

American International University-Bangladesh (AIUB)  
**Department of Computer Science  
Faculty of Science & Technology (FST)**

**Polythene and Plastic Collector**

A Software Engineering Project Submitted

By

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester: Fall\_22\_23** | | **Section:** | **Group Number:** | |
| SN | Student Name | Student ID | Contribution (CO1+CO2) | Individual Marks |
| 1 | MD. ABDULLA AL MAMUN | 20-44192-2 | 20% |  |
| 2 | MD. MAHED HASAN RAMIM | 20-44158-2 | 20% |  |
| 3 | SHAH FAHIM CHOWDHURY | 17-33640-1 | 20% |  |
| 4 | N.S. SALMAN | 18-38488-2 | 20% |  |
| 5 | AKIF ZAMAN | 17-33224-1 | 20% |  |

The project will be Evaluated for the following Course Outcomes

|  |  |  |
| --- | --- | --- |
| CO1: *Analyze* the impact of software engineering models over various context of software development to assess societal, health, safety, legal and cultural issues. | Total Marks | |
|  | |
| Project Background Analysis and feasibility (needs, goal, benefits, etc.) | [5Marks] |  |
| Analysis the impact of societal, health, safety, legal and cultural issues | [5Marks] |  |
| Review of existing Studies and Relevant Example | [5Marks] |  |
| CO2: *Explain* appropriate software engineering model, project management roles and their skills in the context of professional engineering practice and solutions to complex engineering problems in a software development environment. | Total Marks | |
|  | |
| Appropriate Process Model Selection and Argumentation with Evidence | [5Marks] |  |
| Evidence of Argumentation regarding process model selection | [5Marks] |  |
| Submission, Defense, Completeness, Spelling, grammar and Organization of the Project report | [5Marks] |  |

# PROJECT PROPOSAL

## Background to the Problem

## Plastic is a polymeric material that is, a material whose molecules are very large, often resembling long chains made up of a seemingly endless series of interconnected links. Natural polymers such as rubber and silk exist in abundance, but nature’s “plastics” have not been implicated in environmental pollution, because they do not persist in the environment. The average consumer comes into daily contact with all kinds of plastic materials that have been developed specifically to defeat natural decay processes materials derived mainly from petroleum that can be molded, cast, spun, or applied as a coating. Since synthetic plastics are largely nonbiodegradable, they tend to persist in natural environments. Moreover, many lightweight single-use plastic products and packaging materials, which account for approximately 50 percent of all plastics produced, are not deposited in containers for subsequent removal to landfills, recycling centers, or incinerators. Instead, they are improperly disposed of at or near the location where they end their usefulness to the consumer. Dropped on the ground, thrown out of a car window, heaped onto an already full trash bin, or inadvertently carried off by a gust of wind, they immediately begin to pollute the environment. Indeed, landscapes littered by plastic packaging have become common in many parts of the world. Studies from around the world have not shown any country or demographic group to be most responsible, though population centers generate the most litter. The causes and effects of plastic pollution are truly worldwide.

## Plastic pollution can afflict land, waterways, and oceans. It is estimated that 1.1 to 8.8 million tons of plastic waste enters the ocean from coastal communities each year. It is estimated that there is a stock of 86 ([the Korean Society of Environmental Engineers (KSEE)](http://www.kosenv.or.kr/)) million tons of plastic marine debris in the worldwide ocean as of the end of 2013, with an assumption that 1.4% ([2017 United Nations Ocean Conference](https://en.wikipedia.org/wiki/2017_United_Nations_Ocean_Conference)) of global plastics produced from 1950 to 2013 has entered the ocean and has accumulated there. Some researchers suggest that by 2050 there could be more plastic than fish in the oceans by weight. Living organisms, particularly marine animals, can be harmed either by mechanical effects such as entanglement in plastic objects, problems related to ingestion of plastic waste, or through exposure to chemicals within plastics that interfere with their physiology. Degraded plastic waste can directly affect humans through both direct consumption, indirect consumption and disruption of various hormonal mechanisms.

