

American International University-Bangladesh (AIUB)

**Department of Computer Science Faculty of Science & Technology (FST)**

**Roof Gardening Management System**

A Software Engineering Project Submitted By

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester: Summer\_21\_22** | | **Section:** | **Group Number:** | |
| SN | Student Name | Student ID | Contribution (CO1+CO2) | Individual Marks |
| 1 | MAHMUD, SHEIKH TANVIR | 16-32652-3 | 20% |  |
| 2 | KHALIL, EVRAHIM | 18-37658-1 | 20% |  |
| 3 | NAYEEM, MD. SHAHIDUR RAHMAN | 18-38037-2 | 20% |  |
| 4 | SHOHAN, MD. SHOHANUL ISLAM | 19-39613-1 | 20% |  |
| 5 | NABIL, HADIUR RAHMAN | 20-42095-1 | 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.) | [5 Marks] |  |
| 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 Description:

An app is developed as part of the project to assist with gardening. The current plan is for the government to enact legislation requiring every building with a terrace to plant trees, but it is difficult to find trees in Dhaka, and even more difficult for people to find time from their busy schedules to obtain the necessary fertilizer and other equipment to care for the plants. As a result, the government will give the essential gardening equipment. Citizens will be able to order trees and other equipment online through the app, and the nursery will deliver these services. The labor information will be visible in the software, ensuring that the house owner does not face any unpleasant situations.

# Background of the problem:

Unplanned urbanization is the root cause of the problem. We would like to plant trees, but there isn't enough room. Pollution in the environment has become a headache for all countries throughout the world, particularly in Dhaka, and Bangladesh. Dhaka, as everyone knows, has become the most polluted city on the planet. In the project, an app is planned to develop so that it can help to do gardening effortlessly. This gardening process will support decreasing the temperature and ensure timely rain in Dhaka city.

# Project Objectives:

* The name of the project is gardening management where An app is developed as part of the project to assist with gardening
* This process ensures flexibility in gardening.
* Key features of this management system are Citizens will be able to order trees and other equipment online through the app, and the nursery will deliver these services
* This software is mobile-based software to grab the attention of mass users. The target is to increase the tree in Dhaka city to maintain a healthy weather

# Proposed Solution:

Gardening is the theme of our project. Clients may use this program to count how many trees can be planted and see how the landscape will appear once the plants have been decorated. In a nutshell, it will virtually show us how the garden would appear. This project necessitates the use of some software. Some of them just show us how the garden will appear in the future, while others provide us with information on the plants. Our software, on the other hand, will fill in the gaps left by those other programs and offer new functions. Our program will both count the number of trees that can be planted on a roof and depict how the roof will appear once the operation is completed. We will enter all of the roof sizes into the software, and the software will calculate how many plants may be planted. Our program will also be able to compute the number of trees of each variety that can be planted. We will be able to establish more vital plants in this manner. The benefits and drawbacks of the tree will be shown in our program, and the consumer will be able to order the tree of his choosing. In this section, he will be able to select which trees they want to plant, such as flowering trees or fruit-bearing trees. They will place an order when they have made their decision, and the workforce will arrive at their residence.

There is an issue with this initiative. People are largely uninterested because of the difficulties they confront while attempting to grow in the city. We intend to pique their interest by demonstrating how lovely their rooftop will look after gardening and how quickly they can obtain the essential supplies.

# The target group of uses:

The people who have at least a roof or a veranda to make a garden. Also, the people who are experts to use a laptop or an android phone, are the targeted user. As they can maintain all the app operations.

