Software Requirements Specifications

For

Chemistry Calculator

Submitted to

Dipok Chandra Das

Assistant Professor, IIT, NSTU

Submitted by

Md.Mahbub Alam (ASH1825003M)

Md.Abrar Hossain Asif (ASH1825005M)

Nishat Tasnim Tamanna (BKH1825006F)

Md.Faisal Ahammed (ASH1825015M)

Moon Moon Das (BKH1825027F)

Contents

1 Introduction

Chemistry Calculator project uses mathematical algorithms and formulas to calculate different parameters such as molarity, molality, balance equation, concentration, molar mass, percent of completion, titration. Additionally, this calculator can help to minimize errors and improve the accuracy of calculation. Chemistry calculator is a valuable tool for student, teacher and professional to analyze and calculate.

This document contains the reverse engineered Software Requirement Specification for Chemistry Calculator project.

2 Requirement Specification

Before a system is designed and implemented, the requirements have to be specified in enough detail to make analysis and design possible. This is a big part of software engineering, especially for larger systems. The complete requirement specification based on the elicitation process is described in this section.

3 Functional Requirements

Every system must have some functional requirements. Functional requirement defines a system or its component. It describes the functions a software must perform. A function is nothing but inputs, its behavior, and outputs. It can be a calculation, data manipulation, business process, user interaction, or any other specific functionality which defines what function a system is likely to perform. Functional software requirements help to capture the intended behavior of the system. Now, we are going to mention functional requirements associating Chemistry Calculator.

Table 01: User can get balanced equation from unbalanced equation

FR	**User can get balanced equation from unbalanced equation.**
Description	If user write any unbalanced Reactants and Products name, they can get easily balanced equation by clicking on Balance button.
Stakeholders	Teacher, student
Priority	High

Table 02: User can see the history of Equation Balance

FR	**User can see the history of Equation Balance**
Description	After balancing the equation, if any user want to see the history of this balance equation, he/she can see it by clicking on History button.
Stakeholders	Teacher, student
Priority	Low

Table 03: User can get Concentration in the format of Molarity, Molality and Normality

FR	User can get Concentration in the format of Molarity, Molality and Normality
Description	If any user write the Compound, Compound's mass (by kilogram/gram/milligram/pound), Volume of solution (by deciliters, milliliters, centiliters, cubic_decimeters, cubic_millimeters cubic_centimeters) and Equivalent Number, system can calculate concentration in the format of Molarity, Molality and Normality.
Stakeholders	Teacher, student
Priority	High

Table 04: User can get atomic profile

FR	User can get atomic profile
Description	User can get atomic profile by entering atomic number or symbol. If they click on Get Config. Button, they can get the atomic profile.
Stakeholders	Teacher, student
Priority	High

Table 05: User can get Molar mass

FR	User can get Molar mass
Description	User can get Molar mass value by entering compound and they can also see the details of individual chemical elements atomic mass.
Stakeholders	Teacher, student
Priority	High

Table 06: User can get percent of completion

FR	User can get percent of completion
Description	User can get the percent of completion by entering compound. They can see the compound name, symbol, total atoms, atomic mass and percentage.
Stakeholders	Teacher, student
Priority	High

Table 07: User can see the percent of completion pie chart

FR	User can see the percent of completion pie chart
Description	After getting the percent of completion, If user want they can see the pie chart of the percent of completion.
Stakeholders	Teacher, student
Priority	Low

4 Performance Requirements

It is very important to maintain performance of any software system. To ensure performance, we need to maintain some steps. Now, I will explain some perspective by which we are going to enhance the performance of this project.

5 Precision & Accuracy Requirements

Result that is to be shown to the end user is need to be accurate. Because, wrong information might be ruined the whole business process.

Table 08: Calculate result must be accurate

PAR-1	Calculate result must be accurate
Description	When user enter the compound to see the result, then the calculate result must be according to the input value given by user.
Stakeholders	Teacher, student
Priority	High

6 Dependability Requirements

The term dependability is measured based on four dimensions. Such as:

- Availability
- Reliability
- Safety
- Security

If we want to say that this application system is dependable then it must fulfil the four dimensions. But there are other tasks. Like there is no way to make mistakes or this system should have the ability to detect and then remove errors. Besides that, it is also very important to limit the damage which might be caused by system failure.

7 Robustness or Fault-Tolerance Requirements

To ensure robustness and fault-tolerance facilities to the end users, it is urgent to ensure 0% crush. Moreover, it must show accurate results.