## Solution to the Problem

Recycling plastic has long been the main solution for plastic pollution, yet only 10% ([**the Korean Society of Environmental Engineers (KSEE)**](http://www.kosenv.or.kr/)) of the world’s plastics are recycled. The lack of large-scale infrastructures and convenient access to recycling bins or facilities can be attributed to people not recycling regularly. Our "polythene and plastic collector" which is web base software will play a huge role in plastic recycling. People in our country throw away polythene or plastic after using it. Some of these discarded plastics are collected by the cleaning staff but most remain in the environment. People are doing these things again and again despite the fear of law and fines. As a solution to this, using our software, we used the money to buy used polythene and plastics from the people. Since they will get money for unused polythene and plastic, they will collect it without throwing it away. Those who will collect plastic and polythene using the software will be considered as buyers and those who will be collected from will be considered as sellers. Everyone will have their own account in the software. Prices will be determined based on the differences between plastic and polythene. Buyers will be able to collect plastic and polythene to make fuel oil from polythene and sell plastic bottles to build houses. Which will play a huge role in our country's economy and increase the recycling of plastics and polythene.

# SOFTWARE DEVELOPMENT LIFE CYCLE

## Process Model

The suitable model for this software is V-Model. The V model is a model in which the execution of the phases happens in a sequential manner in a v shape. It is an extension of the waterfall model and is based on association of a testing phase for each corresponding development stage of waterfall model. We select this model because it is easy to manage due to the rigidity of the model. Waterfall and V models are similar, however, their approach to software development is completely different. Each phase of V-Model has specific deliverables and a review process. Proactive defect tracking – that is defects are found at early stage. Moreover, the requirements are clearly defined and fixed for this software. This model focuses on verification and validation activities early in the life cycle thereby enhancing the probability of building an error-free and good quality product. The Waterfall Model is a sequential model where the process starts from the beginning and ends at the end. Unlike Waterfall Models where the development process is sequential, the V Model is a cyclical model which allows feedback from previous stages, to improve the next stage. In V Model, the first stage is to identify the problem or define a ‘requirement’. The requirements are gathered from various sources like User Interviews, Market surveys, etc. Then after the requirements are gathered, it is transformed into an analysis model using various methods like Brainstorming, Data Flow Diagrams, etc. This is called the first cycle of the V Model. If the first cycle is successful, then it can be taken into the development stage, and this is the second cycle of the V Model. Once the development is completed, it can be tested, and this will be termed as the third cycle of the V Model. Once the testing is done, it will be delivered to the customer, and this will be termed as the fourth cycle of the V Model. If there are any problems with the delivery, then it can be tracked down and corrected in the next cycle. This is how V Model works. The main advantage of the V Model is that it can deliver the software in a short period of time. During every cycle, changes can be made to the software if everything is not working according to the plan.

## Project Role Identification and Responsibilities

Role: Manager, Customer, Programmer, Tester

At first the manager decides for time, cost, resources, schedule, risk management. Then Customers do the requirement and analysis phase. This phase involves detailed communication with the customer to understand his expectations and exact requirement. This is a very important activity and needs to be managed well, as most of the customers are not sure about what exactly they need. The acceptance test design planning is done at this stage as business requirements can be used as an input for acceptance testing. Decides when each requirement is satisfied. The customer sets the implementation priority for the requirements. The actual coding of the system modules designed in is taken up in the Coding phase. The best suitable programming language is decided based on the system and architectural requirements. The coding is performed based on the coding guidelines and standards. The code goes through numerous code reviews and is optimized for best performance before the final build is checked into the repository. Unit Testing->Integration Testing->System Testing->Acceptance Testing. Every single phase in the development cycle there is a directly associated testing phase.

# REQUIREMENT ANALYSES

## Functional Requirements

1. User Registration
   1. Software will allow users registration with email or phone number.
   2. The user can register as a buyer or seller.
   3. After the 1st step successful then software will take users personal information.
   4. Software forces the user to set a strong password.
   5. If all steps are done, then the software will send a verification code by email or phone number.

Priority Level: High.

Precondition: User should have valid email address or phone number.

