# International Islamic University, H-10 Islamabad


## Assignment # 01

## Introduction to Software Engineering (ISE)

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| Deadline | 14 NOVEMBER, 2022 |

Faculty Of Basic and Applied Sciences

BS in Software Engineering

# INTRODUCTION TO SOFTWARE ENGINEERING

(ISE – 101)

## ASSIGNMENT – 1

**INSTRUCTOR'S: MR. SHAKIR RASHEED KHAN KHATTAK**


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**Registration No. 4324-FBAS/BSSE/F21**

**Batch: F21 – A**

**Department: BS Software Engineering**


**Question No. 1**

**Describe the Waterfall Model and list the stages of Waterfall Model for software development And list three of its advantages and disadvantages?**

**Answer:**

### Waterfall Model:

- The waterfall model was the first process model to be introduced.
- It is also referred to as a linear-sequential Cycle model.
- It is very simple to understand and use.
- In a waterfall model, each phase must be completed fully before the next phase can begin.
- This type of software development model is basically used for the project which is small and there are uncertain requirements.
- At the end of each phase, a review takes place to determine if the project is on the right path and whether or not to continue or discard the project.

### When to Use SDLC Waterfall Model:

SDLC model is used when

- Requirements are stable and not changed frequently.
- An application is small.
- The environment is stable.

## Stages of Waterfall Model:

Stages of Waterfall Model are given below:

- **Requirements Gathering and Analysis**
- **Analysis**
- **System Design**
- **Implementation**
- **Testing**
- **Deployment**
- **Maintenance**

## Advantages of Waterfall:

Some advantages of Waterfall Model are:

- Model is Simple and easy to understand and use.
- For smaller projects, the waterfall model works well and yields the appropriate results.
- Results are well document.

## Disadvantages of Waterfall:

Some disadvantages of Waterfall Model are:

- Cannot adopt the changes in requirements.
- It becomes very difficult to move back to the phase.
- Not suitable for the projects where requirements are changed frequently.
- Does not work for long and ongoing projects.

**Question No. 2**

**List the stages of the software development Life Cycle (SDLC). Describe each stage in one phrase each?**

**Answer:**

## Stages of Software Development Life Cycle (SDLC)

The main SDLC phases are:

Phase 1: Requirement collection and analysis
Phase 2: Feasibility Study
Phase 3: Design
Phase 4: Coding
Phase 5: Testing
Phase 6: Installation/Deployment
Phase 7: Maintenance

**Phase 1: Requirement Collection and Analysis**

The requirement is the first stage in the SDLC process. It is conducted by the senior members with inputs from all the stakeholders and domain experts in the industry.

Planning for the quality assurance requirements and recognition of the risks involved is also done at this Stage.

**Phase 2: Feasibility Study**

In this stage we define and document software needs. This process is conducted with the help of SRS document. It includes everything which should be designed and developed during the project life Cycle.

**Feasibilities Checks**:

- **Economic**
- **Legal**
- **Operation Feasibility**
- **Technical**
- **Schedule**

**Phase 3: Design**

In this phase we design the system and software design documents are prepared as per the requirement Specification document. This phase helps to define overall system architecture.

**Phase 4: Coding**

This phase is incepted after completion of design stage. In this phase, the developers start build the entire System by writing code using the chosen programming language.

In the coding phase, tasks were divided into **units or modules** and assigned to the various developers.

It is the longest phase of the SDLC process.

Developers use different tools i.e. **compiler, interpreters,** debugger to generate and implement the code.

**Phase 5: Testing**

Once the software is complete and it is deployed in the testing environment.

The testing team starts testing the functionality of the entire system. This is done to verify that the entire Application works according to the customer requirement.

During this phase, QA and testing team may find some bugs/defects which

**Phase 6: Installation/Deployment**

Once the software testing phase is over and no bugs or errors left in the system then the the final deployment process starts. Based on the feedback given by the project manager, the final software is released and checked for deployment issues if any.

**Phase 7: Maintenance**

Once the system is deployed, and customers start using the developed system, following 3 activities occur:

- Bug fixing – bugs are reported because of some scenarios which are not tested at all
- Upgrade – Upgrading the application to the newer versions of the Software
- Enhancement – Adding some new features into the existing software

The main focus of this SDLC phase is to ensure that needs continue to be met and that the system continues to perform as per the specification mentioned in the first phase.