Table 09: The system handles all user access without system errors

RFT-1	The system handles all user access without system errors
Description	Thousands of users might hit this application system at a time. All their requests must be handled without any fault.
Stakeholders	N/A
Priority	High

8 Safety-Critical Requirements

There are no safety-critical requirements in this project.

9 Supportability Requirements

Supportability requirements may have related to some extends. Like:

- Testability
- Extensibility
- Adaptability
- Maintainability
- Compatibility
- Configurability
- Serviceability
- Install ability

This application meets all of the above requirements related to supportability.

10 Usability and Human-Interaction Requirement

The main target of developing any system is to make the system user friendly and easy to usable for the end users.

11 Ease of Use Requirements

This application is easy to use and also easily understandable.

Table 10: Application must be usable for the end users

EUR-1	Application must be usable for the end users
Description	This app is enough usable to the end user by which they can operate this system easily.
Stakeholders	Teacher, student
Priority	High

12 Personalization and Internationalization Requirements

There are not any personalization and internationalization requirements to this system. This maiden version of this application is only be operated in Bangladesh.

13 Understand ability and Politeness Requirements

It is already said that the application which we are going to develop, is understandable enough. The system provides hints to users whether any error occurred or wrong. By reading those errors users can be able to operate the system easily.

14 Accessibility Requirements

There are no specific accessibility requirements associated to this system yet.

15 User Documentation Requirements

Documentation are mainly two types. One is internal documentation which is generally written by the application engineers. It is prepared to make development life cycle easier for the system engineers or system analysts.

Table 11: The system engineer documentation

UDR-1	The system engineer documentation
Description	To develop this application named Chemistry Calculator, firstly we have made a system analysis team as well as documentation team.
Stakeholders	System analysts or software developers
Priority	Medium

16 Training Requirements

Training requirements involved in after service of any application. It is very necessary to properly train up end users to the system so that they would be capable to operate easily. After launching the full package to the market, firstly we provide training to the different end users like teachers and students.

17 Look and Feel Requirements

Look and feel requirements mainly refers how the system will look like and how the user interface or graphical user interface of this system will display to the user.

17.1 Appearance Requirements

Patients, doctors and all other user must know which input fields are required and which are not. For that reason, we will use labels for all input fields. Input fields might be text type, radio, checkbox, spinner etc.

Table 12: Labels of mandatory fields must be bold

AR-1	Labels of mandatory fields must be bold
Description	The mandatory field's label must be bold and all input fields must have placeholder to make it easier for the users.
Stakeholders	Teacher, student
Priority	Medium

17.2 Style Requirements

After keeping all contents, it is very essential to load stylesheet to the application. For desktop application like desktop system, extensive mark-up language. It is to be said that we are going to develop this system at desktop platform. Style makes the system lucrative.

Table 13: The appearance must be controllable using stylesheet file

SR-1	The appearance must be controllable using stylesheet file
Description	For desktop application style sheet files are xml. So, all stylesheet must be controllable by the xml file.
Stakeholders	Software developer
Priority	High

18 Operational and Environmental Requirements

Operational and environmental requirement refers to the capabilities, performance measurements, process, measurements of effectiveness, measurements of performance, measures of sustainability, measurements of technical performances etc.

18.1 Expected Physical Requirements

There are no expected physical requirements in this system.

18.2 Requirements for Interfacing with Adjacent Systems

There are no requirements for interfacing with adjacent system for this project.

19 Release Requirements

There are no specific release requirements in this system.

20 Legal Requirements

Legal requirements normally refer to the terms and conditions or privacy policy of any organizations. The terms and condition of this application is that, no third-party software or person are allowed to engage to use the data for their business purpose.

21 Compliance Requirements

There are no specific compliance requirements for this system.

22 Standards Requirements

There are no specific standards requirements for this system.

