ETERNITY: NUMBERS - SILVER RATIO (δs)

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What was the objective? & What activities were carried out?

Objective: The purpose of the project was to carry out a number of activities (related to software systems requirements specification), resulting in a set of interrelated artifacts for the given problem domain.
Problem Domain: A calculator that facilitates for certain calculations relating irrational numbers.
Assigned Irrational Number: Silver Ratio Number (δs)

Activities carried out:

1. Learning about the silver ratio number to attain sufficient background of the problem domain; Finding out unique characteristics of the silver ratio number.
2. Finding out a suitable interviewee; Preparing interview questions together in a project team; Conduct an interview of a potential user of ETERNITY: NUMBERS.
3. Collaboratively brainstorming and mind mapping with my team members to decide a persona template; Creating a persona based on my analysis of the interview.
4. Constructing a problem domain model for silver ratio number using UML; Constructing two different views of a use case model using UML.
5. Eliciting, deciding, and creating a set of user stories.
6. Creating a backward traceability matrix for user stories.
7. Implementing the user stories.

What critical decisions were made?

Situation: How many decimals of silver ratio number do I really need?

Why it was critical? Since a silver ratio is an irrational number and its value is 2.414213562373095048...n ($where, 0 \leq n \leq 9$), one cannot write it in its exact form using only fractions or decimal numbers. The applications of the silver ratio number (such as an equation to find the area of a regular octagon) use the value of the silver ratio number in its equation. So, it becomes the matter of precision and accuracy. Hence, it is critical to the calculator system.

Action: Java's native and supported primitive datatype for precision is "double" which has a binary format that occupies 64 bits (8 bytes) and its significand has a precision of 53 bits (about 16 decimal digits). Hence, I decided to consider maximum (supported by Java) that is 15 decimal digits (one decimal is reserved for the decimal number before decimal point).

Result: I considered 2.414213562373095 as a value of the silver ratio number by keeping in mind that calculating an area of an regular octagon **with full precision is not possible.**

What difficulties were faced?

Following are the difficulties I faced during project work:

- Finding out a suitable interviewee who is using (or ever used) the silver ratio number.
- Finding out the applications of the silver ratio number.

What worked well?

- Brainstorming and mind mapping with my team members to decide a persona template and interview questions.
- Conducting an interview of a potential user of the silver ratio number.
- Learning LATEX report writing and documenting with LATEX typeset.

What lessons are learned?

- Even though we were assigned with weakly-coupled teamwork, we had to work on persona and interview questions collaboratively. **I realized and learned that working in a team is not just working with others, it requires openness, being polite and communicative with other team members** because each team member had individual perspectives and different opinions.
- Role-based requirements gathering is an important part of software requirements gathering and also it is crucial to the success of software development.
- Persona should have clear, helpful and relevant description to the problem domain.

What could be improved?

- Implemented user stories could have been tested by writing unit tests.