ETERNITY: NUMBERS - Silver Ratio (δ_s)

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Objectives

The objective of this project is develop a document of software requirement specification to learn how the industry runs it's operation. Tried to develop a SRS based on specific criteria. Those are:-

- Learn about an irrational number.
- Interviewing someone related to the specific assigned number
- Based on the interview analyze the interview.
- Develop a Class diagram, a use case diagram, and an activity diagram based on the analysis.
- Find out user stories from the above mention sources and out of the mention list .
- Based on the user stories tractability matrix creation
- Developing a calculator based on the user stories.

The main objective of this project is to integrate the necessary operation that is not available in calculator but need to support this numbers in calculator.

Introduction

This poster provides an understanding of only an irrational number called Silver Ratio (δ_s). An irrational number is not a rational number, it is not possible to express an irrational number as a quotient of two integers [1].

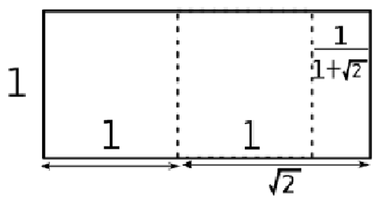

Figure 1: Silver Rectangle

History

Silver Ratio is studied from the time of Greek knowledge, which discusses the fundamental characteristics of the number system. Though it is not used by normal people intentionally. Silver ratio is the limiting of consecutive of infinite sequence of integers, The silver ratio is presented in a Greek symbol (δ_s).

Mathematical Definition

The value of silver ration is 2.4142135623 [2]. A ratio of the sequential sum of smaller number and twice of the larger number, which will produce an infinite sequence and the ration between smaller and larger number will be always same [3]. This can be presented in mathematical equation:-

$$\frac{2a+b}{a} = \frac{b}{a} = \delta_s$$

It will be easier to understand if it can be compared with Fibonacci number. In Fibonacci, the smaller and larger number are added to get the next one. Example:-

$$1, 1, 2, 3, 5, 8, 13, ..$$

For silver ratio, the smaller and twice of the larger number are added to get the next one. Example:-

$$1, 2, 5, 12, 29, 70, ..$$

Then the latest number is divided by the previous larger number.

Persona

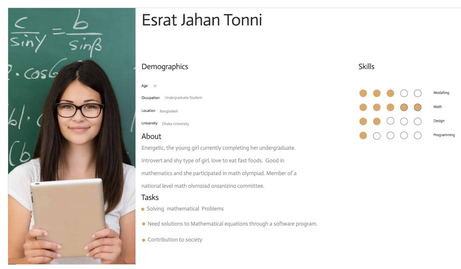

Figure 2: Persona of Interviewee

Interview Analysis

Though the interviewee is not expert in the area of the irrational numbers, She has decent idea about the silver ratio. As she has a math background, she gave a lots of insights about the silver ratio. She is 4th Year student and completed 3 years in math domain. As a math student she has to use calculator almost everyday and she uses scientific calculator for the complex equations. From the interview, it is clear that the silver ratio is used in calculation of geometrical shapes. Also the architect, designer, engineers and Sometimes doctors (Plastic Surgery) uses this. Also stated that in regular scientific calculator the irrational numbers are not available. Then she describe about the silver ratio . which has the value of 4142135623.Its convergent are square triangular numbers, Pell numbers and octagons. According to her it will be good if the irrational numbers are included in the scientific calculator. According to him the calculation can be done here in the scientific calculators but they needs extra effort. But inclusion of these can make few peoples life easier.

Documents and Designs

Instead of all requirements I am providing the number related requirements here.

- As an user, I want the button of silver ratio as number. So that i can use it as a number for arithmetic operation.
- As an user, I want to know the number for which silver ratio will be a given number.

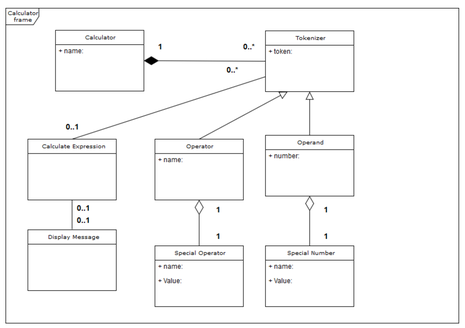

Figure 3: Class Diagram

Figure 4: Class Diagram

Conclusion

In this document, the user requirements for the calculator system have been presented to capture basic requirement of a calculator system along with silver ratio.

References

[1] P. Kamthan. Project description. 2019.

[2] John D. Cook. The silver ratio, 2009.

[3] Tony Padilla. The silver ratio - numberphile, 2018.

[4] Quincy Larson. Javascript calculator project with testable user stories - guinea pigs needed, 2016.

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