



# Lecture 02 (Week 02)

## Requirements Engineering

IT2080 IT Project

B. Sc. Special Honors in Information Technology

Year 2 – Semester 2

# Agenda

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1. Requirements Engineering Methods
2. A Case Study

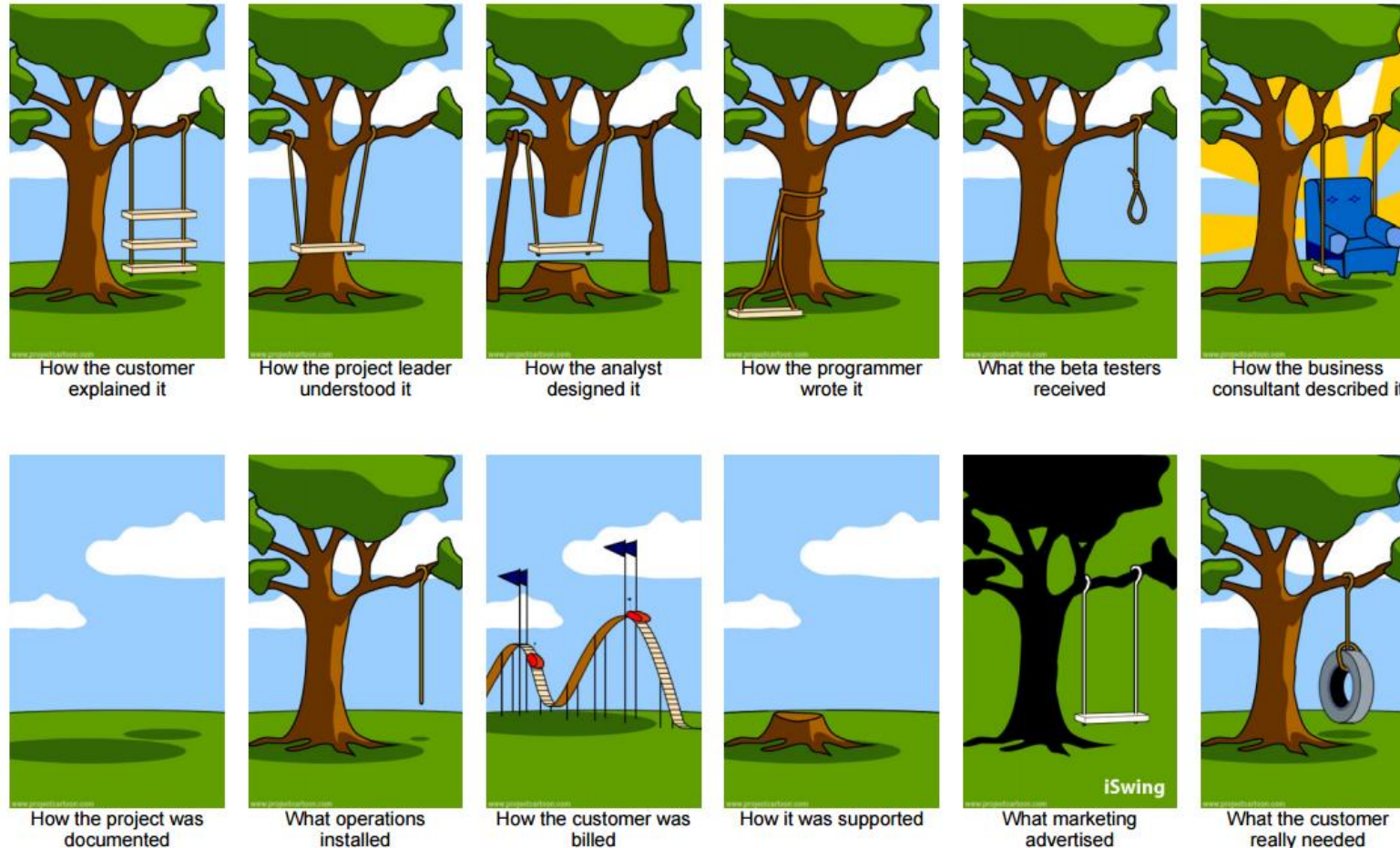
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# 1. Requirements Engineering Methods

# 1. Requirements Engineering Methods

## Requirements Engineering

Why do we need requirements engineering?



