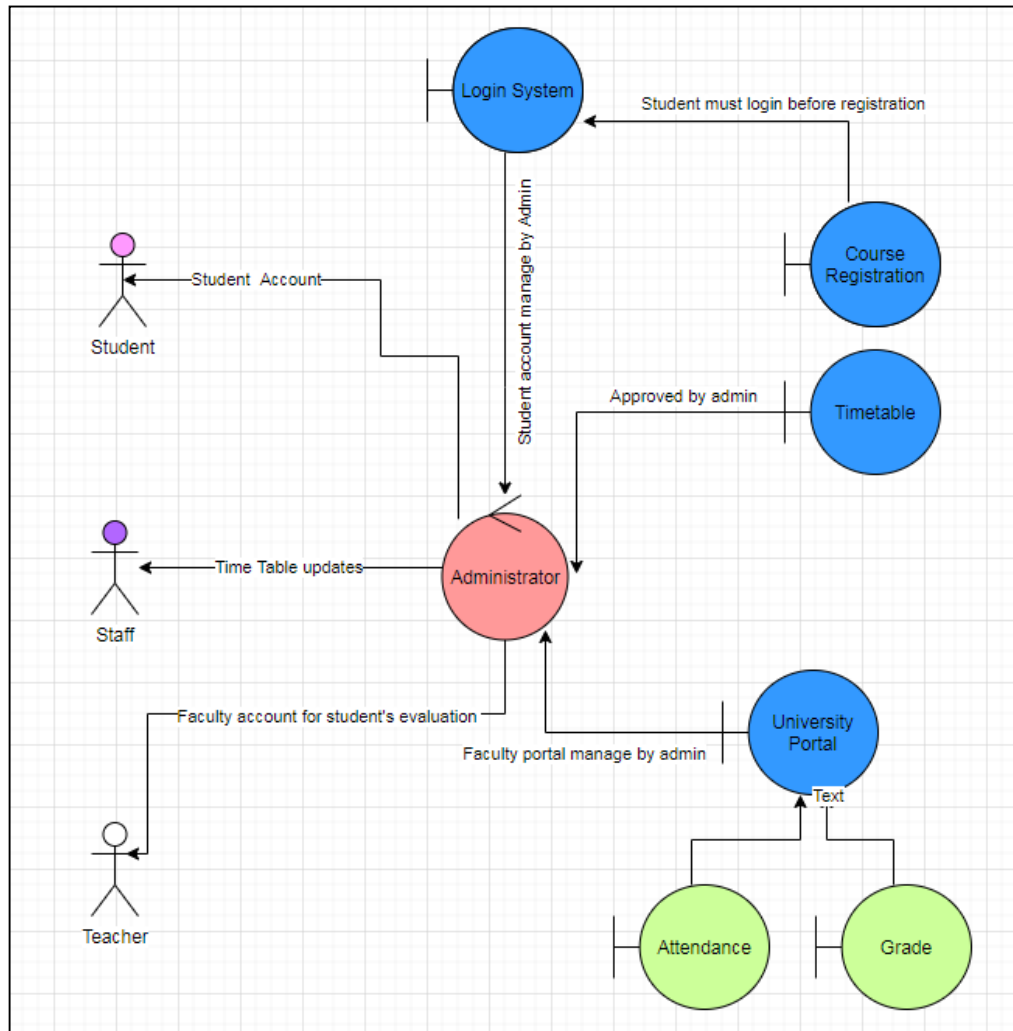
**Administrator(secondary actor)**



## Entity Classes Boundary Diagram for British University Management System



## Robustness Diagram



## Robustness Diagram and Analysis Classes

User Id	<i>AppUC11</i>
Use Case Name	<i>Apply for scholarship</i>
Actor	Applicant
Description	Search for international Scholarship
Trigger	The applicant want to search for foreign fully funded scholarship
Precondition	Applicant start a web browsing
Postcondition	Searched result meet with desirable criteria
Normal Flow	<ol style="list-style-type: none"> <li>1. Applicant visit international scholarship websites</li> <li>2. Applicant click on "apply scholarship" button</li> <li>3. Listed scholarship page displayed from system</li> <li>4. Applicant select fully funded scholarship and click apply button</li> <li>5. System ask for all the academic and personal details</li> <li>6. After system confirm his/her criteria and will give confirmation email.</li> </ol>

<i>Alternative flows</i>	There is no alternative way to apply for international scholarship
<i>Exception</i>	In step no 06, may system will not dent confirmation email to the applicant due to any missing data.
<i>Include</i>	None
<i>Issue</i>	None

### ***Robustness Diagram***

1. Visit <https://online.visual-paradigm.com/>
2. Click on "Start Your Free Trial" within the edition table
3. Enter your email address in the Sign up page and click Sign up to create an online workspace
4. Confirm the confirmation email we sent
5. Done! You can start creating your own drawing with the online drawing tool. Enjoy!

