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***Project Topic:***  
***“E-commerce website to sell secondhand product;  
Bidding system for AIT.”***

***Software Engineering***  
***Software Requirements Specification***  
***(SRS) Document***

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# 1. Introduction

## 1.1 Introduction

Its idea is like any e-commerce platform in which buying and selling of goods are done. But the core addition will be the system of bidding before buying anything. The products added will be subjected to a certain time frame where users most probably buyers will be allowed to bid on their products and are able to buy the product once the bid time closes or when there are no other bidders.

## 1.2 Scope

We will be using MVC with Client-Server architecture. The main architectural challenges that will be addressed will be handling multiple concurrent transactions, real-time information updates and handling online payment through secure payment gateways.

System backup and recovery will not be handled as there are no long transactions that go in our system. However, we will be storing some instant information in the cache, so that with little interruptions like network connectivity issues users will be able to restore their session data.

The customer and the user for the system are the students and employees (staff and faculties) of AIT, including Administrator, and the developers of the system. In case of AIT, this platform can be used to sell the used items. More than one person could be interested in the same product, but with this system, there will be a sense of competition as one person bids over another user's bid at the same time and the product value will also increase.

## 1.3 Overview

The application will be using MySQL as a data store. For developing, we are using Java Spring Boot for backend and HTML & CSS for frontend.

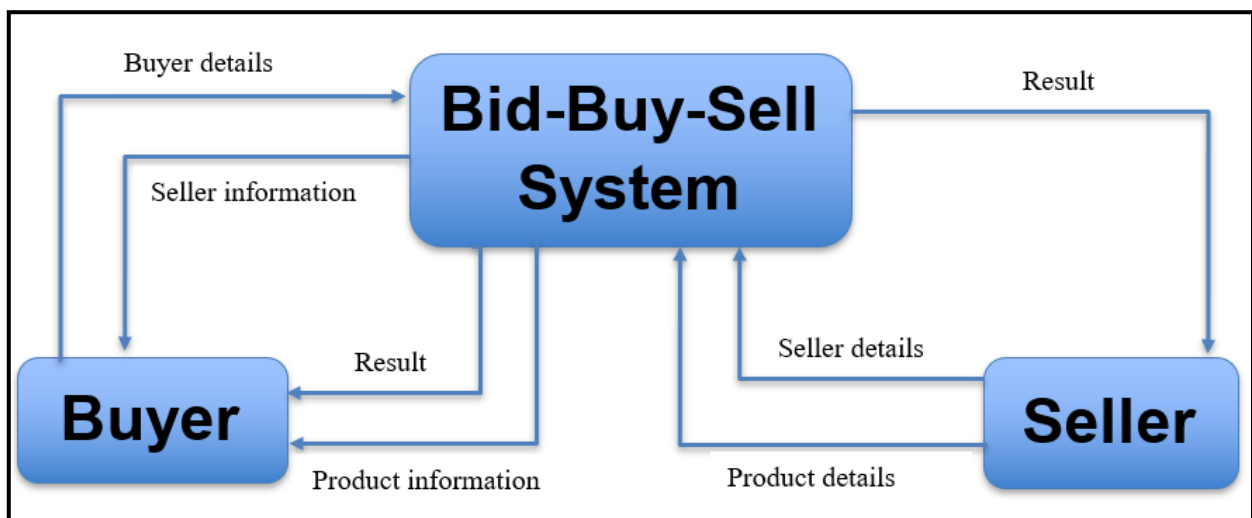


Figure 1. Context Diagram

## 2. Functional Requirement

### 2.1. User Module

- Users should be able to register into the system.
- Users should be able to login to the system.
- Users can update their profile details.
- Admin users can see and update user's information.
- Admin users can see the data dashboard.

### 2.2. Product Module

- Registered users can add new products with detailed description.
- Registered users can update or delete their product details until the bidding time starts.
- Admin users can update or delete product information.
- Sellers can set the bid start time and bid close time for the product.

### 2.3. Bidding Module (For registered users)

- Users can bid on products only during the valid bidding period.
- Users will be allowed to raise the bid amount only by certain predefined percentages.
- Users will be able to see the number of bidders active on the product.