1. Software Login
   1. The software shall allow users to login with their given username and password.
   2. Login successful users will see their interface of account.
   3. If the number of login attempts exceeds its limit (5 times), the system will check whether the user is a robot.

Priority Level: High.

Precondition: User should have user id and password.

1. Forget Password
   1. Unfortunately, if users forgot the password, the software would allow them to reset the password by verifying the email address or phone number.

Priority Level: High.

Precondition: User should have user id and email address or phone number.

1. Map System
   1. Software will give permission to access a map that both buyer and seller will find each other.
   2. The software shows all the nearest buyers on the map.

Priority Level: Low.

Precondition: User should have user id and password.

1. Add & Edit
   1. A seller could add or edit or delete product, price.

Priority Level: High.

Precondition: User should have user id and password.

1. Request

6.1 Buyers can accept the request of seller and products.

Priority Level: High.

Precondition: User should have user id and password.

## Non-Functional Requirements:

**Security:** As it is an e-commerce software must have appropriate encryption and security protocols in place to protect customer data and prevent unauthorized access.

**Reliability:** The software must have a high uptime and be able to handle large amounts of traffic and concurrent users without performance degradation.

**Performance:** The software must be able to quickly and efficiently process orders and handle large amounts of data.

**Maintainability:** The software must be easy to update and maintain, with clear documentation and a modular design.

**Scalability:** The software must be able to easily accommodate a growing user base and increasing amounts of data.

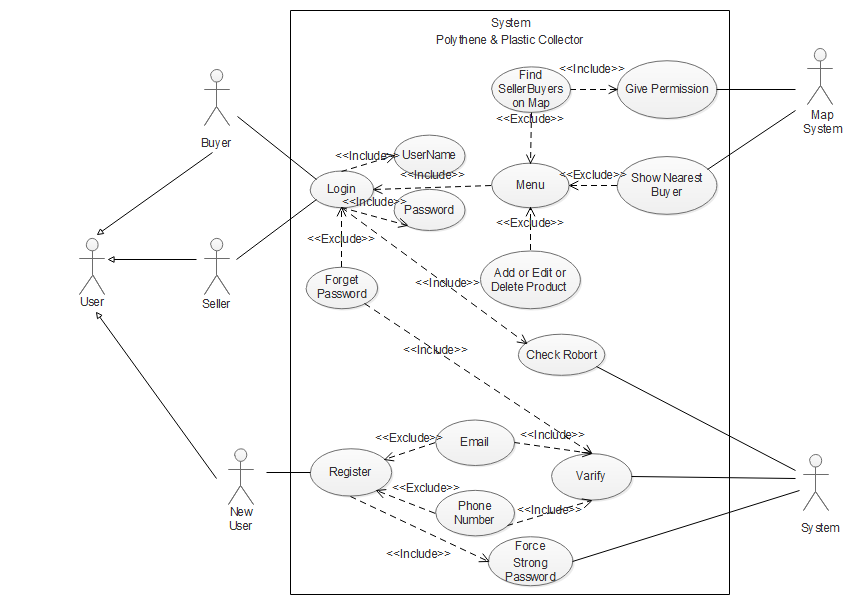
**Usability:** The software must be user-friendly, with a clear and intuitive interface for browsing and purchasing products.