**Question No. 3**

**Using a natural language format write one user and several system level requirements to describe a function to allow a librarian to record a book loan. In the system, a book has an ISBN and may have multiple copies. Each copy has a number (1, 2, 3...) and is either available or has a due date and the ID of the current borrower. Books loaned for two weeks at a time..... Information must be recorded?**

**Answer:**

**User Level Requirement:**

Users must be able to access the System, necessary permissions to perform their tasks, view book names see their dues and get information or NEWS about the library.

**System Requirement:**

1. Functional Requirement:

**1.1 Login:**

There should be a login interface for both the system users and librarian. They both should have unique

User name, password and both have an access to different functionalities.

**1.2 Registration:**

If there is a new user who want to take membership. For membership it is necessary to have a valid Name, CNIC, Address, Phone Number etc. The librarian should take such type of information for their Membership.

**1.3 Search:**

This system should have Search functionalities for both the user and librarian. The user can search books Of their own choice which they want to be borrowed. This option is also helpful for the librarian to check Book borrower limitations and Search the borrower list by Name, ID or book ISBN. Those borrower who have already borrowed books must be only seen by a librarian.

**1.4 Pay Dues:**

Their should be a proper system for the users to pay their dues online through Easypaisa, JazzCash, Credit Card, Debit Card, Challan etc. If the users not pay the dues within the given time. Rs.100/Day should Be incremented automatically.

**2. Non-Functional Requirements**

**2.1** The system shall remain operational from Monday to Saturday (9:00 A.M to 5:00 P.M).

**2.2** The system should have simple interface. So, the users will not face any difficulties while using the system without any special training.

**2.3** The System should be in different languages to help the users to understand everything easily.

**2.4** The System shall be graphical which will help the users who're illiterate.

**2.5** The System should be easily maintainable.

**2.6** The system should be platform independent. So, It can be run on any platform i.e. OS, Linux, Mac etc.

**2.7** The Interface will be design in JavaScript, HTML, CSS, Angular while the back end shall be written in Java/JavaScript.

**Question No. 5**

**Write the Non-Functional requirements for the following two projects?**

**1. Bike Racing Game**

**2. An Online Banking System**

**Answer:**

**Non-Functional Requirement** for:

**An Online Banking System:**

For a banking System, the most important non-functional requirements include:

- **Security**
- **Performance**
- **Usability**
- **Availability**

**Security:**

Bank management systems are notorious for being subject to malicious attacks, so security is the major requirement for the system. Unauthorized access to the data is not permissible. The **data must be backed up** daily and stored in a secured location, at a distance from different facilities of the system. Online transactions and stored Digital files must be encrypted according to 128-bit or 256-bit AES encryption standards. The system must employ firewall software as a defense against network attacks.

**Performance:**

The bank management System is a multi-client system that must reach response time targets for each of the Clients during simultaneous calls and must be able to run a target number of transactions per seconds without Failure. The system must effectively utilize the hardware and energy resources to minimize operational costs.

**Usability:**

The system must provide different graphical interfaces for customers, tellers, and admins. All system interfaces must be user-friendly and simple to learn, including helping hints and messages and intuitive workflow, especially in a client interface: the client must be able to fast learn and use the interface Without prior knowledge of banking terminology or rules.

**Availability:**

The system must be available during bank working hours. The mobile banking and ATM must be available round-the-clock with minimal maintenance times, reaching 99.999% availability time per year.

**Bike Racing Game:**

For Bike Racing Game, the most important non-functional requirements include:

**High Graphics:**

The game should have high-quality graphics. This property is an essential because it will attract the players or other users and shall give the game a realistic look.

**High Performance:**

High Performance means that the game will run smoothly. In short proper interface, players, bikes and maps So, in it there will be no lagging concept or glitch.

**Security:**

In a game, there should be a proper registration system. Those who want to play games must have an account this will allow the game players to have a proper USER NAME, an Email, Password through which the users can access their accounts.