# Basic functionality:

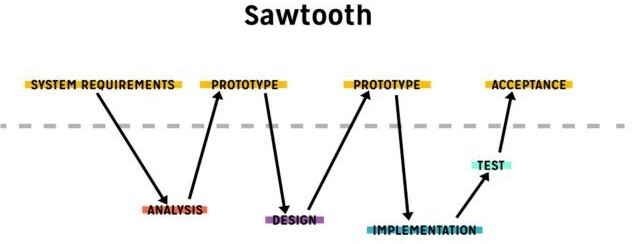
* User Registration
* Login
* User management
* Admin panel
* User Activities
* Contacts

# Selection of Process model:

**Propose model**

Our software will calculate how many trees can be placed on a roof and what the roof will look like after those trees are there. Customers will be able to buy trees, and fertilizer, and even make an appointment with an agriculturist if their gardens are infected by illnesses through this program. To make this software better, a review component will be included. Therefore, the **Sawtooth Model** was selected for this program since it is the most appropriate linear process model.

For instance, if a foreign species of plants is imported and clients want those plants, we will need to add new information about the plants. In this scenario, we are adding new information without it changing the features of our program, therefore it is a linear process rather than an incremental one.

 Figure: Sawtooth Model

# Specific Documents of Roof Gardening

**Introduction**: Roof gardening provides a great gardening experience, as well as some hand grown fruits and vegetables, as well as an amazing sitting experience in the fresh air. Apart from that, terrace gardening will defend our structure from heat absorption. Terrace gardens are simple to maintain and can be used to raise a variety of vegetables and fruits.

**Purpose:** They have the potential to control the quantity of carbon dioxide and other pollutants discharged into the air you breathe on a daily basis. Your children will inhale the fresh air brought in by your garden, which will help them develop a stronger immune system.

**Intended Audience**: Gardening is one of the most gratifying, enjoyable, and healthy pastimes available. It comes with a slew of advantages that go way beyond what you might expect at first. Gardening is a way of life for some people, a way to disconnect from the rest of the world in their own personal place.

**Definitions and Acronyms**: A patio, balcony, or other outside living area is what a terrace is defined as. A paved sitting area adjacent to an apartment's back door is an example of a terrace. In the midst of a street, a tiny strip of planted ground. The colonnades surround a porch or walkway.

**Overall Description:** Well, it's just producing fruits, veggies, or any other plants on one's home's rooftop without using pesticides or chemicals. As individuals find less space to grow plants, terrace gardening is becoming more popular in most urban locations across the world.

### User Needs:

* Planters. Containers constructed of clay, baked clay (ceramic), and plastic are commonly used as planters.
* Fertilizers. The initial nutrients for the plants will come from the potting mix. • A watering can or a pump.
* Trowels.
* Gloves.
* Pruners.
* Bio-Pesticide

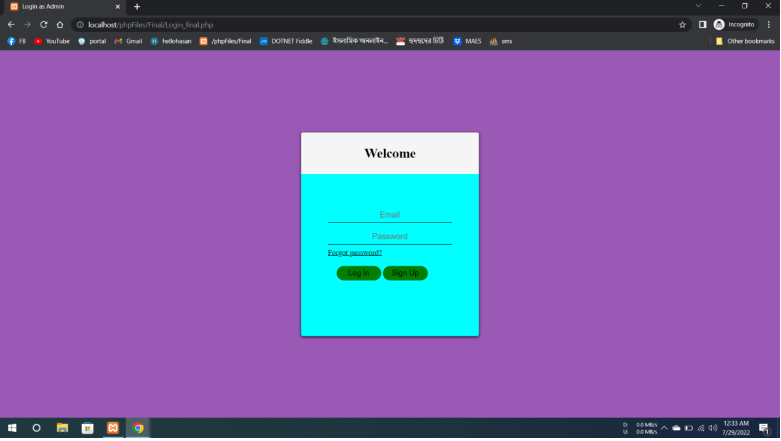
**Advantages:** Some of the health, aesthetic, and environmental benefits include: 1. Lowering indoor temperatures by 6-8 degrees and lowering air conditioning costs 2. Lowering overall heat absorption and insulating buildings against heat and cold 3. Conducive to a regimen of physical exercise, clean air, and being close to nature 4. Increases the amount of oxygen in the air 5.Reduces sound pollution 6. Act as a refuge for city-weary birds

