# Use Case Descriptions

# Use Case Diagram

## What does a Use Case diagram show?

Functionality of a system from the user's

perspective. Each Use case name is usually an active verb and a noun phrase.

## How might a Use Case diagram be used?

To model a current system

To model a proposed system

# Drawing Use Case Diagrams

- ➤ List use cases and identify the actors
- ➤ Prioritize use cases and focus from the top of the list
- ➤ Develop each of the priority use cases starting with writing a description for each

# Types of Use Case Descriptions

- High Level – A general description

- Expanded (Detailed) – Step by step

- Essential - free of technological detail

- Real – adds technological detail

# Case Study – College Student Records System

You have been asked to look into developing a new system for a College.

**Currently** the Student Records System is **entirely manual**.

- When a new student enrolls, he/she completes an enrollment form, pays fees and the registrar places the form in a filing cabinet.

- When a student leaves, he/she completes a withdrawal form and the registrar files this with the enrollment form.

- If the student's details change, the registrar will record this on the form.

- When a student passes a course, the lecturer records this on a form which he/she gives to the registrar – this result form is stored with the enrollment form.

# Possibilities for a New System

The college wants a new system – but has not yet decided precisely what it wants.  It may consider a better manual system, a computer system which office staff may use , or perhaps even a web based system.

So, as a **first step** in establishing what the system has to do,  **draw a Use Case** diagram to portray the College Student Records system – as it is at the moment (**i.e. the current manual system**).  This diagram will be used as a basis of discussion with the College Management – so they **need to be able to recognize the processes easily**.

# College Student Records System - Current
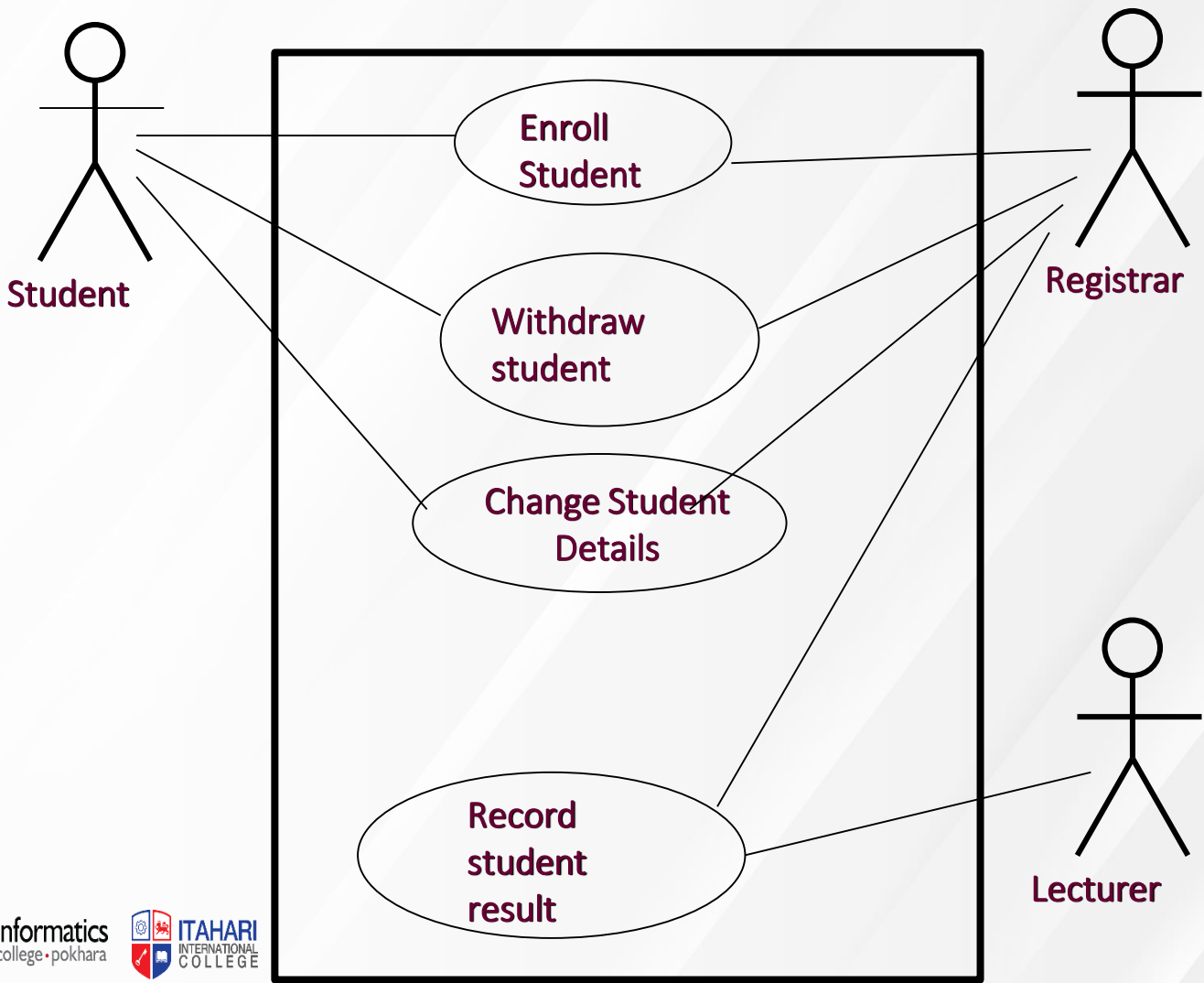
*Produce a **High Level** Use Case description*