### 2.4. Payment Module

- Sellers can determine mode of payment while adding product details.
- Winning users can select the payment method from the options available.

Note:

- ❖ Product, Users, and bidding details provided to the system shall be stored in the MySQL Database.
- ❖ The information shall be accessible via queries and JPA (Java Persistence API).
- ❖ The data stored should be able to be manipulated through forms or interface.

## 3. Interface Requirements

### 3.1. User Interfaces

The user interface for this project is the interface provided by HTML and CSS using Spring Boot. Interface includes forms and dashboard for the users to query and organize data to suit their needs. Forms and dashboard both have builders that let the user specify which fields they want to use and which constraints they want to define.

### **3.2.Hardware Interfaces**

The project uses the MySQL. Access hardware is managed by the operating system and MySQL.

### **3.3.Communications Interfaces**

If we decide to implement an Ad Hoc network for a shared database, the operating system will handle those connections.

## **4. Non-functional Requirements**

### **4.1.Performance**

The system shall be designed with high performance level to handle concurrent or multiple bidding and multiple bids of different product at same time. The output is to show who won and is bidding for the product in this system and we need to focus on concurrency, response time and block time.

This system should be available most of the time (mostly in bidding period) and it consists of transactions of lots of users concurrently.

### **4.2.Security**

The system shall be designed with a level of security appropriate for the sensitivity of information enclosed in the database. More interaction is needed with client about the instability of the information. Since there is no obvious information that is of a high security level such as credit card information, the only requirements that could be implemented are encrypting the database and/or making the database password-protected, by user's request.

### **4.3.Modifiability**

System should be easy to modify since data will not remain the same all the time and input sources may change with newer bidders/buyers and sellers. For users with different privileges/roles, the system should modify and make changes accordingly.

### **4.4.Reliability**

Reliability is one of the key attributes of the system. Back-ups will be made regularly so that restoration with minimal data loss is possible in the event of unforeseen events. The system will also be thoroughly tested by all team members to ensure reliability.

### **4.5.Interoperability**

For the website we just import and integrate various information with pictures into the system from the seller.

### **4.6.Portability**

The system shall be designed in a way that allow it to be run on multiple computers with different browsers.

#### 4.7.Scalability

With data, the storage size will increase but can be manage with time. This app can be made vertically scalable when there are issues of memory storage.

#### 4.8.Reusability

The system should be designed in a way that allows the database to be re-used regularly for the various bidding that the organization shall hold.

#### 4.9.Serviceability

The maintenance of the system should be able to be sufficiently performed by any person with a basic understanding of bidding system.

## 5. Preliminary Use Case Models and Sequence Diagrams

This section presents a list of the fundamental sequence diagrams and use cases that satisfy the system's requirements. The purpose is to provide an alternative, "structural" view of the requirements stated above and how they might be satisfied in the system.

