SOEN 6481

Software Requirement Specification

Summer 2019

Deliverable 2

Eternity: Numbers

Declaration

I have read and understood the Fairness Protocol and Communal Work Protocol, and agree to abide by the policies therein, without any exception under any circumstances, whatsoever.

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Problem 6. [70 Marks]

6.1 Value of π

Identifier	EternityNumbers_01
Statement	As a user, I want my calculator to display the value of π till 10 decimal places to support usability.
Constraint	-
Acceptance Criteria	Given that I have to determine the value of π . • I will press the button for π . • The value for π will be displayed till 15 decimal places i.e. 3.1415926535.
Priority	Should Have
Estimate	1

6.2 Circumference Calculation

Identifier	EternityNumbers_02
Statement	As a user, I should be able to calculate the circumference directly by just providing the radius of the circle. This can help to enhance efficiency if I have to use formula of circumference in my work.
Constraint	Number entered by the user for the radius should not be negative.
Acceptance Criteria	Given that I have to calculate the circumference of a circle with radius 3. • I will press the button "CRF" . • I will press 3. • The result "18.84" (2∗ 3.14∗ r) will be displayed.
Priority	Must Have
Estimate	3

6.3 Precision

Identifier	EternityNumbers_03
Statement	As a user, I want my calculator to allow me to choose the precision of π so that I can use it as per my requirement.
Constraint	-
Acceptance Criteria	Given that I have to calculate the area of circle and this will use π . I should be able to choose the value of π up to 2 decimal places as it will give me the required result • While using the formula, I will press π . • I will press "P" to choose its precision. • I will choose 2 and therefore will get the value 3.14 that I can use to calculate the area.
Priority	Must Have
Estimate	1

6.4 Operator Selection

Identifier	EternityNumbers_04
Statement	As a user, if I enter 2 or more operators consecutively, the operation performed should be of the last operator to enhance usability.
Constraint	There must be at least 2 operators occurring consecutively in the expression.
Acceptance Criteria	Given that I have entered 3-+3. The result should be calculated as 3+3 i.e. 6.
Priority	Must Have
Estimate	1

6.5 Edition

Identifier	EternityNumbers_05
Statement	My calculator should allow edition on the operator or operand of the current computation until the result is displayed so that any mistake can be corrected.
Constraint	At least one operator or operand must be entered.
Acceptance Criteria	Given that I have to perform the following calculation "3+4∗ 2" . • I will enter 3+4∗ 2. • Before pressing =, if I want to replace 4 with 5, I can do it.
Priority	Must Have
Estimate	1

6.6 Record Keeping

Identifier	EternityNumbers_06
Statement	As a user, I want my calculator to keep a record of all the computations till the calculator is turned off so that I can access the record and use it when needed.
Constraint	There must be at least one result for the record to exist.
Acceptance Criteria	• To open the record, press "R" . • Record empty • 3+4=7(stored in record) 5+5=10(stored in record) 4-2=2(stored in record) • Press "R" . • 7,10,2 • Calculator is turned off. • After turning on the calculator, press "R" . • Record empty.
Priority	Should Have
Estimate	2

6.7 Record Deletion

Identifier	EternityNumbers_07
Statement	As a user, I want my calculator to give me an option to delete the record of the computation that is not needed to save the memory.
Constraint	There must be at least 1 calculation in the record.
Acceptance Criteria	• 3+4=7(stored in record) 5+5=10(stored in record) Press "DEL" , (10 deleted from the record). 4-2=2(stored in record) • Press "R" . • 7,2
Priority	Should Have
Estimate	2

6.8 Clear

Identifier	EternityNumbers_08
Statement	As a user, I want my calculator to clear all the contents so that I can start a new calculation.
Constraint	There must be at least 1 operator, operand or a calculation that can be cleared.
Acceptance Criteria	• Given that I enter the following calculation, 3+4. • 7 will be displayed. • Press "CLR" . • 0 will be displayed.
Priority	Must Have
Estimate	1

Problem 7. [10 Marks]

Sno.	User Story Identifier	User Story Name	User Story Source
1	Eternity_Numbers01	Value of π	Problem 1(Description of pi)
2	Eternity_Numbers02	Circumference Calculation	Problem 2 (Interview)
3	Eternity_Numbers03	Precision	Dr.Pankaj Kamthan (kamthan@cse.concordia.ca)
4	Eternity_Numbers04	Operator Selection	Problem 5 (Use Case)
5	Eternity_Numbers05	Edition	Problem 5 (Use Case)
6	Eternity_Numbers06	Record Keeping	Problem 4 (Problem Domain Model)
7	Eternity_Numbers07	Record Deletion	Problem 5 (Use Case)
8	Eternity_Numbers08	Clear	Problem 5 (Use Case)

Problem 8. [40 Marks]

1). User Story 2 is implemented in the file **CircumferenceCalculation.java**. It represents the functionality of circumference. In this, circumference can be easily calculated by a person by just pressing the button "CRF" (type CRF) and entering the radius of the circle (the radius has to be a positive number).

2). User Story 3 is implemented in the file **Precision.java**. In this, the user will press the button "pi" (type pi). According to User Story 1, the calculator can display the value of pi up to 10 decimal places. Therefore, the user can choose the precision of pi up to 10 decimal places and this can be done by pressing "P" (type P). The user will then enter the precision that he/she wants to choose. (Enter a number). The value of pi up to the chosen precision will be displayed. The user can then perform the computation using this precision of pi. In this case, area of circle is calculated. The user will press the button for "Area" (type Area) and then enter the radius of the circle (the radius has to be a positive number). The area of the circle will be displayed.

3). User Story 6 is implemented in the file **RecordKeeping.java**. In this the user will turn on the calculator by pressing the "ON" button (type ON) and then enter the 2 numbers to perform the computation. (The program shows the computations on just 2 numbers for now.) After entering the numbers, an operator can be chosen from "+" ," -", "/" and "$*$ " (Enter one of these.).After the computation is performed, the user can press "R" to see the record, "C" to continue the computations or "OFF" to turn off the calculator (Type either one of them). If the user presses C, the user will continue to perform more computations, if OFF, then the calculator will be turned off and if R, the user can see all the computations

that are performed after the calculator was turned on. The user is again given the option to turn off the calculator or to continue the computations.

Glossary

1). User Story- In software development and product management, a user story is an informal, natural language description of one or more features of a software system. [2]

2). Backward Traceability Matrix- The potential for tracing antecedent steps in a developmental path, which is not necessarily a chronological path.

References

[1]. P. Kamthan, Summer 2019, "Project Description" , Department of Computer Science

and Software Engineering, Concordia University.

[2]. Wikipedia, User Story, 2015 [Online]. Available: https://en.wikipedia.org/wiki/User_story

[3]. Wikipedia, Traceability Matrix, 2008 [Online]. Available: https://en.wikipedia.org/wiki/Traceability_matrix

GitHub link

Available: https://github.com/sargundhanju83/SOEN-6481-Project-