*for each Use Case.  Concentrate on giving a short description of each process as it actually happens and as the college staff would recognize it.*

*Example:*

Use Case:       Enroll Student
Actors:         New Student (initiator), Registrar

Description:    A new student arrives at the College Office wishing to enroll on a course.  The Registrar collects the course fees and enrolls the student on his/her chosen course.

*Produce an **Expanded Use Case Description** for each Use Case.  Again, concentrate on giving a description of each process as it actually happens and as the college staff would recognize it.*
*Example:*

Use Case:              Enroll Student
Actors:                 New Student (initiator), Registrar

Description:        A new student arrives at the College Office wishing to enrol on a course.  The Registrar collects the course fees and enrols the student on his/her chosen course.

Typical Course of Events:

**New Student**

1. A new Student arrives at College Office and completes an enrolment form.
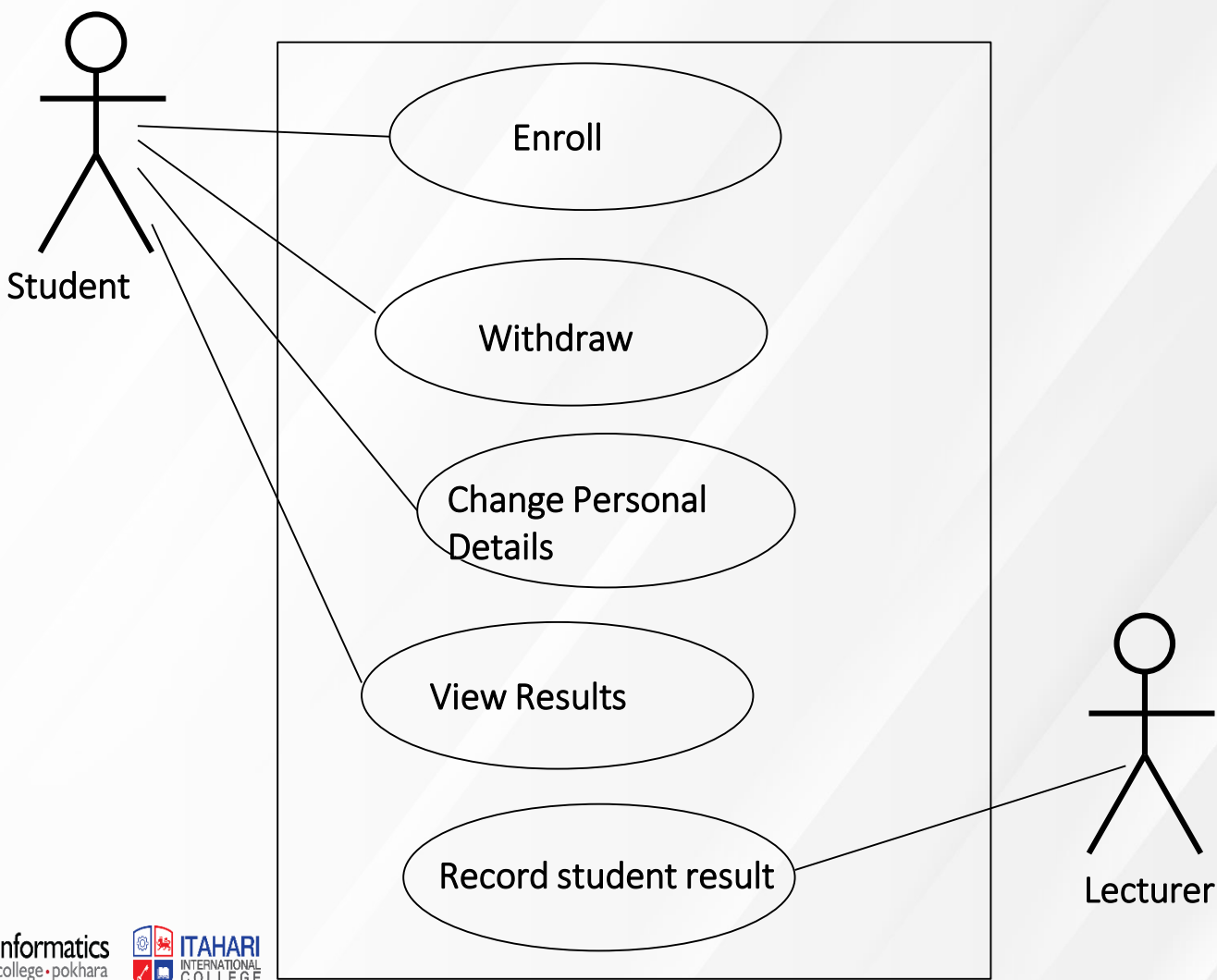
3. The new Student pays the fee

**Registrar**

2. The Registrar inspects the enrolment form and looks up the fee for the course in the courses manual.  He/she informs the student of the fee.

4. The Registrar completes a Course Joining Form

5. The Registrar files the Enrolment Form in the Enrolments filing cabinet

6. The Registrar stamps the Course Joining Form and hands it to the new Student

7. The new Student leaves with the Joining Form

➢ **After discussion the College Management are clearer about the type of system they want.  They decide that they would like students to be able to enroll directly on-line without dealing with college staff.**

➢ **Lecturers should be able to record results directly.**

➢ **The College would also like a facility for students to be able to view their results directly.**

➢ **However the management  have not as yet considered the precise details of any of the interactions.**

➢ **Draw a Use Case diagram outlining the College Management's requirements for their new system.**

# College Student Records System - Required

Student

- Enroll
- Withdraw
- Change Personal Details
- View Results
- Record student result

Lecturer

Produce *a **High Level** Use Case Description* for each Use Case in the NEW REQUIRED SYSTEM.

Give a short non-detailed description of each required process. Do not go into details on the interaction.

*Example:*

Use Case:  Enroll Student
Actors:          New Student (initiator)

Description:  A new student provides personal details and his/her choice of course to the system. He/she pays fees and receives confirmation of enrollment.

*NEW REQUIRED SYSTEM:* *Produce an Expanded Use Case Description for each Use Case.   As the details of each interaction have not been finalized, use an Essential style.*

## Example:

Use Case:              Enroll Student
Actors:                New Student (initiator)
Description:            A new student provides personal details and his/her choice of course to the system.  He/she pays fees and receives confirmation of enrollment.