### 5.1.Use Case Model

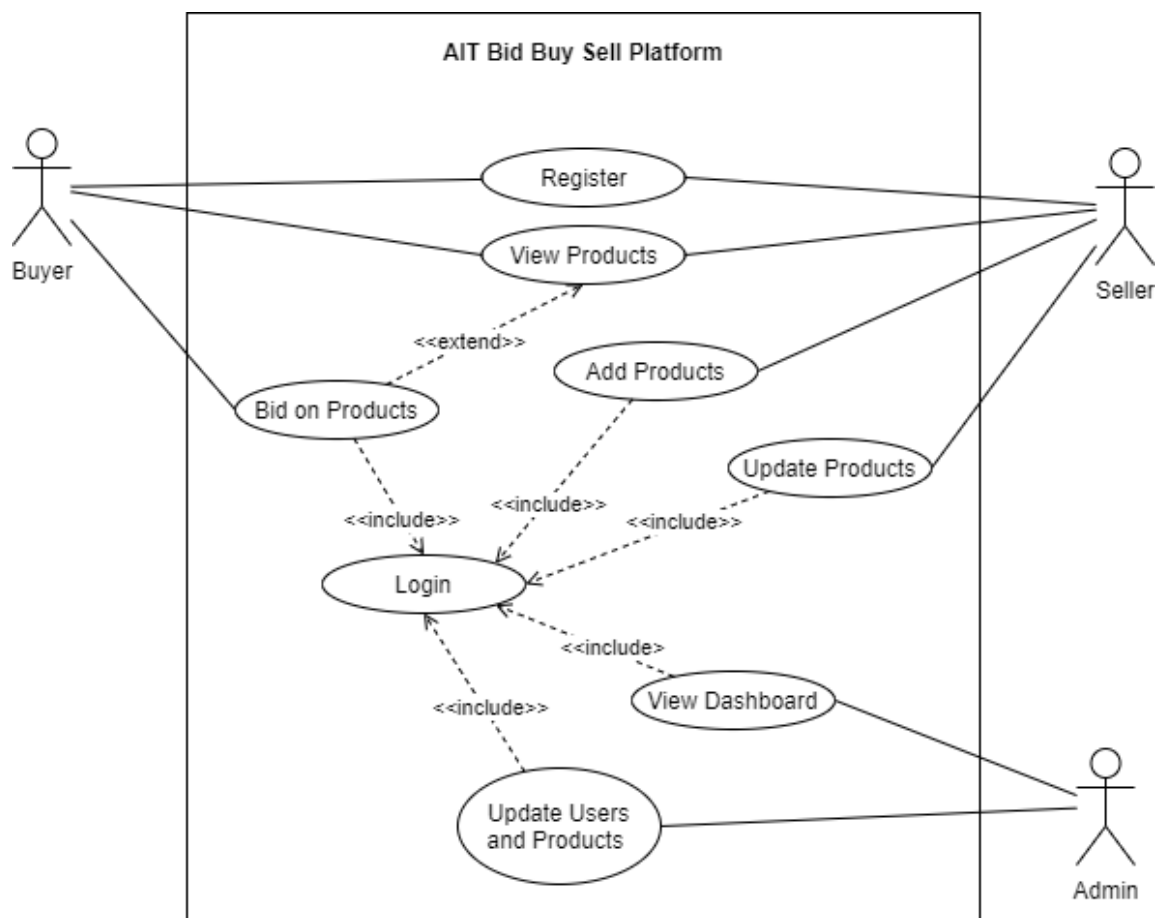


Figure 2. Use Case Diagram

## 5.2. Sequence Diagram

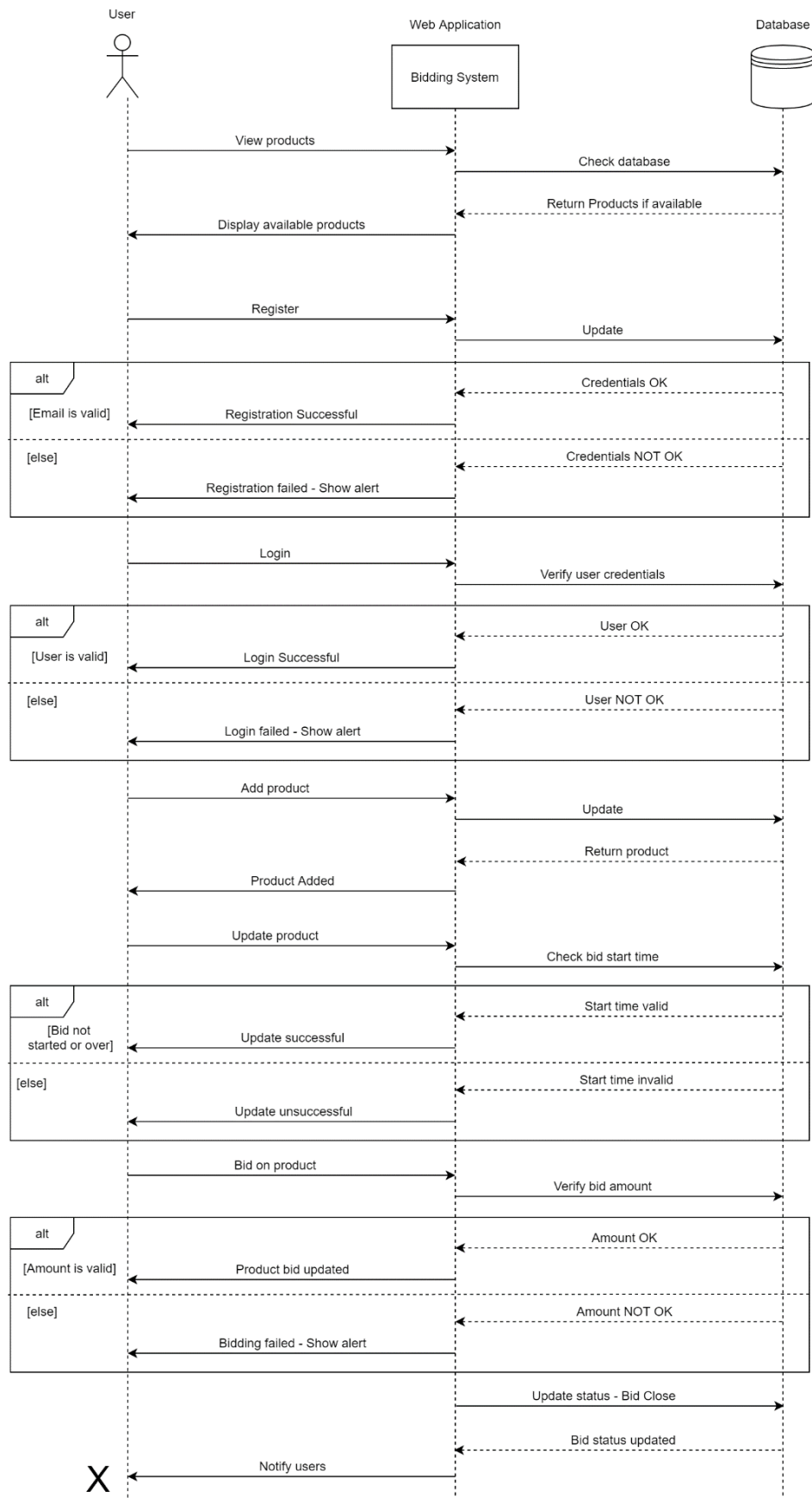


Figure 3. Sequence Diagram

## 6. Risk and mitigation plan

Risk management is the identification, assessment, and prioritization of risks followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events or to maximize the realization of opportunities.

The main objective of Risk Management is to minimize, monitor and control the probability of infortune events that may occur while doing the project. It is also to assure that uncertainty does not deviate the endeavor from goals thus maximizing the realization of opportunity.