## Project Requirements:

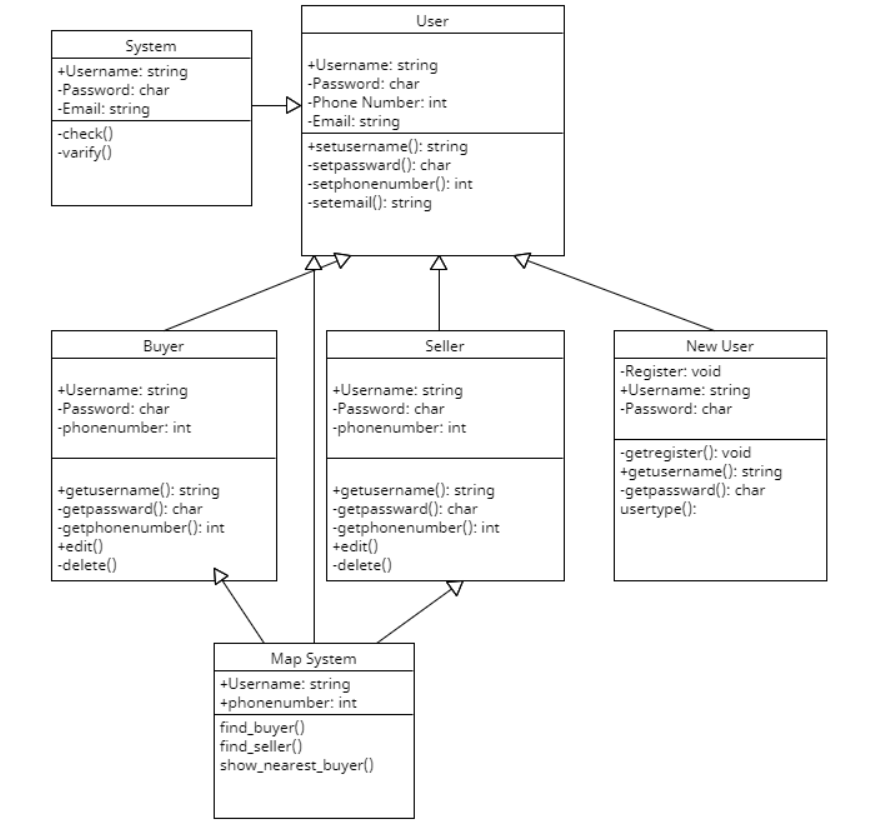
1. Time: We need 35 weeks to build this software.
2. Budget: We need around 3 lakhs to build this software.
3. Environment: We need an office space so that we can create our software flawlessly.
4. Resources: We need around 3 human resources to build this software.
5. Bandwidth: We need high speed internet support which is around 100 to 120 Mbps.

# DIAGRAM

1. Use Case Diagram:



1. Class Diagram:



1. Sequence Diagram:

Diagram

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1. Activity Diagram:

1Diagram

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# UI/UX DESIGN

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1. **PROJECT TEST PLANNING**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Project Name: Polythene and plastic Collector | | | Test Designed by: Akif | | |
| Test Case ID: FR\_1 | | | Test Designed date: 17/11/2022 | | |
| Test Priority (Low, Medium, High): High | | | Test Executed by: | | |
|  | | |  | | |
| Module Name: User registration | | | Test Execution date: | | |
| Test Title: Verify user registration | | | | | |
| Description: Test website user registration with required data | | | | | |
| Precondition (If any): User must input correct format of data | | | | | |
| Test Steps | Test Data | Expected Results | | Actual Results | Status (Pass/Fail) |
| 1. Go to the website 2. Click a new account 3. Enter Fist Name, Last Name, Username. 4. Enter password   Click submit   1. Allow user to register by email or phone number 2. Click Registration | First Name: Akif  Last Name: Zaman  Username: akif  Password: Akif@123  Email: [akifzaman1001@gmail.com](mailto:akifzaman1001@gmail.com)  Phone No.: 017542424242 | User should be able to do registration successfully. | |  |  |
| Post Condition: User is validated with database and successfully can login into account. | | | | | |

*Table 1: Test Case for User Registration*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Project Name: Polythene and plastic Collector | | | Test Designed by: Akif | | |
| Test Case ID: FR\_1 | | | Test Designed date: 17/11/2022 | | |
| Test Priority (Low, Medium, High): High | | | Test Executed by: | | |
|  | | |  | | |
| Module Name: User Registration | | | Test Execution date: | | |
| Test Title: Verify user registration to login page transition | | | | | |
| Description: Test website registration page transition | | | | | |
| Precondition (If any): User must have valid username and password | | | | | |
| Test Steps | Test Data | Expected Results | | Actual Results | Status (Pass/Fail) |
| 1. Go to the website 2. Already have an account to log in 3. Click “Already have an account” | Username: akif  Password: Akif@123 | User should login into the application with valid username and password | |  |  |
| Post Condition: User is validated with database and successfully login to account. | | | | | |