<https://i.stack.imgur.com/2YGV6.png>

# 1. Requirements Engineering Methods

## Requirements Engineering Process

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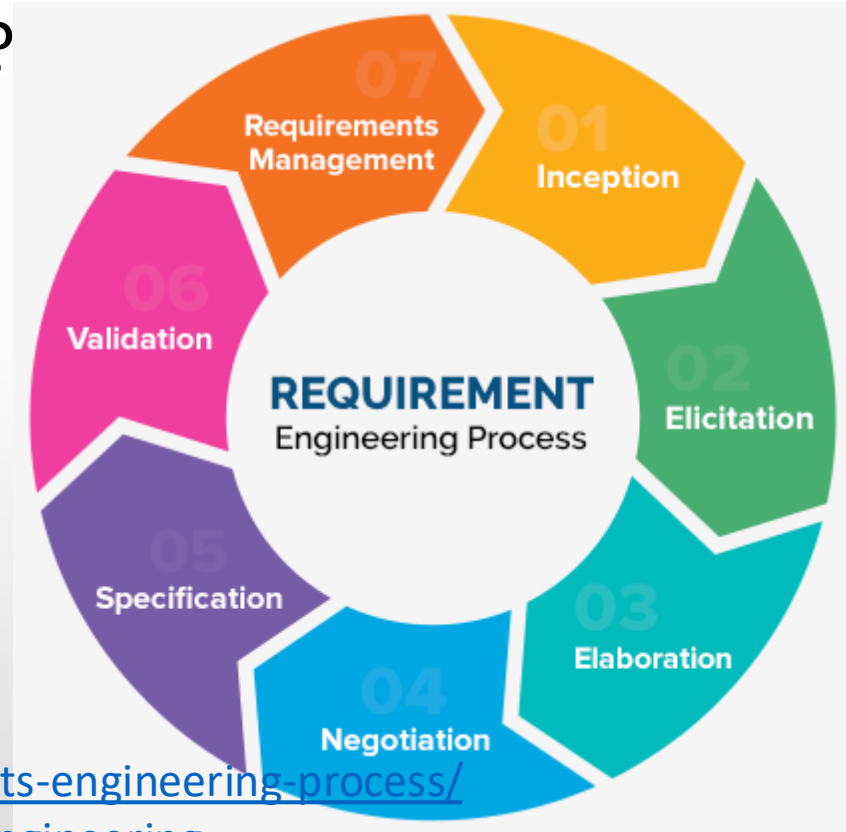
What are the steps in requirements engineering?

# 1. Requirements Engineering Methods

## Requirements Engineering Process

What are the steps in requirements engineering?

1. Requirements elicitation
2. Requirements specification
3. Requirements verification and validation
4. Requirements management



<https://www.geeksforgeeks.org/software-engineering-requirements-engineering-process/>

<https://www.javatpoint.com/software-engineering-requirement-engineering>

<https://www.jamasoftware.com/requirements-management-guide/requirements-gathering-and-management-processes/requirements-engineering>

# 1. Requirements Engineering Methods

## Requirements Elicitation

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First, the requirements should be gathered from different sources.

What are the requirements elicitation methods and identify the method/s suitable for you?

# 1. Requirements Engineering Methods

## Requirements Elicitation

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- Background reading
- Documentation reading/analysis
- Surveys (Data surveys and Literature surveys)
- Interviews
- Questionnaires
- User observations
- Workshops
- Brainstorming

<https://www.indeed.com/career-advice/career-development/requirement-gathering-techniques>

[https://www.utm.mx/~caff/doc/OpenUPWeb/openup/guidances/guidelines/req\\_gathering\\_techniques\\_8CB8E44C.html](https://www.utm.mx/~caff/doc/OpenUPWeb/openup/guidances/guidelines/req_gathering_techniques_8CB8E44C.html)

[https://www.tutorialspoint.com/business\\_analysis/business\\_analysis\\_requirement\\_gathering\\_techniques.htm](https://www.tutorialspoint.com/business_analysis/business_analysis_requirement_gathering_techniques.htm)

# 1. Requirements Engineering Methods

## Requirements Modelling

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Secondly, the gathered requirements should be specified/documentated.

What are the requirements modelling methods you have learned?

