Universal Parabolic Constant

Balakrishnan Rajagopal (40075977)

Contents

Chapter 1

Repository Address

https://github.com/balakrishnankom/SOEN6481

Chapter 2

User Stories

The Fibonacci Sequence was used for user story estimation.

2.1 US-N10-1 - Calculate Universal Parabolic Constant

US-N10-1 - Calculate Universal Parabolic Constant	
Story ID	US-N10-1
Priority	Must have
Description	As a user, I should be able to calculate the universal parabolic constant by clicking a button so that I can use it for other calculations.
Acceptance	I know I'm done when I click the UPC button, constant is calculated.
Estimate	5 point
Constrains	Universal Parabolic constant should be displayed or should be appended to the computation.

2.2 US-N10-2 - Select the number of precisions of the constant

US-N10-2 - Select the number of precisions of the constant	
Story ID	US-N10-2
Priority	Must have
Description	As a user, I should be able to choose the number of precisions of the constant so that I can get the desired result.
Acceptance	I know I am done When the result has only the selected number of the digits after decimal point.
Estimate	2 points
Constrains	The number of digits should be a positive number.

2.3 US-N10-3 - Symbolize the constant

US-N10-3 - Symbolize the constant	
Story ID	US-N10-3
Priority	Won't have
Description	As a user, I should be able to choose to display the constant as a symbol so that the computation will be easy to edit.
Acceptance	I know I am done when, I click the UPC constant button, 'P' symbol is displayed instead of 2.29558714939
Estimate	2 points
Constrains	The calculator should display the symbol for further computations.

2.4 US-N10-4 - Store result

US-N10-4 - Store result	
Story ID	US-N10-4
Priority	Should have
Description	As a user,I want the result of the computation to be stored in memory so that It could be used for next calculation.
Acceptance	I know I am done when, When I am able to retrieve the result of the last computation.
Estimate	3 points
Constrains	only the result of the last computation should be stored.

2.5 US-N10-5 - Arithmetic Operations

US-N10-5 - Arithmetic Operations	
Story ID	US-N10-5
Priority	Must have
Description	As a user, I should be able to perform all arithmetic functions such as add,subtract,multiply and division, so that I can use the arithmetic operations in other computations.
Acceptance	I know I am done when, when the result of the chosen arithmetic operation is displayed.
Estimate	3 points
Constrains	The result of the arithmetic operation should be displayed in less than one second

2.6 US-N10-6 - Editable input

US-N10-6 - Editable input	
Story ID	US-N10-6
Priority	Should have
Description	As a user, I should be able to edit the computation so that I can change the operator and the operands.
Acceptance	I know I am done when, I click the input field, I should be able to modify the operator and operands.
Estimate	2 points
Constrains	When the user is able to edit, only the numbers or allowed symbols should be given as input.

2.7 US-N10-7 - Clear the screen

US-N10-7 - Clear the screen	
Story ID	US-N10-7
Priority	Should have
Description	As a user, I should be able to clear the screen so that I can proceed with next computation.
Acceptance	I know I am done when, I click the clear button, input field or the display should be cleared.
Estimate	1 points
Constrains	When the user clicks clear button, the display should be cleared.

2.8 US-N10-8 - Calculate the area

US-N10-8 - Calculate the area	
Story ID	US-N10-8
Priority	Must have
Description	As a user, I should be able to calculate the area of a parabolic arch given the height and chord so that I can use it for my application.
Acceptance	I know I am done when, I click the area button, area of the parabolic arch is displayed.
Estimate	5 points
Constrains	Height and Chord should be positive.

Chapter 3

Backward Traceability Matrix

US ID	US Name	Interviewee	Online Sources	Domain Modal	Use Case
US-N10-1	Calculate Universal Parabolic Constant	✓	✓	✓	✓
US-N10-2	Select the number of precisions of the constant	✓	✓		
US-N10-3	Symbolize the constant	✓	✓		
US-N10-4	Store result	✓		✓	
US-N10-5	Arithmetic Operations	✓	✓	✓	✓
US-N10-6	Editable input	✓			
US-N10-7	Clear the screen	✓			
US-N10-8	Calculate the area		✓		

Chapter 4

Implementation

The Universal Parabolic Constant calculator is implemented using Java without using built-in libraries. The Source of the calculator can be found on the repository (Chapter 1) mentioned above.

4.1 User Stories Implemented

The following user stories were implemented in the UPC calculator, the User stories which have been implemented are chosen based on the priority.

1. **US-N10-1** - Calculate Universal Parabolic Constant
2. **US-N10-2** - Select the number of precision of the constant.
3. **US-N10-4** - Store result
4. **US-N10-5** - Arithmetic Operations
5. **US-N10-7** - Clear the screen
6. **US-N10-10** - Calculate the area

Chapter 5

References

1. Reese, Sylvester and Sondow, Jonathan. "Universal Parabolic Constant." From MathWorld–A Wolfram Web Resource, created by Eric W. Weisstein. http://mathworld.wolfram.com/UniversalParabolicConstant.html
2. https://keisan.casio.com/exec/system/1223291032
3. Sylvester Reese and Jonathan Sondow, Feb 13 2005 "https://oeis.org/A103710"
4. https://www.revolvy.com/page/Universal-parabolic-constant