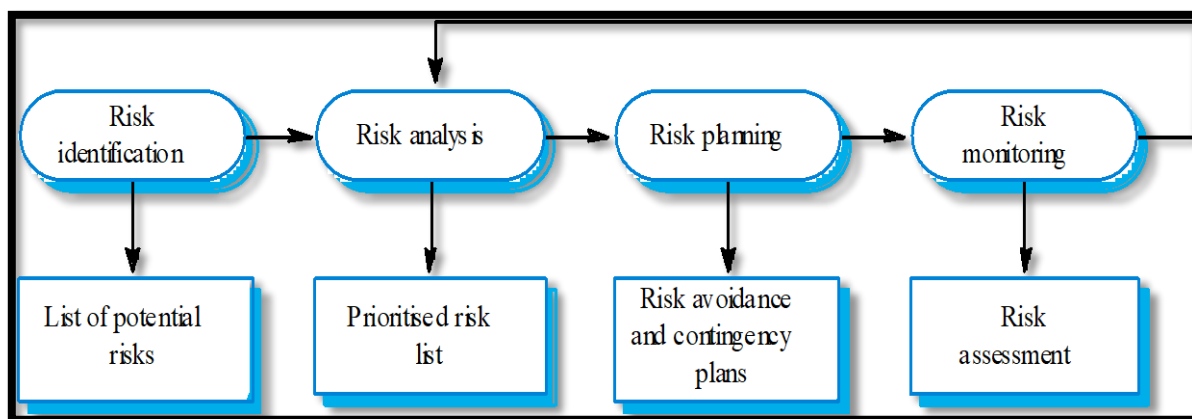


Figure 4. Risk Management process

### A. Different risks that can occur during the progress of the project are:

Table 1. Risk Identification

<i>Risk</i>	<i>Description</i>	<i>Example</i>
Technology	The risk that can come from uncertainty in technologies that we used during our project.	System crash
People	During the progress of the project, the potential problem that might occur due to the group members' contribution.	Members are ill during critical times in the project.
Tools	The risks that occur when the CASE tools which support the project do not perform as expected.	Code is inefficient.
Requirement	While doing the project, if any changes occur in our mind to either add or reduce some functionality on our project then it will lead to requirement risk.	Deletion of one of the functionalities.
Estimation	The risk that are likely to occur due to time of completion and size of the project.	Underestimate time and size

## B. RISK ANALYSIS

Table 2. Risk Analysis

Risk	Probability	Effect
System crashes	High	Serious
No internet access	Low	Tolerable
Members not able to come on time due to sickness or other reasons	Moderate	Serious
CASE tool which supports the project do not perform as expected	Moderate	Tolerable
Changes to requirement which require major work design are proposed	Moderate	Serious
Time required to develop the software is underestimated.	High	Serious
The size of the software is underestimated.	Moderate	Tolerable

## C. Risk Planning

Consider each risk and develop a strategy to manage that risk by:

### 1. Avoidance strategies

Taking actions that will avoid the risk altogether.

### 2. Minimisation strategies

Try to either reduce the impact of the risk or reduce the probability of risk arising.

### 3. Contingency plans

If the risk arises, contingency plans are plans to deal with that risk.

Table 3. Risk Planning

Risk	Strategies
System crashes (avoidance)	Constant systems scan and backup the files.
Members unavailable due to some reasons (minimize)	By mitigating the work in between and making an extra effort to meet the deadlines.
CASE tool which supports the project do not perform as expected (avoidance)	We could look for plugins to work with the current CASE tools and if it doesn't work then, we can use other CASE tools to complete our project on time.
Changes to requirements which require major work. (contingency)	Maximizing information hiding in the design by reviewing the report.
Time required to develop the software is underestimated (contingency)	Create a short term plan to complete the spillover tasks and give our extra effort
The size of the software is underestimated. (minimization)	Produce simple and effective products so that we can briefly describe the functionality.



## D. Risk Monitoring

Risk Management is an iterative process:

- Assess each identified risk regularly to decide whether or not it is becoming less or more probable.
- Also assess whether the effects of the risk have changed.
- Each key risk should be discussed at group meetings.

## 7. Planned Schedule

Table 4. Work Break Down

Activities	Remarks
1. Planning	
1.1. Project topic, problem statement and System scope	Done
1.2. Assignment of members, their roles and scheduling	Done
1.3. Setting up project git repo	Done
1.4. Quality attribute analysis	Done
1.5. Background study on architecture and design patterns	Done
2. Project requirements	
2.1. Determining and analysis of system requirements	Done
2.2. Initial UI Mockups design	Done
2.3. Preliminary Use case diagram and sequence diagram	Done
2.4. One series of mockups for one use case.	Done
2.5. Risk and mitigation plan	Done
2.6. Software requirements document.	Done
3. Architectural Design	
3.1. Design analysis	
3.2. Final Use-case diagrams, class-diagrams, sequence diagrams, deployment diagrams	
3.3. Literature review (RELATED WORK)	
3.4. Draft Scientific report	
4. Implementation	
4.1. Code design patterns	Done
4.2. Home page, login form, registration form	Done
4.3. Email functionality with authentication and authorization	Done

4.4. Implement ORM	
4.5. TBD	
5. Testing	
5.1. Unit testing	
5.2. Integration testing	
5.3. Performance testing	
5.4. Stress testing	
5.5. Acceptance testing	
5.6. Testing Documentation	
5.7. Update Scientific report	
6. Documentation	
6.1. Presentation slide	
6.2. Final Scientific report	
6.3. All updated Requirement, Design, Testing documents	