# 1. Requirements Engineering Methods

## Requirements Modelling

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- Onion diagram – Stakeholder analysis
- User story mapping – Functional Requirements(FRs), Non-Functional requirements, Technical Requirements
- Use case diagram – FRs, NFRs, TRs
- Wireframes – UI/UX, FRs
- Mind maps – concept and context

<https://createely.com/blog/diagrams/requirements-gathering-techniques/>

# 1. Requirements Engineering Methods

## Requirements Engineering

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- When waterfall-based methodologies were used, the requirements were documented and the Software Requirements Specification (SRS) was produced before starting the design and development phases.
- But when Agile-based methodologies are used, heavy documentations are reduced.
- However, it is important to document the requirements for later use.
- When Agile-based methodologies are used, requirements engineering is usually performed in every iteration.

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# 2.

# A Case Study

## 2. A Case Study

# Automated Teller Machine (ATM)

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Let's assume we have gathered some requirements. The requirements are analyzed and the following user stories are identified.

- Account holder
  - I want to log into the ATM and do these operations
    - Inquire balance
    - Withdraw money
    - Change password
    - Print statement if needed

## 2. A Case Study

# Automated Teller Machine (ATM)

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- Cash handler
  - I will place the money in the machine. Then I will log into the ATM system and update the amount of money I placed.
- Branch manager
  - I want to get a status report including the transactions done by the account holders and the ATM's available money .

## 2. A Case Study

### Automated Teller Machine (ATM)

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Identify the stakeholders of the ATM system and draw an onion diagram.

- Note that the ATM machine itself is a part of the system.

5 mins

## 2. A Case Study

# Automated Teller Machine (ATM)

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### Stakeholders

**Do not include:**

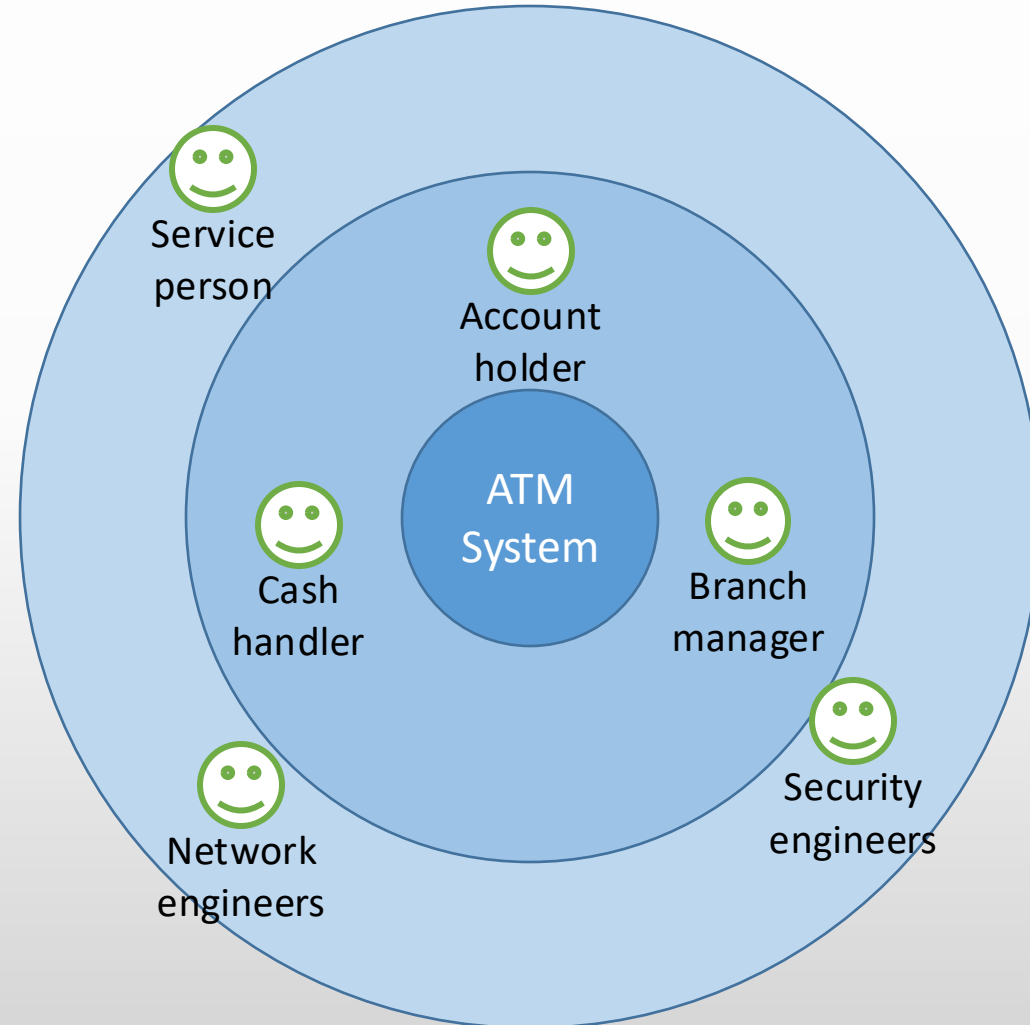
Designer

Developer

Tester

Hosting service

.....



