ETERNITY: NUMBERS - Silver Ratio (δ_s)

Md Hasibul Huq

Department of Computer Science and Software Engineering (CSSE) , Concordia University

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].

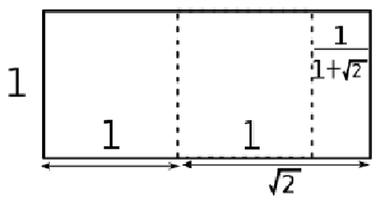

Figure 1: Silver Rectangle

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.

Lesson Learned

- Learn about an geometrical uses of irrational numbers.
- How to conduct a interview.
- How to Analyze an interview.
- Developing UML and Class diagram in
- learned different equations to find Silver ratio
- Learned about the square triangular numbers, Pell numbers, octagons

Challenges

- Very few people know about the silver ratio.
- Arranging a group meeting with all at a time.
- My interviewee never worked with the silver ratio.
- Finding it's uses in real world is quite difficult
- Resources related to it is vague
- Implementation without build in function makes life herder.
- Find user intention from an interview is not easy.
- Find out Software requirements from persons interviewee is difficult.

How the Challenges are overcome?

- By questioning related known problems.
- By learning from her theoretical knowledge .
- By searching on internet.
- By assuming some information from the internet.
- By building an algorithm which gives approximate result.
- By researching the interview answers.
- By using the related system.

Critical Decision

Silver ration has good number of implication in the field of mathematics. Most of the time normal people use those without knowing about it. The ratio is used mainly in the architecture design.

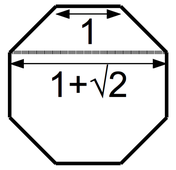

Figure 2: Silver Rectangle

From the uses of silver ratio I chose to implement to find the ratio of a given number. Which will help to draw shapes based on the proportioned number. As an example silver rectangle and octagon.

Conclusion

In this document, how the software requirements specification document are created , what are the challenges faced during the project and how they are solved is mentioned. Also what are the learning's from the project is mentioned. More research and good knowledge on the engineering methods can make this projects more accurate and enriched.

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.

[5] Dhaval Dalal.
Calculator stories, 2012.

[6] Prashanthi Ramesh.
Calculator stories, 2012.

[7] mansya prime Kydon Chantzaridis, Achintha Gunasekara.
Simple-java-calculator, 2019.

Online Versions

- **Report:** `https://github.com/Hasib-rafi1/SRS-Silver-Ratio`
- **Project:** `https://github.com/Hasib-rafi1/srs-project-calculator`

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Contact Information

- Web: http://www.hasibulhuq.com