Typical Course of Events:

| Actor Action | System Response |
|---|---|
| 1. The new Student provides personal details for enrollment | 2. Presents course options |
| 3  Chooses course |  |
|  | 4  indicates the course fee |
| 5. Pays the fee |  |
|  | 6. provides confirmation of enrollment. |

**After viewing the Use Case model and further discussion, the college management agree on adding more details including some information on the required interaction.**

*Produce an Expanded Use Case Description for each Use Case.   However, as the details of each interaction are now partially known,*
*use a Real style.*

Example:

Use Case:   Enroll Student
Actors:                    New Student (initiator)
Description:              A new student provides personal details and his/her choice of course to the system.  He/she pays fees and receives confirmation of enrolment.

Typical Course of Events:

| Actor Action | System Response |
|---|---|
| 1. The new Student uses the on-screen enrollment form to input personal details | 2. Presents a menu of the subject areas in the college |
| 3. Clicks on the chosen subject area | 4. Presents a menu of the courses in the subject area |
| 5. Clicks on the chosen course | 6. Displays the course fee |
|  | 7. Requests card details |
| 8. Pays by credit/debit card | 9. Provides a printable course joining form including a student id number |
| 10. Prints joining form |  |

# Alternative Courses of Action

- An expanded Use Case concentrates on showing the Typical course of events

- However, there will often be important alternatives – these are shown separately as an *alternative course*

*Example:*

Use Case:             Enroll Student
Actors:               New Student (initiator)
Description:          A new student provides personal details and his/her choice of course to the system.  He/she pays fees and receives confirmation of enrollment.

Typical Course of Events:

| Actor Action | System Response |
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| 1. The new Student uses the on-screen enrollment form to input personal details | 2. Presents a menu of the subject areas in the college |
| 3. Clicks on the chosen subject area | 4. Presents a menu of the courses in the subject area |
| | 6. displays the course fee |
| 5 Clicks on the chosen course | 7. requests card details |
| 8. pays by credit/debit card | 9. provides a printable course joining form including a student id number |
| 10. prints joining form | |

**Alternative Courses:**
**Line 5 The new Student does not see a suitable course.  Use Case ends.**
**Line 8 The new Student does not have credit/debit card available.  Use Case ends.**

# Pre-conditions and Post-conditions may be added to a Use Case description.

**Pre-condition:** a situation which must exist before the process represented by the Use case may be carried out

**Post-condition:** the situation which will exist after the process has been carried out.

*Both are optional.*

*Post-conditions are only relevant if the use case will change the state of system data. If the process merely views data, then the post-condition will be 'none'.*

# Documenting <<include>> and <<extend>> relationships

**These will be listed in the relevant expanded Use Case descriptions – with cross references to the other Use Case(s).** Avoid premature use, overuse, and misuse of the <<include>> and <extend>> relationships.
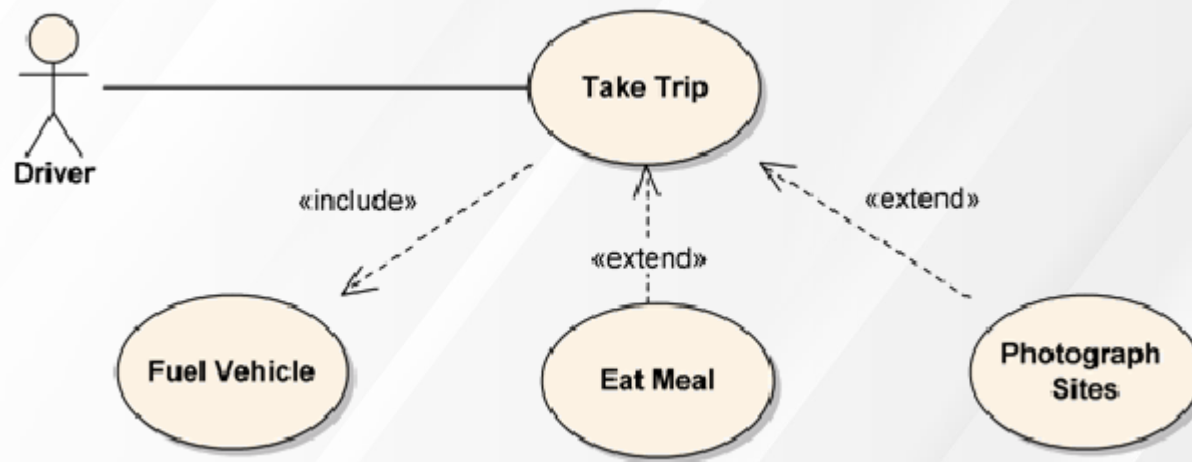
# Purpose