# Diagram

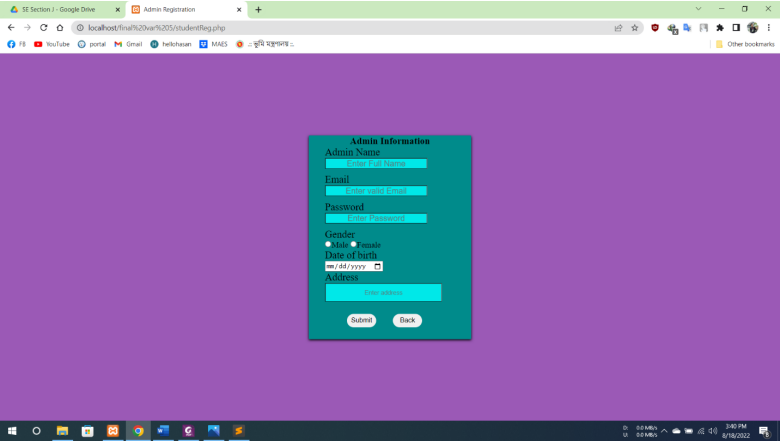
# 

# UI/UX design:

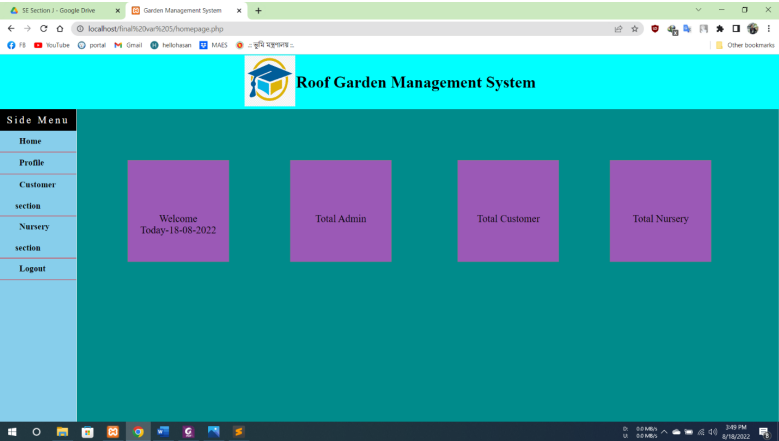
**Login page:**

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# Registration Page:

****

# Home Page:

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# Project Test Planning:

A Test Plan is a detailed document that describes the test strategy, objectives, schedule, estimation, deliverables, and resources required to perform testing for a software product. Test Plan helps us determine the effort needed to validate the quality of the application under test. The test plan serves as a blueprint to conduct software testing activities as a defined process, which is minutely monitored and controlled by the test manager.

# Test case (login)

|  |  |  |  |
| --- | --- | --- | --- |
| **Test case(login)** | | | |
| Priority | | Medium | |
| Pre-condition: user must enter email and password | | | |
| Post-condition: N/A | | | |
| Test Steps | Test data | Expected result | Status |
| User’s email | [nabil@gmail.com](mailto:nabil@gmail.com) | Login to system | passed |
| Password | Test2password |

# Test case (login)

|  |  |
| --- | --- |
| **Test case(Registration)** | |
| Priority | Medium |
| Pre-condition: user must enter email and password, address, full name | |
| Post-condition: N/A | |

|  |  |  |  |
| --- | --- | --- | --- |
| Test Steps | Test data | Expected result | Status |
| User’s email | [nabil@gmail.com](mailto:nabil@gmail.com) | Information save to database | passed |
| Password | Test2password |
| Full name | Hadiur Rahman Nabil |
| Address | Dhaka, Bangladesh |