23 Use case diagram

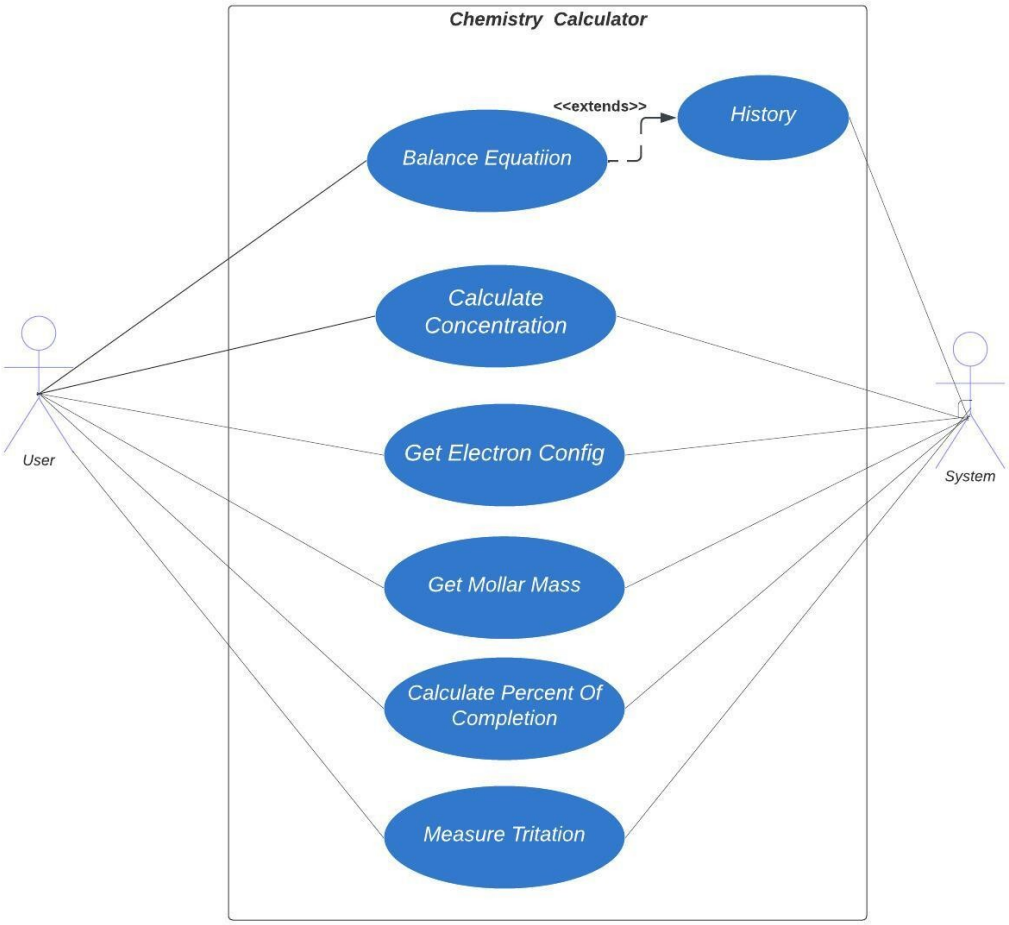

Fig 1: Use Case diagram for Chemistry Calculator

24 Use Case Description

Table 24.1: Use Case Description of Balance Equation

Use Case ID	01	
Use Case Name	Balance Equation	
Goal	Balance equation between Reactants and Products	
Preconditions	Not Applicable	
Success End Condition	The equation is balanced successfully between Reactants and Products	
Failed End Condition	The equation is balanced successfully between Reactants and Products	
Primary Actors: **Secondary Actors:**	Teacher, student Not Applicable	
Trigger	Click on the Equation Balance option from side bar menu	
Main Success Flows	**Step**	**Action**
	1	The user input reactants
	2	The user input products
	3	Click balance button
	4	System provides given equation and balanced equation
	5	The user clicks on the clear button to clear input
Alternative Flows	**Step**	**Branching Action**
	1a	The user input incorrect reactants
	2a	The user input incorrect products
	3	Show an error
Quality Requirements	**Step**	**Requirement**
		Not Applicable

Table 24.2: Use Case Description of Concentration

Use Case ID	02	
Use Case Name	Concentration	
Goal	Calculate Molarity ,Molality and Normality	
Preconditions	Not Applicable	
Success End condition	Show Molarity, Molality, Normality Successfully	
Failed End Condition	Compound not valid	
Primary Actors: **Secondary Actors:**	Teacher, student Not Applicable	
Trigger	Click on the Concentration option from side bar menu	
Main Success Flows	**Step**	**Action**
	1	The user input compound
	2	The user input compound's mass
	3	The user input volume of solution
	4	System provides concentration based on input
	5	The user clicks on the clear button to clear input
Alternative Flows	**Step**	**Branching Action**
	1a	The user input incorrect compound
	2a	The user input incorrect product compound's mass
	3a	The user input incorrect volume of solution
Quality Requirements	**Step**	**Requirement**
		Not Applicable