## 2. A Case Study

# Automated Teller Machine (ATM)

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Identify the FRs, NFRs, and TRs from these requirements.

5 mins

## 2. A Case Study

# Automated Teller Machine (ATM)

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### Functional requirements

- Login – Account holder, Cash handler, Branch manager
- Balance inquiry – Account holder
- Withdraw – Account holder
- Update cash amount – Cash handler
- Get status report – Branch manager

## 2. A Case Study

# Automated Teller Machine (ATM)

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### Non-Functional requirements

Security, Scalability, Availability, Usability, Efficiency, Accuracy, Maintainability, .....

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#### **Account holder**

Security  
Availability  
Usability  
Performance – Speed  
Accuracy

#### **Cash handler**

Security  
Accuracy

#### **Branch manager**

Accuracy

## 2. A Case Study

# Automated Teller Machine (ATM)

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### Technical requirements

- Web-based system
- Back-end – Java web service
  - RESTful API
  - Host – server specification
- Front-end – Java Swing desktop app, Linux OS
- Security – SSL
- Database – Oracle

## 2. A Case Study

# Automated Teller Machine (ATM)

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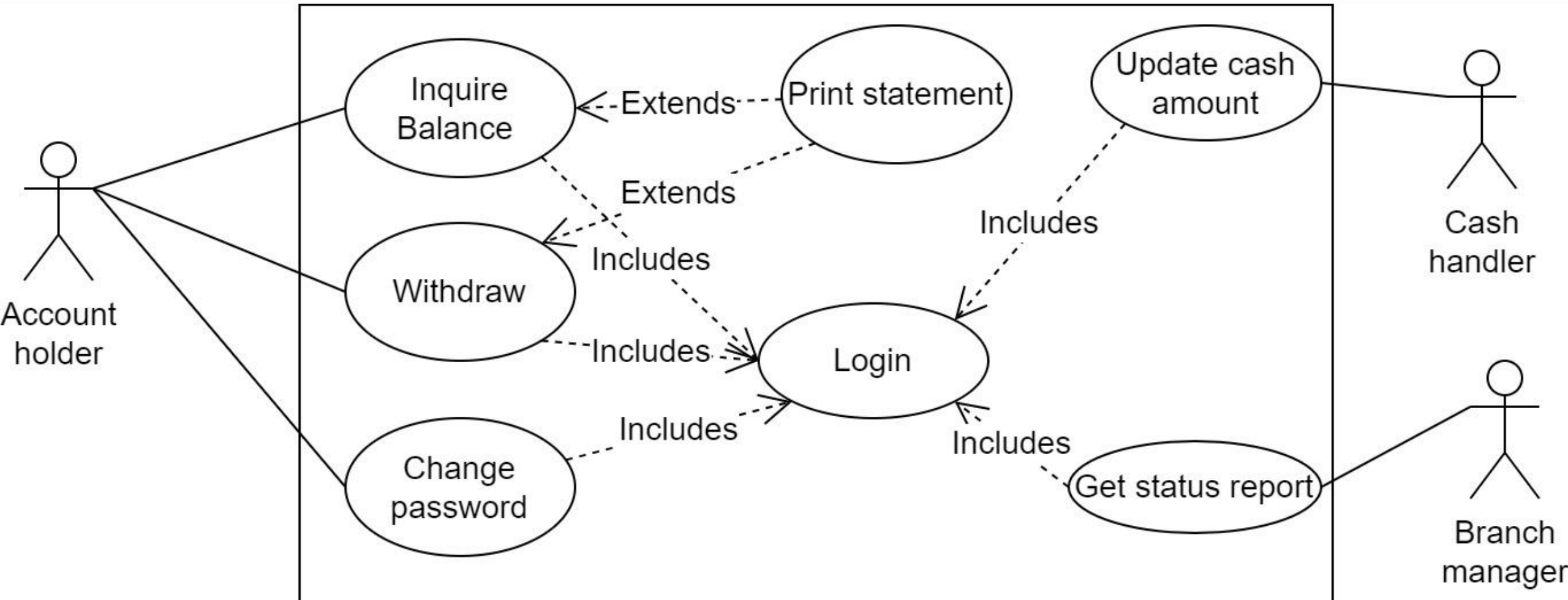
Draw a use case diagram for the ATM system