# Project planning:

**Test case 1:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Project Name: Roof Gardening Management  System | | | Test Designed: Hadiur Rahman Nabil | | |
| Test case ID: ST\_1 | | | Test designed date: 18/8/22 | | |
| Test priority(low,medium,high): Medium | | | Test executed by: Evrahim khalil | | |
| Module name: Registration | | | Test executed date: 18/8/22 | | |
| Test title: Create new account using required data | | | | | |
| Description: test application registration | | | | | |
| Precondition (If any): user must enter email, password, name should be valid, password must be 8 character long | | | | | |
| Test Steps | Test data | Expected Results | | Actual Results | Status (pass/fail) |
| 1. Go to   homepag e   1. Go to   registrati on window   1. Enter   email   1. Enter   password   1. Enter   name   1. Verify otp 2. Click registrati on 3. Click on   profile | Email: [msr@gmail.com](mailto:msr@gmail.com) Password: Test2password Name: nayeem Address: Dhaka, Bangladesh | User data should be store to database, after click registration user should get OTP on his email. After enter valid OTP user should be able to go to his  profile. | | As expected, | Pass |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| link |  |  |  |  |
| Post Condition: User is validated with database and successfully created a new account. The  account session details are logged in the database. | | | | |

**Test case 2:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Project Name: Roof Gardening Management  System | | | Test Designed: MD. Shahidur Rahman nayeem | | |
| Test case ID: ST\_2 | | | Test designed date: 18/8/22 | | |
| Test priority (low, medium, high): High | | | Test executed by: Hadiur Rahman Nabil | | |
| Module name: Registration | | | Test executed date: 18/8/22 | | |
| Test title: login to system using registered data (email and password) | | | | | |
| Description: test application system login | | | | | |
| Precondition (If any): user must enter email, password, name should be valid, password must  be 8 character long | | | | | |
| Test Steps | Test data | Expected Results | | Actual Results | Status (pass/fail) |
| 1. Go to   homepag e   1. Go to   login window   1. Enter   Email and Password   1. Click Login   button | Email: [nabil@gmail.com](mailto:nabil@gmail.com) Password: Test2password | User logged in successfully using registered email and password | | As expected, | Pass |
| Post Condition: User logged in successfully to given required data. | | | | | |

**Test case 3:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Project Name: Roof Gardening Management System | | | Test Designed: Hadiur Rahman Nabil | | |
| Test case ID: ST\_3 | | | Test designed date: 18/8/22 | | |
| Test priority (low, medium, high): Medium | | | Test executed by: Shohan md. Shohanul islam | | |
| Module name: add new nursery | | | Test executed date: 18/8/22 | | |
| Test title: add new nursery in specific location | | | | | |
| Description: test application adding new nursery | | | | | |
| Precondition (If any): check nursery details, location, opening and closing time | | | | | |
| Test Steps | Test data | Expected Results | | Actual Results | Status (pass/fail) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1. Go to | Name, email, | Save all the | unexpected, | failed |
| homepage | contact, location | information to |  |  |
| 2. Go to login |  | database |  |  |
| window |  |  |  |  |
| 3. Nursery |  |  |  |  |
| section |  |  |  |  |
| 4. Enter |  |  |  |  |
| nursery |  |  |  |  |
| informatio |  |  |  |  |
| n |  |  |  |  |
| 5. Click save |  |  |  |  |
| button |  |  |  |  |
| Post Condition: nursery owner can add different tree in different categories. | | | | |

**Bug report:**

|  |  |
| --- | --- |
| bug Name: Application crashes upon clicking  the SAVE button while creating a new nursery. | Test Designed: Hadiur Rahman Nabil |
| bug ID: automatically by software | Test designed date: 18/8/22 |
| Area path: Login -> Add new Nursery -> save | |
| Build Number: version 3.0.1 | |
| Severity: High or 1 | Priority: High or 1 |
| Assigned to: group 1 | Reported by: Hadiur Rahman Nabil |
| Reason: Defect | Reported on: 18/8/22 |
| Status: New | Environment: Windows 2010/SQL server |
| Description: Application crashes upon clicking the SAVE button while creating a new tutor with  session, hence unable to create a new tutor session in the application. | |
| Steps to reproduce:   1. Login to system 2. Go to add nursery 3. Enter all the information 4. Click on save button 5. Seen an error “… Expectation: insert values error” 6. See logs 7. Also see attached screenshot of error page | |
| Expected Result: On clicking the SAVE button, you should be prompted to a successful message  “New nursery added successfully”. | |