Table 24.3: Use Case Description of Electron Config

Use Case ID	03	
Use Case Name	Electron Config	
Goal	Provide Electron configuration of atomic symbol	
Preconditions	Not Applicable	
Success End Condition	Show electronics configuration successfully	
Failed End Condition	Symbol is not valid	
Primary Actors: **Secondary Actors:**	Teacher, student Not Applicable	
Trigger	Click on the Electron config option from side bar menu	
Main Success Flows	**Step**	**Action**
	1	The user input Atomic number or symbol
	2	Click Get config button
	3	System provides given equation and balanced equation
	4	The user clicks on the clear button to clear input
Alternative Flows	**Step**	**Branching Action**
	1a	The user input incorrect atomic number or symbol
	2	Show an error
Quality Requirements	**Step**	**Requirement**
		Not Applicable

Table 24.4: Use Case Description of Get Molar Mass

Use Case ID	04	
Use Case Name	Get Molar Mass	
Goal	Get Molar Mass of a compound.	
Preconditions	Not Applicable	
Success End Condition	Molar Mass is displayed successfully	
Failed End Condition	The system shows an error message	
Primary Actors: **Secondary Actors:**	Teacher, student System	
Trigger	Click on the "Molar mass" from the sidebar menu	
Main Success Flows	**Step**	**Action**
	1	The user enters compound in the input box.
	2	The user clicks on the "Get Molar Mass" button
	3	The system displays Molar Mass of the given compound and listed each element of the compound and their respective Atomic Mass
	4	The user clicks on the clear button to clear input box.
Alternative Flows	**Step**	**Branching Action**
	1a	The user enters wrong compound in the input box
	3a	The system displays an error message
Quality Requirements	**Step**	**Requirement**
		Not Applicable

Table 24.5: Use Case Description of Get Percent of Completion.

Use Case ID	05	
Use Case Name	Get Percent of Completion	
Goal	To get the total percentage of completion for each element in the compound.	
Preconditions	Not Applicable	
Success End Condition	Percentage of completion is displayed successfully.	
Failed End Condition	The system displays an error message.	
Primary Actors: **Secondary Actors:**	Teacher, student System	
Trigger	Click on the "Percent of completion" from the sidebar menu	
Main Success Flows	**Step**	**Action**
	1	The user enters compound in the input box.
	2	The user clicks on the "Percent of completion" button
	3	The system displays Name of the elements and their Symbols, Total Atoms, Atomic Mass, and Percentage of Completion
	4	The user clicks on the clear button to clear input box.
Alternative Flows	1a	The user enters wrong compound
	3a	The system displays an error message
Quality Requirements	**Step**	**Requirement**
		Not Applicable

Table 24.6: Use Case Description of Get Unknown Value in Titration

Use Case ID	06	
Use Case Name	Get Unknown Value in Titration	
Goal	To get the unknown value in a titration	
Preconditions	Not Applicable	
Success End Condition	The system displays unknown value successfully	
Failed End Condition	The system displays an error message	
Primary Actors: **Secondary Actors:**	Teacher, student System	
Trigger	Click on the "Titration" button from the sidebar menu.	
Main Success Flows	**Step**	**Action**
	1	The user enters five known values in the input box among six.
	2	The user selects units from dropdown of Molarity and Volume values.
	3	The user keeps empty the input box of unknown value
	4	The user clicks on the Get unknown value
	5	The system displays the unknown value in the input box of unknown value.
	6	The user clicks on the clear button to clear input box.
Alternative Flows	**Step**	**Branching Action**
	1a	The user enters less than five known values in the input box
	1b	The user enters wrong values in the input box
	5a	The system displays a message "Fill up any 5 fields to get unknown value"
	5b	The system displays an error message "Only numbers are allowed"
Quality Requirements		Not applicable

