Project Report
on
Calculator User Stories, Traceability Matrix and Implementation of the User Stories

By
Samir Anghan
Student id: 40040308
Email: samir.anghan@gmail.com

Gina Cody School of Engineering and Computer Science
Concordia University
Montreal - Canada

July, 2019

Acknowledgment

I would like to express my sincere gratitude to our professor Pankaj Kamthan for his co-operation, suggestion, guidance, and continuous encouragement through the course of the study. I am highly grateful to our teaching assistance M. Ishanian for reviewing this report and giving us suggestions to improve it.

Abstract

In this document, the user stories for calculator system has been described. Each user story is associated with a priority, estimate (in story points), as well as with one or more acceptance tests. The document also describes backward traceability matrix for each user story.In the last, it also provides information on the Java implementations of the selected representative user stories.

Contents

Chapter 1

Background

1.1 Introduction

This document is a part of project report on the problem domain model Calculator System. Domain is a calculator that computes the value of certain established irrational numbers. The purpose of the project is to carry out a number of activities, resulting in a set of inter-related artifacts for the problem domain of such a calculator.

In this document, the user stories for calculator system has been described. Each user story is associated with a priority, estimate (in story points), as well as with one or more acceptance tests. The document also describes backward traceability matrix for each user story.In the last, it also provides information on the Java implementations of the selected representative user stories.

Chapter 2

User stories for calculator system

2.1 User stories for calculator system

User Story 1	
Id	US1
User Story Statement	As a mathematician, I want to calculate the value of the silver ratio number up to given certain decimal places, so that I can see what the number is up to certain decimal places.
Acceptance Criteria	Given that I need to calculate the value of silver ratio number having 10 digits after the decimal point, When I perform an operation by providing 10 as a number of digits I want after the decimal point, I should see 2.4142135623 as an answer.
Priority	Must have
Constraint	Usability-specific: A calculator user can calculate the value of the silver ratio number having a maximum of 20 digits after the decimal point.
Estimated Story Points	6

User Story 2	
Id	US2
User Story Statement	As a mathematician, I want to calculate an area of a regular octagon with given side length, so that I can see what the area is for a given side length.
Acceptance Criteria	Given that I need to calculate an area of a regular octagon with a side length of 8, When I perform an operation by providing 8 as a side length of an octagon, Then I should see 309.02 as an answer.
Priority	Must have
Constraint	NIL
Estimated Story Points	6

User Story 3	
Id	US3
User Story Statement	As a mathematician, I want to store a calculated value of the silver ratio number in memory, so that I can use it later.
Acceptance Criteria	Given that I have already calculated the value of the silver ratio number having 10 digits after the decimal point, When I press “M in” key, Then the number of 2.4142135623 should be stored in memory, And the status bar on the display should show “M”, And the calculator should allow me to do the next operation.
Priority	Must have
Constraint	NIL
Estimated Story Points	6

User Story 4	
Id	US4
User Story Statement	
Acceptance Criteria	
Priority	Must have
Constraint	NIL
Estimated Story Points	6

User Story 5	
Id	US5
User Story Statement	As a mathematician, I want to add a certain number to the value of the silver ratio number, so that I can see what their total is.
Acceptance Criteria	Given that I have two numbers 5 and the silver ratio number, When I perform addition on them, Then I should see the sum as 7.4142135623.
Priority	Must have
Constraint	The addition expression should use the number 2.4142135623 as a value of the silver ratio number, which has exactly 10 digits after the decimal point.
Estimated Story Points	6

User Story 6	
Id	US6
User Story Statement	As a mathematician, I want to subtract a certain number from the value of the silver ratio number, so that I can see what the difference between them is.
Acceptance Criteria 1	Given that I have two numbers 2 and the silver ratio number, When I subtract 2 from the silver ratio number, Then I should see the difference as 0.4142135623.
Acceptance Criteria 2	Given that I have two numbers 10 and the silver ratio number, When I subtract 2 from the silver ratio number, Then I should see the difference as -7.5857864377 which is a negative number.
Priority	Must have
Constraint	The subtraction expression should use the number 2.4142135623 as a value of the silver ratio number, which has exactly 10 digits after the decimal point.
Estimated Story Points	6

User Story 7	
Id	US7
User Story Statement	As a mathematician, I want to multiply a certain number with the value of the silver ratio number, so that I can see what their product is.
Acceptance Criteria 1	Given that I have two numbers 5 and the silver ratio number, When I multiply 5 with the silver ratio number, Then I should see the product as 12.0710678115.
Acceptance Criteria 2	Given that I have two numbers 0 and the silver ratio number, When I multiply 0 with the silver ratio number, Then I should see the product as 0.
Acceptance Criteria 3	Given that I have two numbers 1 and the silver ratio number, When I multiply 1 with the silver ratio number, Then I should see the product as 2.4142135623 which is the same as the silver ratio number.
Priority	Must have
Constraint	The multiplication expression should use the number 2.4142135623 as a value of the silver ratio number, which has exactly 10 digits after the decimal point.
Estimated Story Points	6

User Story 8	
Id	US8
User Story Statement	As a mathematician, I want to divide a certain number by the value of the silver ratio number, so that I can see what the quotient is.
Acceptance Criteria 1	Given that I have two numbers 10 and the silver ratio number, When I divide 10 by the silver ratio number, Then I should see the quotient as 4.14213562386.
Acceptance Criteria 2	Given that I have two numbers 0 and the silver ratio number, When I divide 0 by the silver ratio number, Then I should see the quotient as 0.
Priority	Must have
Constraint	The division expression should use the number 2.4142135623 as a value of the silver ratio number, which has exactly 10 digits after the decimal point.
Estimated Story Points	6

User Story 9	
Id	US9
User Story Statement	As a mathematician, I want to divide the value of the silver ratio number by a certain number, so that I can see what the quotient is.
Acceptance Criteria 1	Given that I have two numbers the silver ratio number and 100, When I divide the silver ratio number by 100, Then I should see the quotient as 0.02414213562.
Acceptance Criteria 2	Given that I have two numbers the silver ratio number and 0, When I divide the silver ratio number by 0, Then I should see the quotient as infinity.
Priority	Must have
Constraint	The division expression should use the number 2.4142135623 as a value of the silver ratio number, which has exactly 10 digits after the decimal point.
Estimated Story Points	6

Chapter 3

Backward traceability matrix for calculator system

3.1 Backward traceability matrix for calculator system

User Story Id	Use case 2	Use case 3	Use case 4	Use case 5	Interviewee
US1	X				
US2				X	
US3					X
US4		X			
US5			X		
US6			X		
US7			X		
US8			X		
US9			X		

User cases:

1. Evaluate Expression
2. **Evaluate Irrational Number Value**
3. **Evaluate Irrational Algebraic Expression**
4. **Evaluate Irrational Arithmetic Expression**
5. **Evaluate Area of Regular Octagon Expression**
6. Evaluate Area of Circle Expression
7. Save Value of Evaluated Expression
8. Display Answer

Chapter 4

Implementation for user stories

4.1 Implementation for user stories

Chapter 5

Conclusion and Discussion

5.1 Conclusions

I learn lot of things such as Brainstorming and Mind Mapping, Domain Modeling, Use case modeling. I believe this will help me in future towards my carrier.

5.2 Future Directions

Creation of user stories from the user cases, implementation of those user stories using Java programming language.

Bibliography