**Test case 4:**

|  |  |
| --- | --- |
| Project Name: Roof Gardening Management System | Test Designed: MD. Shahidur Rahman  nayeem |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test case ID: ST\_4 | | | Test designed date: 18/8/22 | | |
| Test priority (low, medium, high): Medium | | | Test executed by: MD. Shahidur Rahman  nayeem | | |
| Module name: Adding new customer | | | Test executed date: 18/8/22 | | |
| Test title: customer registration | | | | | |
| Description: customer can order new tree, gardening equipment etc. | | | | | |
| Precondition (If any): admin check customer information | | | | | |
| Test Steps | Test data | Expected Results | | Actual Results | Status (pass/fail) |
| 1. Go to   homepage   1. Go to login 2. New user registration 3. Enter name 4. Enter email 5. Enter   password   1. Enter   location   1. Click registration | Email: [mrtn@gmail.com](mailto:mrtn@gmail.com) Password: Test4userr Name: nayeem Address: Dhaka, Bangladesh | Save all the information to database | | As expected, | Pass |
| Post Condition: user can access system after successful registration. | | | | | |

**Test case 5:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Project Name: Roof Gardening Management  System | | | Test Designed: MD. Shahidur Rahman nayeem | | |
| Test case ID: ST\_5 | | | Test designed date: 18/8/22 | | |
| Test priority (low, medium, high): Medium | | | Test executed by: Hadiur Rahman Nabil | | |
| Module name: profile | | | Test executed date: 18/8/22 | | |
| Test title: update/change admin information | | | | | |
| Description: admin information changed by given information | | | | | |
| Precondition (If any): admin can not change email | | | | | |
| Test Steps | Test data | Expected Results | | Actual Results | Status (pass/fail) |
| 1. Go to | Name, password, | Save all the | | unexpected, | failed |
| homepag | location | information to | |  |  |
| e |  | database | |  |  |
| 2. Go to |  |  | |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| login window   1. Go to   profile section   1. Edit 2. Click save button |  |  |  |  |
| Post Condition: User can see updated information after successful update. | | | | |

# Bug report:

|  |  |
| --- | --- |
| bug Name: system can not show updated  information after edit | Test Designed: Hadiur Rahman Nabil |
| bug ID: automatically by software | Test designed date: 18/8/22 |
| Area path: Login -> profile -> edit | |
| Build Number: version 3.0.1 | |
| Severity: Medium | Priority: Low or 1 |
| Assigned to: group 1 | Reported by: Hadiur Rahman Nabil |
| Reason: Defect | Reported on: 18/8/22 |
| Status: New | Environment: Windows 2010/SQL server |
| **Description**: Application can’t show modified information after edit information., hence unable  to change information or edit new information in the application. | |
| Steps to reproduce:   1. Login to system 2. Go to profile 3. Edit 4. Navigate all the information -> edit information 5. save 6. Seen an error “… Expectation: insert values error” 7. See logs 8. Also see attached screenshot of error page | |
| Expected Result: On clicking the SAVE button, you should be prompted to a successful message  “New information has been edit successfully” and new information show in profile. | |
| Effort estimation: | |

Estimation in software engineering refers to an effort to estimate the cost, time, and effort necessary to develop a particular software-based system. It aids the project manager in making more accurate predictions about the time and effort required to complete the project.

