N11: Plastic Number
Problem 6 - 8

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Contents

List of Tables

Chapter 1

Repository Details

The link for the repository is
https://github.com/HannaMichael/SOEN-6481

Chapter 2

Changes from D1 to D2

The Application of the plastic number has been changed to calculate the circumradius of Snub Icosidodecadodecahedron.

Chapter 3

User Story

3.1 User Story # 1

Basic Arithmetic Calculation	
Story ID	US1
Description	As a user, I want to perform basic arithmetic calculation such as Add, Subtract, Multiply and Divide, so that i can get the summation, Difference, product and quotient
Priority	High
Estimated Points	2 Points
Constraints	User shall perform the calculation on two numbers only with one operation, User shall not be able to perform compound operations.
Acceptance Criteria	- User shall first select the desired operation [select a number from 1 to 4] - User shall enter the first number - User shall enter the second number - User shall press the enter button to do the calculation
Acceptance Test	And I know I am done when I perform the following calculations: 2 + 3 = 5 3 - 2 = 1 5 x 2 = 10 6 / 2 = 3

3.2 User Story # 2

Save result in Memory	
Story ID	US2
Description	As a user, I want to save the number in memory, so that i can recall it later.
Priority	Medium
Estimated Points	5 Points
Constraints	One Result only can be saved in the memory.
Acceptance Criteria	- User shall first do any arithmetic calculation from user story ID ("US1") - User shall get a message either to save the number in memory or not. - If the user wants to save the number, then the user shall press "Y". - If the user does not want to save the number, then the user shall press "N".
Acceptance Test	And I know I am done when I press "Y" the result shall be stored in memory and then i can select number "7" from the main menu to get the saved number.

3.3 User Story # 3

Clear the wrong digit	
Story Id	US3
Description	As a user, I want to clear the wrong digit, so that i can update the number without entering the whole number again
Priority	Low
Estimated Points	1 Point
Constraints	N/A.
Acceptance Criteria	- User shall enter the first number. - User shall press "E" to edit the number that he has entered.
Acceptance Test	And I know I am done when the user enter 123455 and the user can change the number to 123456 by changing the last digit only.

3.4 User Story # 4

Save operations even if i pressed clear by mistake	
Story Id	US4
Description	As a user, I want to save the equation in memory, so that i can recall it again even if I pressed clear by mistake.
Priority	Low
Estimated Points	5 Points
Constraints	Huge usage of memory to store everything that has been entered into the calculator.
Acceptance Criteria	- User shall enter the equation. - User shall press clear to earse the equation. - User shall be able to recall the equation again by pressing recall button.
Acceptance Test	And I know I am done when I press equation recall button and the previous equation should be recalled from memory.

3.5 User Story # 5

Get Plastic number	
Story Id	US5
Description	As a user, I want to get the plastic number, so that i can perform some operations.
Priority	High
Estimated Points	3 Points
Constraints	The User shall not use the plastic number with the basic operations, the user can not use the plastic number as a first or second number in the basic operations.
Acceptance Criteria	- User shall press number "5". - User shall be able to see the plastic number.
Acceptance Test	And I know I am done when I press "5" Get plastic number and I get 1.324717957.

3.6 User Story # 6

Calculate circumradius of Snub Icosidodecadodecahedron[1]	
Story Id	US6
Description	As a user, I want to calculate circumradius of Snub Icosidodecadodecahedron.
Priority	High
Estimated Points	5 Points
Constraints	The usage of this function is only valid for (Cartesian coordinate) a = 1.
Acceptance Criteria	- User shall press number "6". - User shall be able to see the circumradius of Snub Icosidodecadodecahedron.
Acceptance Test	And I know I am done when I press number "6" and I get the result 1.12689

3.7 User Story # 7

Enter two numbers	
Story Id	US7
Description	As a user, I want to enter two numbers so that i can perform some operations on these numbers.
Priority	High
Estimated Points	1 Point
Constraints	The range of each number shall be between $3.40282347x10^{38}, 1.40239846x10^{-45}$.
Acceptance Criteria	- User shall first select the desired operation [select a number from 1 to 4]. - User shall enter the first number and see the first number on the screen. - User shall enter the second number and see the second number on the screen.
Acceptance Test	And I know I am done when I pressed 123 i got 123 on the screen then i pressed 456 and i got 456 on the screen.

Chapter 4

Backward Traceability Matrix

	Interview	Persona	Internet	Project Description
US1	✓	✓		
US2	✓	✓		
US3	✓	✓		
US4	✓	✓		
US5				✓
US6			✓	
US7	✓	✓		

Table 4.1: Backward Traceability Matrix

The source of US1, US2, US3, US4 & US7 is P.Tran Tuan.

The source of US6 is
http://mathworld.wolfram.com/SnubIcosidodecadodecahedron.html

Chapter 5

Implementation

The User stories that has been implemented are as follow:

- US1 - Basic Arithmetic Calculation

- US2 - Save result in Memory

- US5 - Get Plastic Number

- US6 - Calculate circumradius of Snub Icosidodecadodecahedron

- US7 - Enter two numbers

Memento Design Pattern has been used[1].

Junit has been used for unit testing.

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[1]https://www.tutorialspoint.com/design$_p$attern/memento$_p$attern

Bibliography

[1] *Wenninger, M. J. Polyhedron Models. Cambridge, England: Cambridge University Press, pp. 177-178, 1971.*