25 Activity Diagram

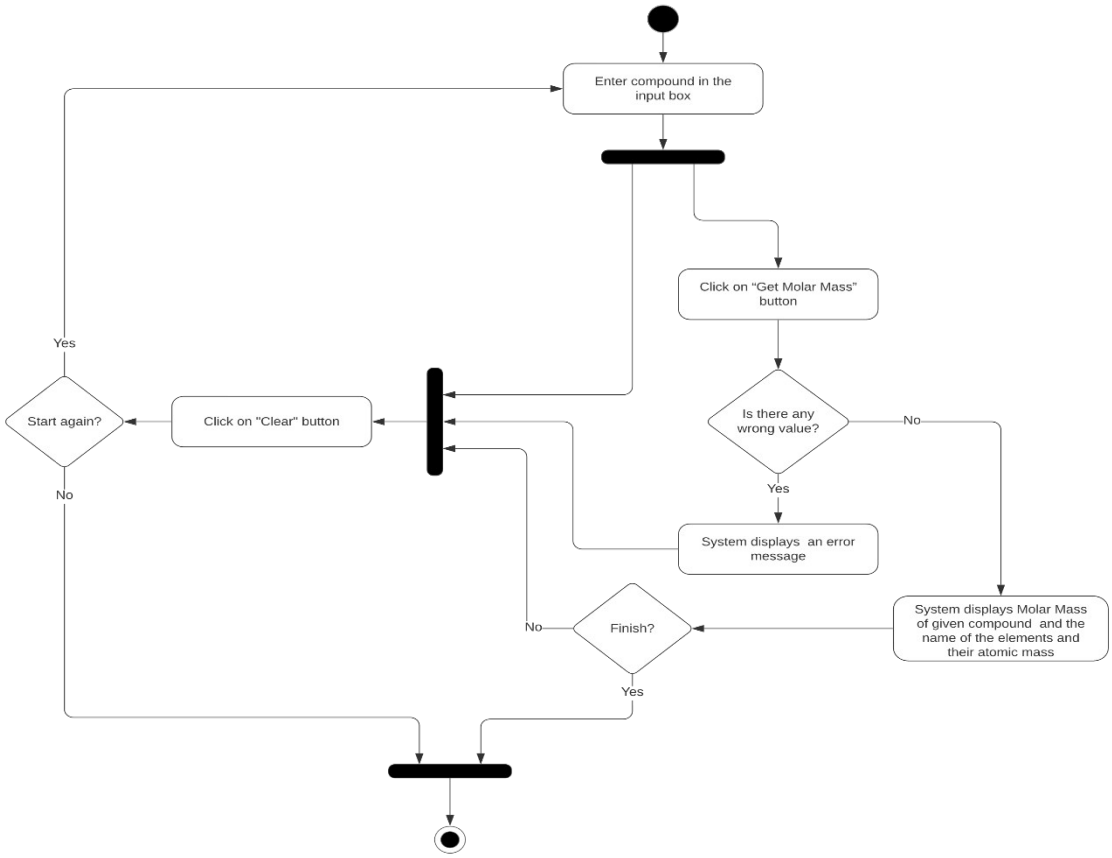

Fig 2: Activity Diagram of Get Molar Mass

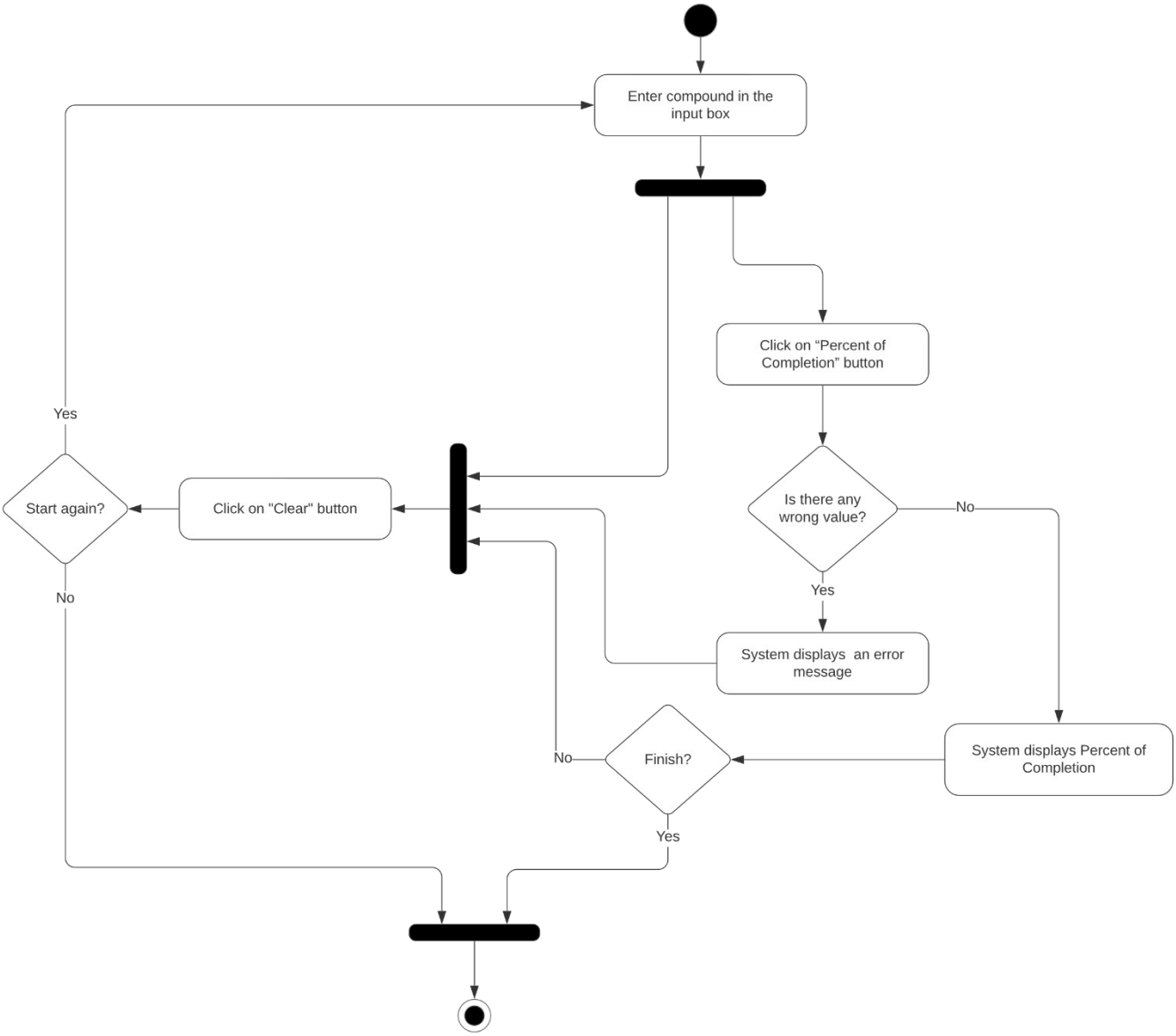