5 mins

## 2. A Case Study

# Automated Teller Machine (ATM)

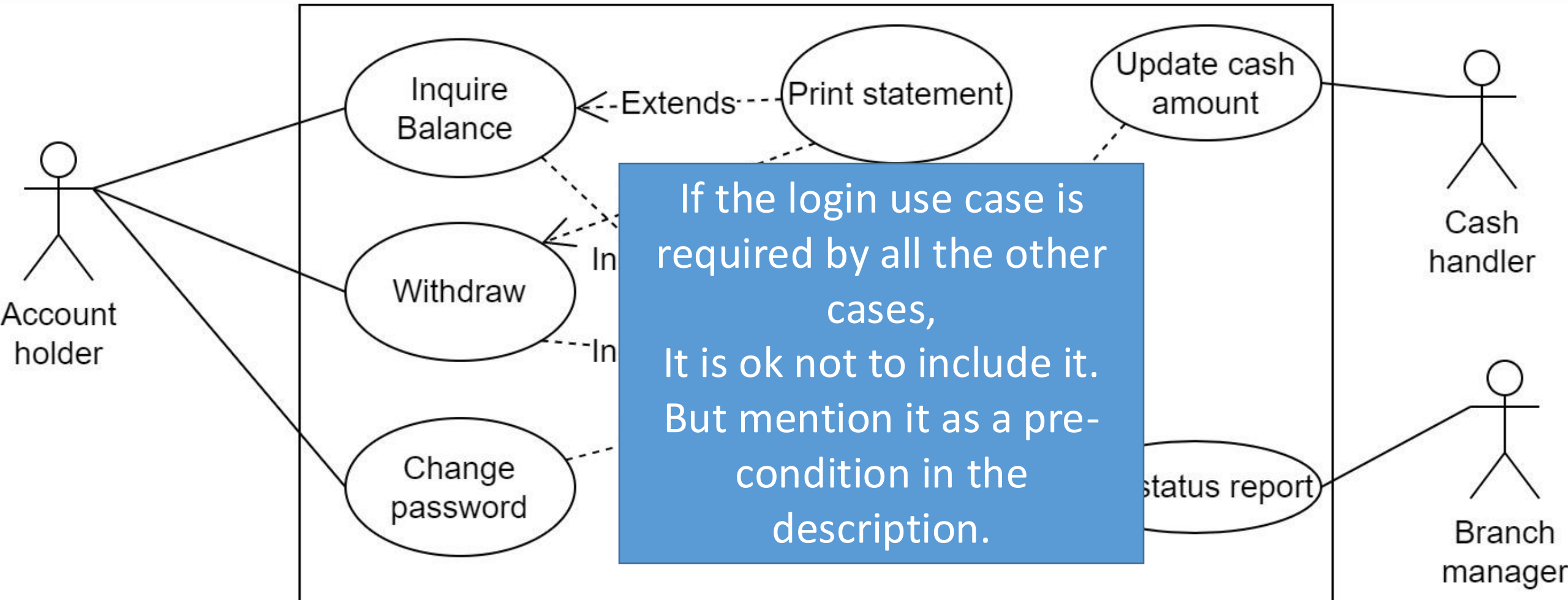
Use case diagram



## 2. A Case Study

# Automated Teller Machine (ATM)

### Use case diagram



## 2. A Case Study

# Automated Teller Machine (ATM)

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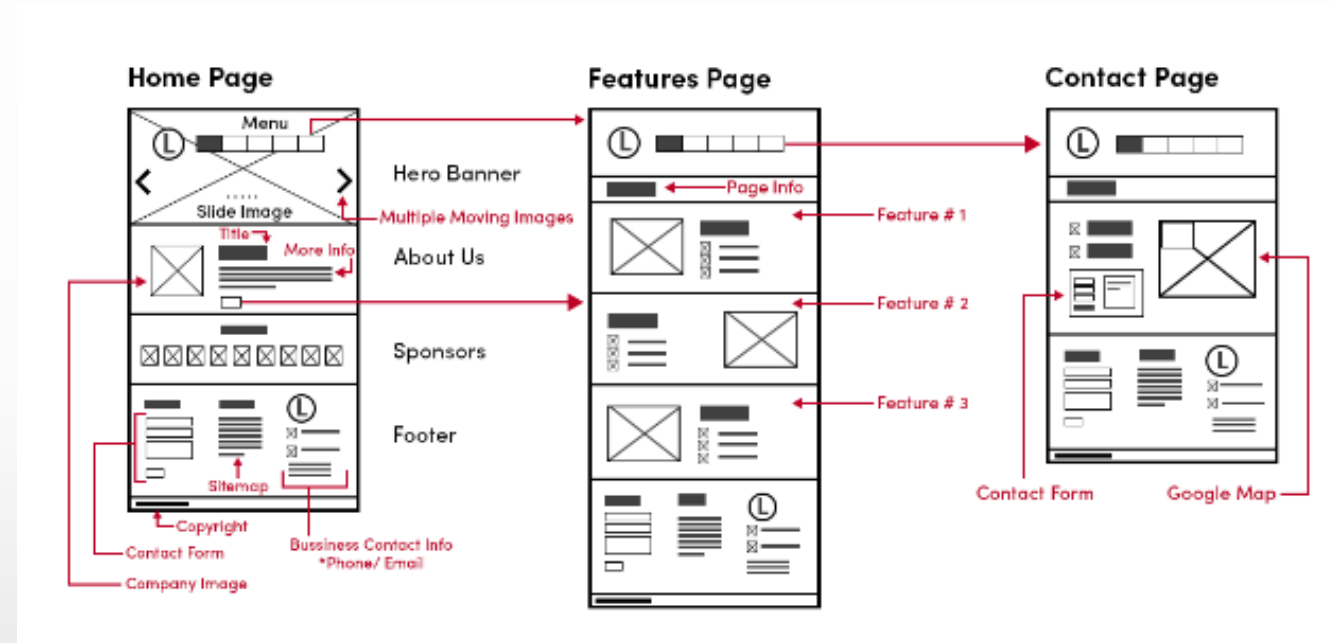
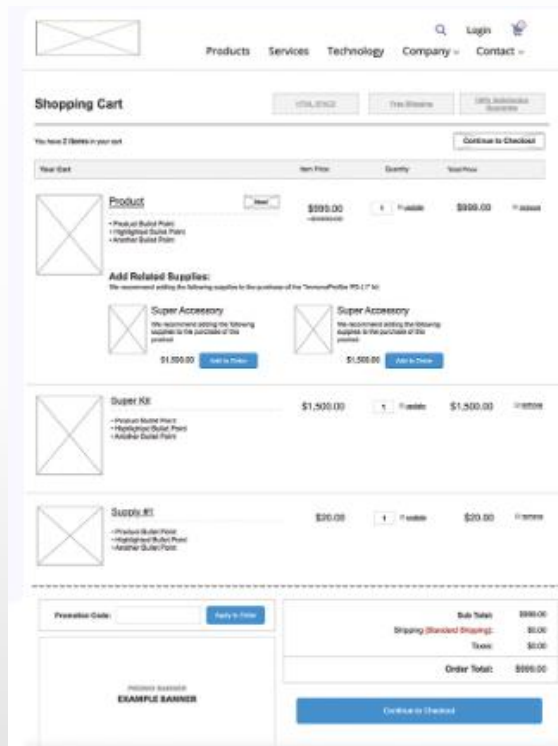
### Use case description

Use case name:	
Actor:	
Goal:	
Overview:	
Pre-conditions:	
Post-conditions:	
Basic path/ alternative path:	
NFRs and TRs:	

<https://www.visual-paradigm.com/guide/use-case/what-is-use-case-specification/>

<https://businessanalystmentor.com/use-cases-the-use-case-narrative/>

# GUI sketches



# Activity 2

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Objective: Identify the requirements of your system

1. Identify the stakeholders in your system and analyze them using an onion diagram.
2. List the Functional Requirements for the direct system users (in the inner most layer of the Onion diagram or main stakeholders).
3. List the related NFRs, and analyze them user wise.
4. State the Technical requirements for the system
5. Model the requirements using a use case diagram
6. Write down the use case descriptions for 5 main use cases in the diagram
7. Develop suitable diagrams to show visual presentation of data flow, the **process Flow and Data Connections** to support the above ( e.g system diagram, Flow chart, DFD)
8. Create a plan to develop the project.

# Summary

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1. Requirements Engineering Methods
2. A Case Study
3. Activity 2 submission