*Table 2: Test Case for User Accounts Transition*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Project Name: Polythene and plastic Collector | | | Test Designed by: Akif | | |
| Test Case ID: FR\_1 | | | Test Designed date: 17/11/2022 | | |
| Test Priority (Low, Medium, High): High | | | Test Executed by: | | |
|  | | |  | | |
| Module Name: User Registration | | | Test Execution date: | | |
| Test Title: Verify error pop up messages with wrong data in user registration | | | | | |
| Description: Test website user registration error pop up messages with wrong data | | | | | |
| Precondition (If any): User input incorrect format of data | | | | | |
| Test Steps | Test Data | Expected Results | | Actual Results | Status (Pass/Fail) |
| 1. Go to the website 2. Enter wrong Format First Name, Last Name, Username, Email, Phone No, and Password 3. Click Registration | First Name: @! #!  Last Nam: @###  Email: 1234  Phone no.: 01000  Username: @34.  Password: 1234 | Error messages should pop up for all the textboxes and user should put in correct format data to complete the registration. | |  |  |
| Post Condition: Error massage pop up | | | | | |

*Table 3: Test Case for Error Pop Up Messages*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Project Name: Polythene and plastic Collector | | | Test Designed by: Mamun | | |
| Test Case ID: FR\_2 | | | Test Designed date: 17/11/2022 | | |
| Test Priority (Low, Medium, High): High | | | Test Executed by: | | |
|  | | |  | | |
| Module Name: Login Session | | | Test Execution date: | | |
| Test Title: Verify login with valid username and password | | | | | |
| Description: Test website login page | | | | | |
| Precondition (If any): User must have valid username and password | | | | | |
| Test Steps | Test Data | Expected Results | | Actual Results | Status (Pass/Fail) |
| 1. Go to the website 2. Enter username 3. Enter password   Click submit | Username: User123  Password: Pass@123 | User should login into the application with valid username and password | |  |  |
| Post Condition: User is validated with database and successfully login to account. The account session details are logged in the database. | | | | | |

*Table 1: Test Case for Log in*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Project Name: Polythene and plastic Collector | | | Test Designed by: Mamun | | |
| Test Case ID: FR\_2 | | | Test Designed date: 17/11/2022 | | |
| Test Priority (Low, Medium, High): High | | | Test Executed by: | | |
|  | | |  | | |
| Module Name: Login Session | | | Test Execution date: | | |
| Test Title: Verify forgot password | | | | | |
| Description: Test website login page forgot password | | | | | |
| Precondition (If any): User must have created an account | | | | | |
| Test Steps | Test Data | Expected Results | | Actual Results | Status (Pass/Fail) |
| 1. Go to the website 2. Click forgot password 3. Enter email address or phone number 4. Click send code 5. Enter Code 6. Reset Password | Email: m@gamil.com  Phone Number: 019\*  Verify: 343  New Password: 7384@#2 | User should login into the application and reset new password | |  |  |
| Post Condition: User is validated with database and successfully login to account with new password. The account session details are logged in the database. | | | | | |

*Table 2: Test Case for Forgot Password*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Project Name: Polythene and plastic Collector | | | Test Designed by: Mamun | | |
| Test Case ID: FR\_2 | | | Test Designed date: 17/11/2022 | | |
| Test Priority (Low, Medium, High): High | | | Test Executed by: | | |
|  | | |  | | |
| Module Name: Login Session | | | Test Execution date: | | |
| Test Title: Verify login attempts | | | | | |
| Description: Test website login attempts | | | | | |
| Precondition (If any): | | | | | |
| Test Steps | Test Data | Expected Results | | Actual Results | Status (Pass/Fail) |
| 1. Go to the website 2. Enter wrong username 3. Enter wrong password 4. Click login 5. Try over 5 times 6. Fill up captcha | Username: User456  Password: Pass@888  Captcha: *U7EC4* | User should login into the application with invalid username and password over 5 time then the system will give a CAPTCHA will appear the login page | |  |  |
| Post Condition: User can find the login page once more and can login into account. | | | | | |