**Usability:**

The game shall fulfill the user requirements. The game should be unique features from common games so It will attracts more people.

**Q4. Draw a Use Case Diagram and Domain Model for the problem mentioned in Q3?**

**"OR"**

**Draw Use Case diagrams and Domain Model (with one sentence textual descriptions) to describe the requirements for a university Management Scheduling System that manages the university's Course offerings, including students registering for courses. You should include at least 3 Actors. Each actor should have at least one use case that is unique. You should have at least 5 use cases (Interactions)?**

**Answer:**

**Use Case Diagram:**

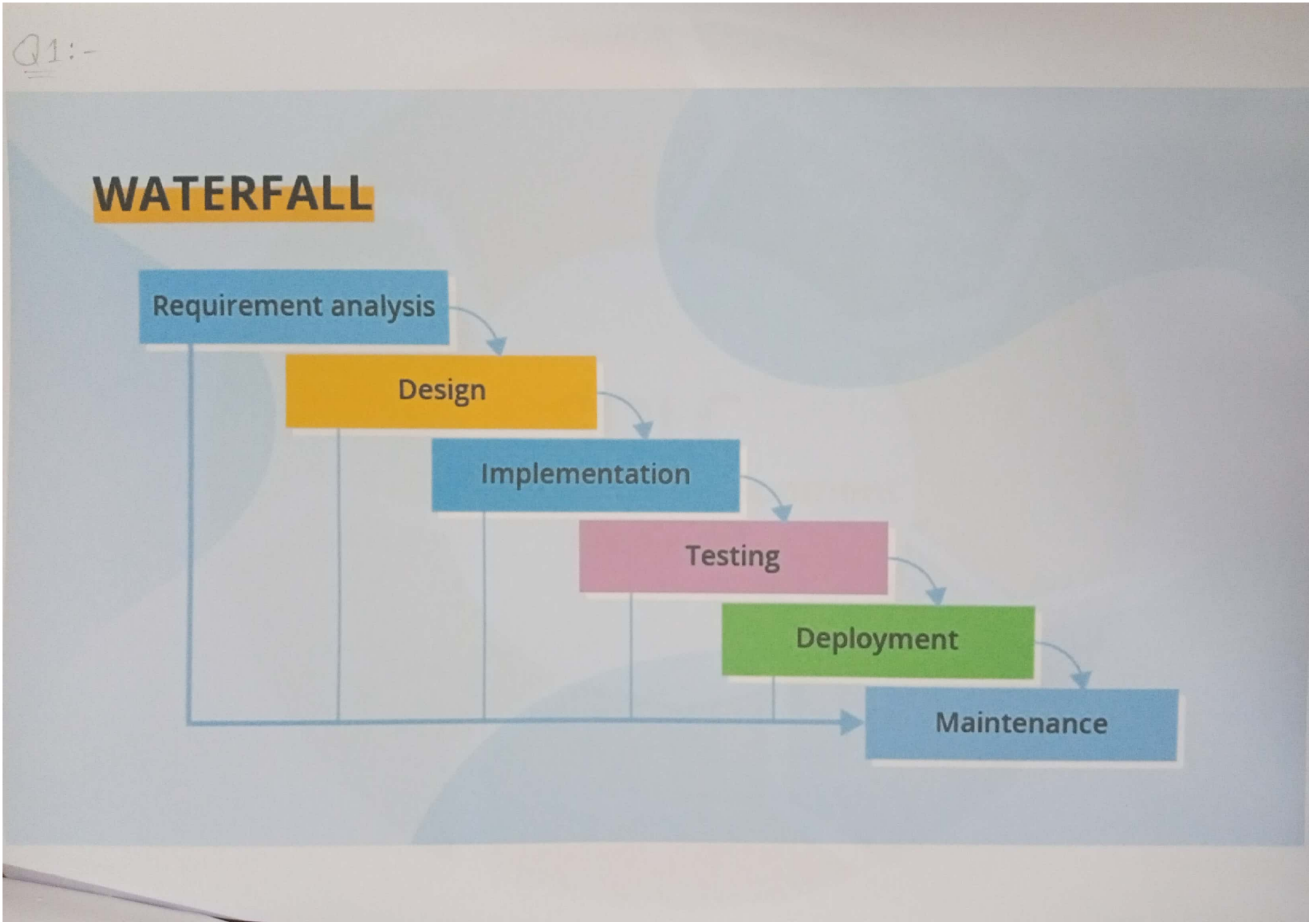
Inserted on A4 Size paper attached at the end.