Fig 3: Activity Diagram of Get Percent of Completion

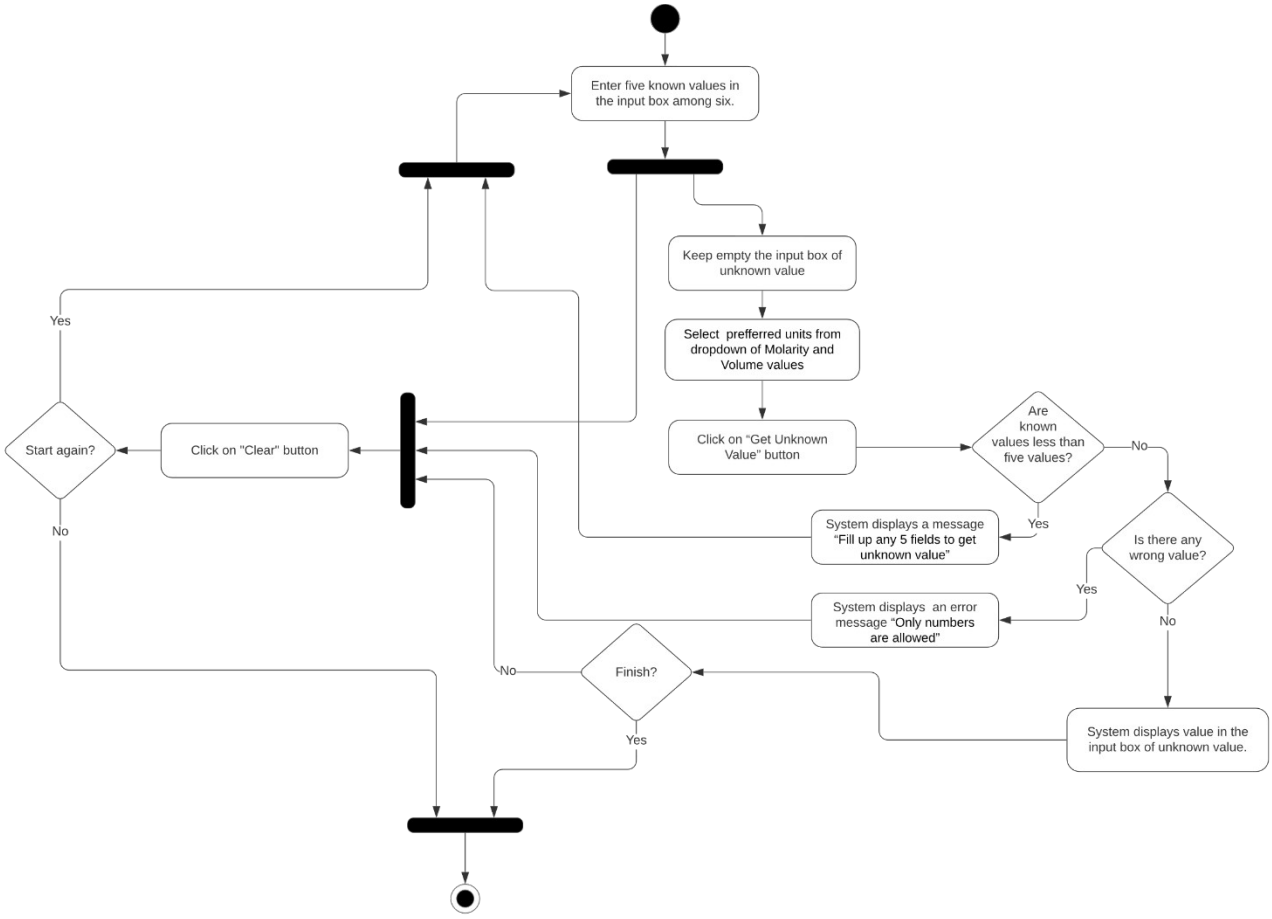