*Table 3: Test Case for Login Attempts*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Project Name: Polythene and plastic Collector | | | Test Designed by: Ramim | | |
| Test Case ID: FR\_4 | | | Test Designed date: 17/11/2022 | | |
| Test Priority (Low, Medium, High): High | | | Test Executed by: | | |
|  | | |  | | |
| Module Name: Selling Product | | | Test Execution date: | | |
| Test Title: Sell some product to buyer as seller. | | | | | |
| Description: Test some product from given list. | | | | | |
| Precondition (If any): User needs to create an account as a seller. | | | | | |
| Test Steps | Test Data | Expected Results | | Actual Results | Status (Pass/Fail) |
| 1.Login as a seller  2.Go to sell product  3.Thick mark to give listed products.  4.Click sell request. | Thick mark: Plastic,  Polythene (New)  Select Quantity:  5kg,7kg | User can sell their products | |  |  |
| Post Condition: User can see their sell request acceptance or rejection via notification. | | | | | |

*Table 1: Test Case for Selling Products*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Project Name: Polythene and plastic Collector | | | Test Designed by: Ramim | | |
| Test Case ID: FR\_4 | | | Test Designed date: 17/11/2022 | | |
| Test Priority (Low, Medium, High): High | | | Test Executed by: | | |
|  | | |  | | |
| Module Name: Buyer in Map | | | Test Execution date: | | |
| Test Title: Find buyer in map | | | | | |
| Description: Test for buyer find in the map | | | | | |
| Precondition (If any): User needs to create an account as a buyer | | | | | |
| Test Steps | Test Data | Expected Results | | Actual Results | Status (Pass/Fail) |
| 1.Go to the website  2.Login account  3.Go to Buyer in Map  5.Click action | Username: User123  Password: Pass@123 | User should see all the buyers nearby him | |  |  |
| Post Condition: None | | | | | |

*Table 2: Test Case for Buyer in Map*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Project Name: Polythene and plastic Collector | | | Test Designed by: Nafis | | |
| Test Case ID: FR\_5 | | | Test Designed date: 17/11/2022 | | |
| Test Priority (Low, Medium, High): High | | | Test Executed by: | | |
|  | | |  | | |
| Module Name: Edit product | | | Test Execution date: | | |
| Test Title: Edit a product by Buyer | | | | | |
| Description: Test edit a product from database. | | | | | |
| Precondition (If any): User needs to create an account as a buyer | | | | | |
| Test Steps | Test Data | Expected Results | | Actual Results | Status (Pass/Fail) |
| 1. Go to the website   2.Login account  3.Go to add and edit product  4.Click action  5.Click update | Click action: Plastic  Input updated:  Price:30Tk/KG | Buyer updated the product. | |  |  |
| Post Condition: All information update from database server successfully. | | | | | |

*Table 1: Test Case for Edit Products*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Project Name: Polythene and plastic Collector | | | Test Designed by: Nafis | | |
| Test Case ID: FR\_5 | | | Test Designed date: 17/11/2022 | | |
| Test Priority (Low, Medium, High): High | | | Test Executed by: | | |
|  | | |  | | |
| Module Name: Buyer Session | | | Test Execution date: | | |
| Test Title: Buyer can accept the request of seller product | | | | | |
| Description: Test website buyer page accept request | | | | | |
| Precondition (If any): User must accept products which are above 150/- | | | | | |
| Test Steps | Test Data | Expected Results | | Actual Results | Status (Pass/Fail) |
| 1. Go to Request's 2. Checkmark the appropriate product price. 3. Enter accept request 4. Click submit | Number of selected products:3  Total price:600 | User should accept the appropriate products for him by viewing the map. | |  |  |
| Post Condition: Seller can see the acceptance notification | | | | | |