**Domain Model Diagram:**

Inserted on A4 Size paper attached at the end.

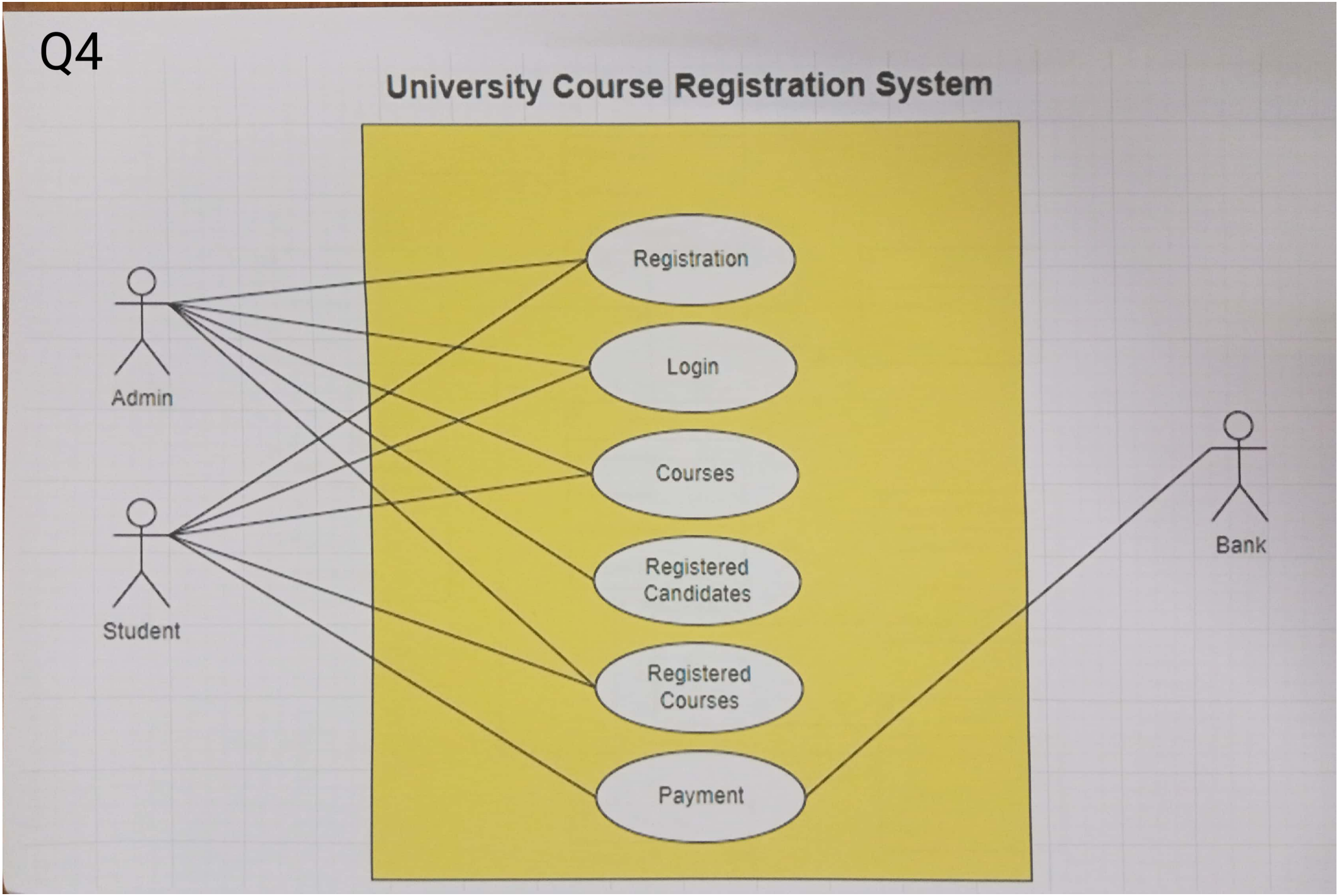