When producing a Use Case Model always keep in mind what you are trying to portray and for what purpose.

- Use case diagram, and use case description
    - Written from the user's point of view
    - Avoid describing the internal aspects

# Activity Diagrams

Activity diagram is another important diagram in UML to describe the dynamic aspects of the system.

Activity diagram is basically a flowchart to represent the flow from one activity to another activity. The activity can be described as an operation of the system.

The control flow is drawn from one operation to another. This flow can be sequential, branched, or concurrent. Activity diagrams deal with all type of flow control by using different elements such as fork, join, etc

# Purpose of Activity Diagrams

The basic purposes of activity diagrams is similar to other four diagrams. It captures the dynamic behavior of the system. Other four diagrams are used to show the message flow from one object to another but activity diagram is used to show message flow from one activity to another.

Activity is a particular operation of the system. Activity diagrams are not only used for visualizing the dynamic nature of a system, but they are also used to construct the executable system by using forward and reverse engineering techniques. The only missing thing in the activity diagram is the message part.

It does not show any message flow from one activity to another. Activity diagram is sometimes considered as the flowchart. Although the diagrams look like a flowchart, they are not. It shows different flows such as parallel, branched, concurrent, and single.

The purpose of an activity diagram can be described as −

- Draw the activity flow of a system.

- Describe the sequence from one activity to another.

- Describe the parallel, branched and concurrent flow of the system.

# How to Draw an Activity Diagram?

Activity diagrams are mainly used as a flowchart that consists of activities performed by the system. Activity diagrams are not exactly flowcharts as they have some additional capabilities. These additional capabilities include branching, parallel flow, swim-lane, etc.

Before drawing an activity diagram, we must have a clear understanding about the elements used in activity diagram. The main element of an activity diagram is the activity itself. An activity is a function performed by the system. After identifying the activities, we need to understand how they are associated with constraints and conditions.

Before drawing an activity diagram, we should identify the following elements

- Activities

- Association

- Conditions

- Constraints

Once the above-mentioned parameters are identified, we need to make a mental layout of the entire flow. This mental layout is then transformed into an activity diagram.

Following is an example of an activity diagram for order management system. In the diagram, four activities are identified which are associated with conditions. One important point should be clearly understood that an activity diagram cannot be exactly matched with the code. The activity diagram is made to understand the flow of activities and is mainly used by the business users

Following diagram is drawn with the four main activities −

- Send order by the customer

- Receipt of the order

- Confirm the order

- Dispatch the order

After receiving the order request, condition checks are performed to check if it is normal or special order. After the type of order is identified, dispatch activity is performed and that is marked as the termination of the process.