*Table 2: Test Case for Buyer's Accept Request.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Project Name: Polythene and plastic Collector | | | Test Designed by: Nafis | | |
| Test Case ID: FR\_5 | | | Test Designed date: 17/11/2022 | | |
| Test Priority (Low, Medium, High): High | | | Test Executed by: | | |
|  | | |  | | |
| Module Name: Buyer Session | | | Test Execution date: | | |
| Test Title: Buyer can reject the product which is not appropriate. | | | | | |
| Description: Test website buyer page reject request | | | | | |
| Precondition (If any): User mustn't reject 2 request in a row of the products. | | | | | |
| Test Steps | Test Data | Expected Results | | Actual Results | Status (Pass/Fail) |
| 1. Go to Request's 2. See the products, if it is not needed then go to the next step. 3. Enter reject request 4. Click submit | Number of rejected request:1  Mark the seller for inappropriate products for future buying | User should reject the inappropriate products by following map. | |  |  |
| Post Condition: Seller can see the rejection notification | | | | | |

*Table 3: Test Case for Buyer's Reject Request.*

**6. Constructive Cost Model:**

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**7.1 Timeline Chart:**

Graphical user interface

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A picture containing calendar

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**7.2 Timeline Chart:**

Chart

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**8. Eva Exercise:**

Diagram

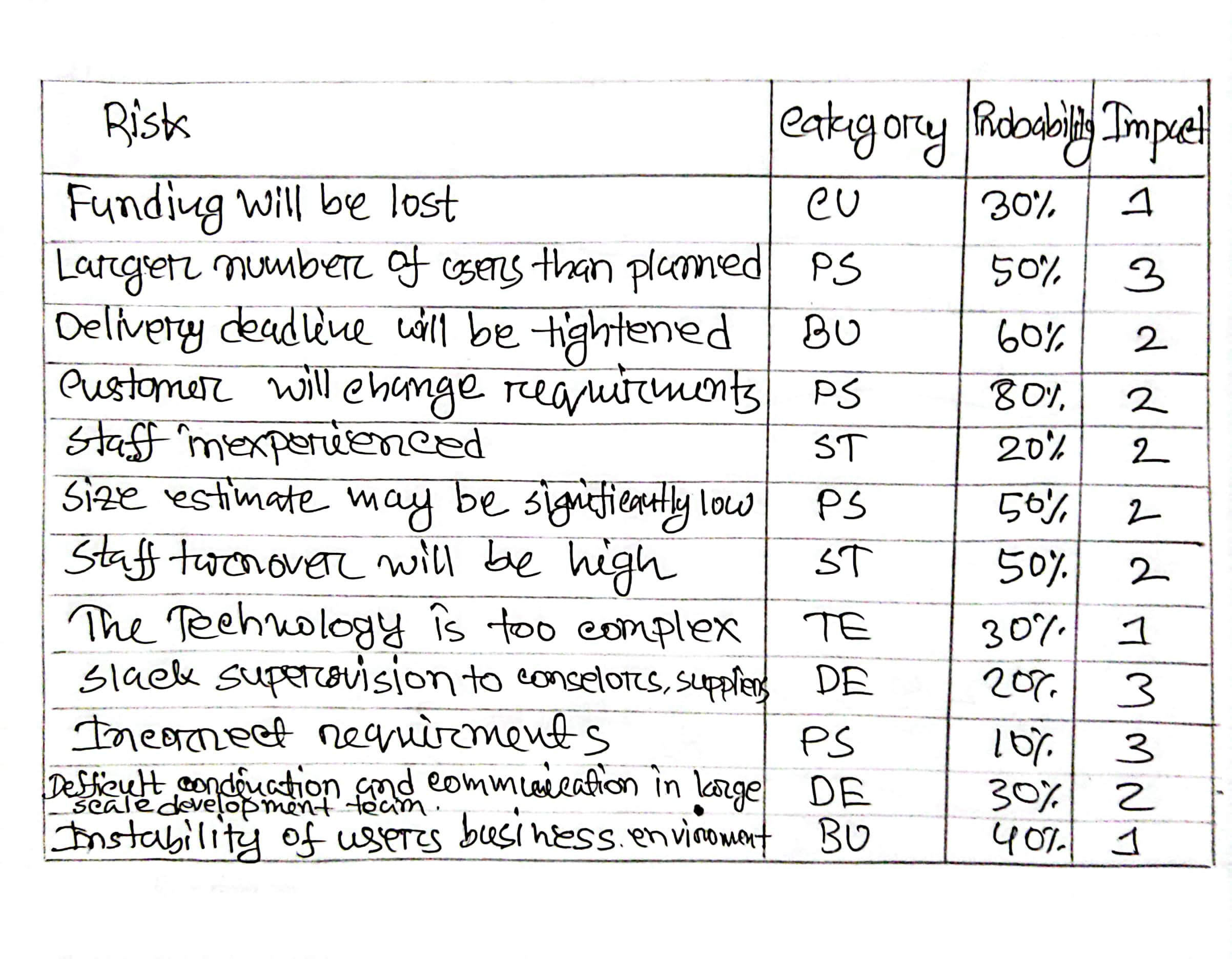
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Text, letter