**P.T.O**

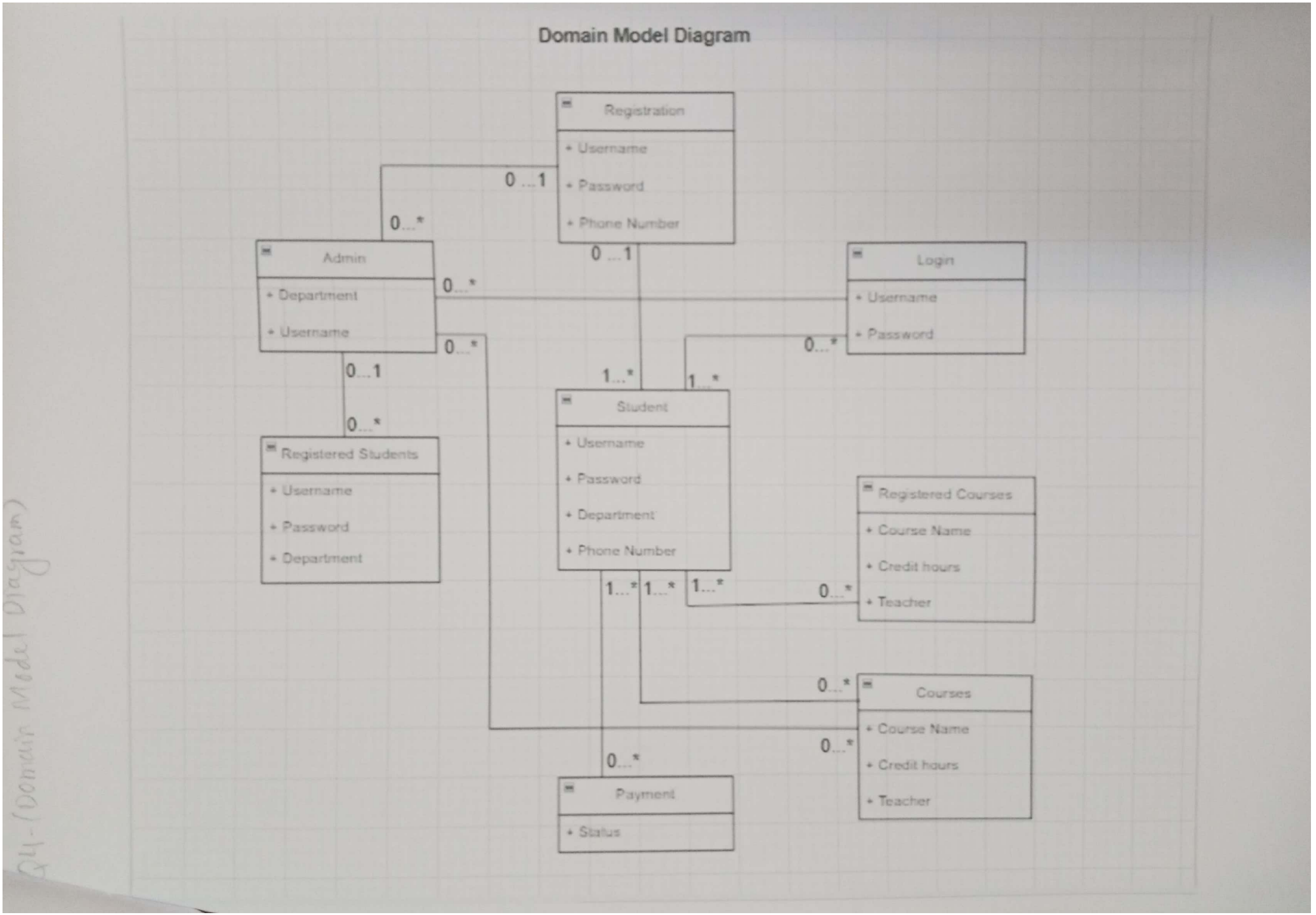
Q1:-



Q2:-

Q4






Q4- (Domain Model Diagram)