Fig 4: Activity Diagram of Get Unknown Value in Titration

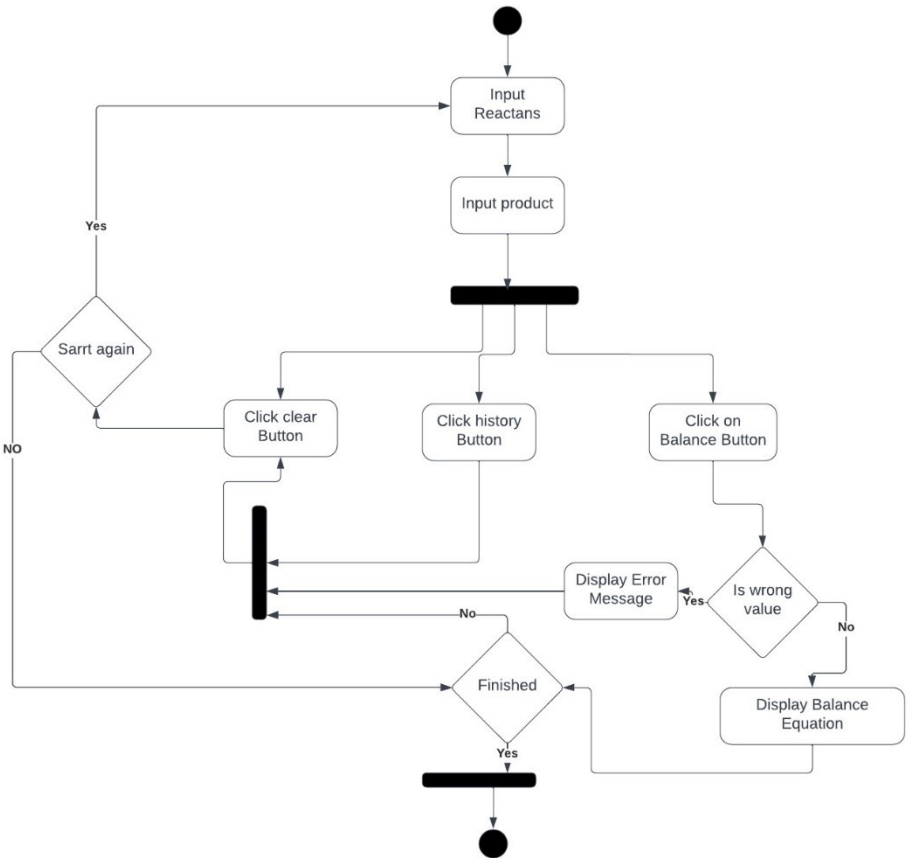

Fig 5: Activity Diagram of balance equation