Description automatically generated



**9. Building Risk Table-2:**



## Rubric for Project Assessment (CO1)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Marking Criteria | Marks Distribution (Maximum 3X5=15) | | | | Acquired Marks |
| **Inadequate (1-2)** | **Satisfactory (3)** | **Good (4)** | **Excellent (5)** |
|  |  |  |  |  |  |
| Background  Analysis | No background information regarding the project is  given; project goals and benefits are  missing. | Insufficient background information is given; project goals and benefits are  poorly stated | Sufficient background information is given; the purpose and goals of the project are explained. | Thorough and relevant background information  is given; project goals are clear and easy to identify. |  |
| Analysis the impact of societal, health, safety, legal and cultural issues | Student vaguely discuss the impact of societal, health, safety, legal and cultural issues in their project | Student provided with partial relevance to the impact of societal, health, safety, legal and cultural issues in their project | Student fairly provided the analysis to the impact of societal, health, safety, legal and cultural issues in their project | Student comprehensively provided the analysis to the impact of societal, health, safety, legal and cultural issues in their project |  |
| Existing Studies and Relevant Example | Ambiguous representative example. | Partially identify / indicate towards real-life example. | Real-life example is fairly connected towards the definition. | Comprehensively defend with real life example. |  |
| Acquired Marks: | | | | |  |
| CO Pass / Fail: | | | | |  |

## Rubric for Project Assessment (CO2)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Criteria | Marks distribution (Max 3X5= 15) | | | | Acquired  Marks |
| **Inadequate (1-2)** | **Satisfactory (3)** | **Good (4)** | **Excellent (5)** |
| Argumentation of Model selection with Evidence of Argumentation | Does not articulate a position or argument of choosing appropriate model. Does not present any evidence to support the arguments for the choice of the model | Articulates a position or argument for choosing models that is unfocused or ambiguous. Presents incomplete/vague evidence to support argument for model choice | Articulates a position or argument of choosing models that is limited in scope. Does not present enough evidence to support the argument for the choice of the model | Clearly articulates a position or argument for the choosing software engineering models. Presents sufficient amount of evidence to support argument for the model selection |  |
| Role identification and Responsibility Allocation | The project has poor project management plans for identifying roles and assigning the responsibilities | Identify few roles in the project management where some of the roles are left alone with any project responsibilities | Identify most of the roles in the project management and assign their responsibilities | Well planned project with proper role identification and responsibility allocation in the project management activities |  |
| Submission, Completeness, Spelling, grammar, and Organization of the Project report | Project report is not complete and Several errors in spelling and grammar. Present a Confusing organization of concepts, supporting  arguments, and  real-life example.  Sentences rambling, and details are repeated. | Some errors in spelling and grammar. Some problems  of organizing the answer in a logical order of defining,  elaborating, and providing real-life examples. | Few errors in spelling and grammar. Presents most of the details in a logical flow of  organization in  definition,  details, and  example. | Project report is complete and No errors in spelling and grammar. Consistently  presents a logical  and effective  organization of definition,  details, and real-life example of  the topic. |  |
| Acquired marks: | | | | |  |
| CO Pass / Fail: | | | | |  |