# Activity Diagram



Activity diagram of an order management system
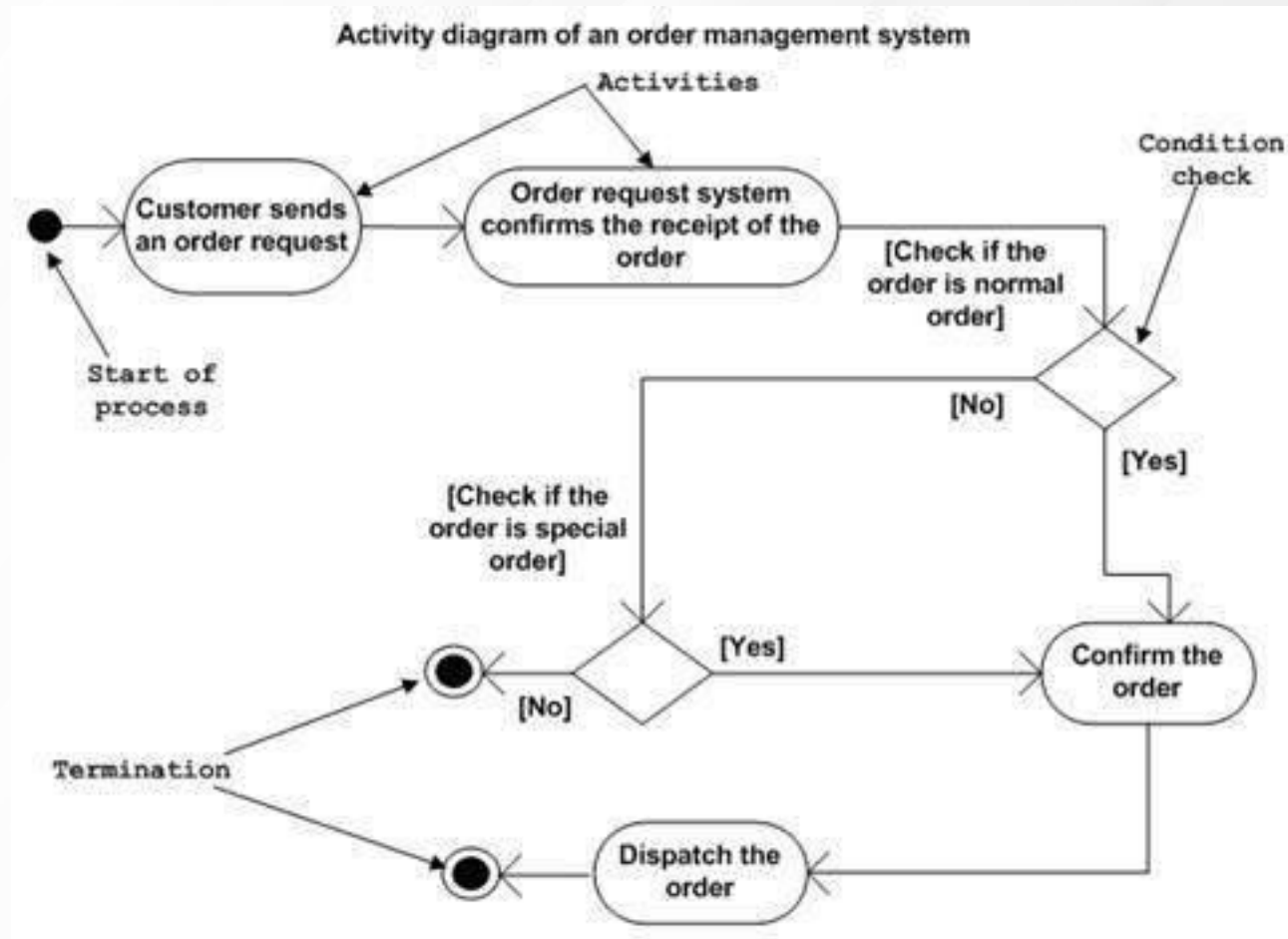
# Where to Use Activity Diagrams?

The basic usage of activity diagram is similar to other four UML diagrams. The specific usage is to model the control flow from one activity to another. This control flow does not include messages.

Activity diagram is suitable for modeling the activity flow of the system. An application can have multiple systems. Activity diagram also captures these systems and describes the flow from one system to another. This specific usage is not available in other diagrams. These systems can be database, external queues, or any other system.

We will now look into the practical applications of the activity diagram. From the above discussion, it is clear that an activity diagram is drawn from a very high level. So it gives high level view of a system. This high level view is mainly for business users or any other person who is not a technical person.

This diagram is used to model the activities which are nothing but business requirements. The diagram has more impact on business understanding rather than on implementation details.

Activity diagram can be used for −

- Modeling work flow by using activities.

- Modeling business requirements.

- High level understanding of the system's functionalities.

- Investigating business requirements at a later stage.

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