# Cost estimation:

Total resource cost = 400 $ Employee Salary:

Developer= (2\*150) =300$ Business analyst = 200$ Testing team= 300$

Total salary= 800$

Total cost= 900$ per month

# Budget estimation:

Profit= 300$ Time= 6 month

Total budget= (900$+300$) \* 6

= 7200$

# Activity Scheduling and Resource Allocation:

# Activity Scheduling:

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Duration** | **Start** | **End** |
| Project plan | 8 | 16/8/22 | 25/8/22 |
| Analysis | 5 | 23/8/22 | 29/8/22 |
| Design | 11 | 30/8/22 | 1/9/22 |
| Development | 12 | 2/9/22 | 20/9/22 |
| Test | 8 | 21/9/22 | 30/9/22 |
| System Deploy | 2 | 3/10/22 | 4/10/22 |

# Resource allocation:

### Human Resource allocation:

We suggest using a genetic approach to solve the issue of allocating human resources (GA). We contrast our method with one that only takes the shortest possible time into account. Our analysis demonstrates that the proposed algorithm takes into account the practical aspects of continuous allocation on pertinent tasks, minimization of developer multitasking time, and allocation balance.

### Helps in planning:

Allocating resources can stop you from overspending on resources you don't need or from running out of them in the middle of a project. With the appropriate tools, you can quickly determine the resources and timelines available for projects currently in the pipeline and make plans accordingly. increases team morale and well-being Your workforce may become burned out as a result of poor resource management. When that occurs, performance and productivity suffer, and happiness vanishes.

### Assign all the stuffs:

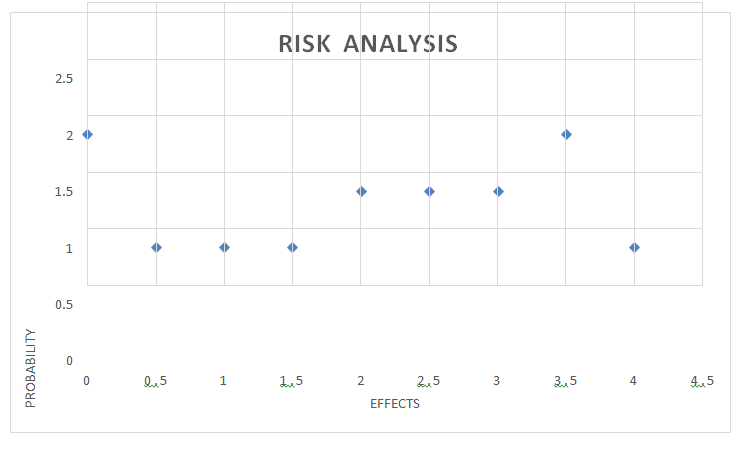
When collaborating on a project, it is essential to track progress. That usually means regular updates on the status of tasks, issues, and milestones. If you’re using manual tools, this will eat up your time and increase the odds of making mistakes.

### Software:

For better project management we used software “TRELLO”. In Trello we created a workspace and added all the teammates together. Assign their task and set deadline for every task. Trello increased our productivity.

# Risk analysis:

|  |  |  |
| --- | --- | --- |
| Risk | Probability | Effect |
| Force reduction of budget | High | Serious |
| Stuff absence | Low | Serios |
| Faults in software code and component | Low | Tolerable |
| Major requirement changes | Low | Insignificant |
| Database execution delay | Medium | Serious |
| Customer failed to give requirement | Medium | Serious |
| Rate of defect repair | Medium | Serious |
| Software size underestimated | High | Tolerable |
| Garden owner Timeliness | Low | tolerable |



**Rubric for Project Assessment (CO1)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Marking Criteria** | **Marks Distribution (Maximum 3X5=15)** | | | | **Acquired Marks** |
| **Inadequate (1-2)** | **Satisfactory (3)** | **Good (4)** | **Excellent (5)** |
|  |  |  |  |  |  |
| **Background** | No background | Insufficient | Sufficient | Thorough and |  |
| **Analysis** | information | background | background | relevant |
|  | regarding the | information is | information is | background |
|  | project is | given; project | given; the | information |
|  | given; project | goals and | purpose and | is given; project |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | goals and benefits are  missing. | benefits are poorly stated | goals of the  project are explained. | goals are clear  and easy to identify. |  |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Criteria** | | **Marks distribution (Max 3X5= 15)** | | | | | | | | **Acquired Marks** | |
| **Inadequate (1-2)** | | **Satisfactory (3)** | | **Good (4)** | | **Excellent (5)** | |
| **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)**

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