The Plastic Number

Michael Hanna

Concordia University

About the project

The Plastic number is known as the Plastic constant or Plastic ratio.

The value of the Plastic number is

$$\rho = \sqrt[3]{\frac{9+\sqrt{69}}{18}} + \sqrt[3]{\frac{9-\sqrt{69}}{18}} \qquad (1)$$

Its decimal representation begin with 1.32471.

Challenges

1 - Domain Knowledge

Understanding the plastic number was challenging because this was the first time to be introduced to it.

2 - Interview

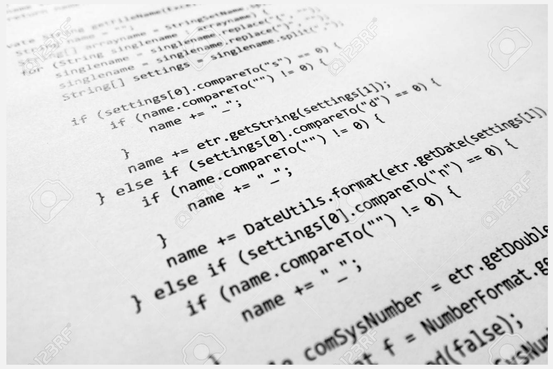
Finding a suitable interviewee that had experience in this specific domain was challenging undertaking considering the time constraints surrounding the project, preparing the questions and finally conducting the interview.

3 - Finding an application

Although the plastic number is well known, it was difficult to find an application to implement it, However after researching online, a suitable application for the constant was found for implementation.

4 - Implementation

The implementation process was challenging as because one of the constraints of the project was not utilizing java's math library, therefore every function was needed to be implemented from scratch such as : Square root and cubic root.



5 - Time Constraints

It was challenging to meet the deadlines in the project because of the length of this course was 6.5 weeks only.

Decision Making

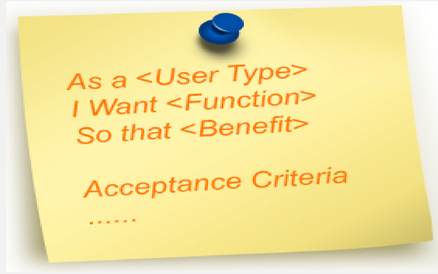
1 - Memento Design pattern

- It records the state of an object.
- It eliminates the need to create multiple objects for saving purposes.
- It has High Cohesion.

2 - Implementation of user stories

Among the seven user stories that have been created, the following user stories have been selected:

- **Basic Calculation:** A calculator can not be a calculator without general arithmetic calculations (Add, Subtract, Multiply & Divide).
- **Generate plastic number:** This is the core function that generate the plastic number to be utilized by the calculator.
- **An Application of the number:** Implementing an application for the plastic number is important to understand the number itself.
- **Enter two numbers:** All basic operation required to have at least two numbers to perform the calculation.
- **Save results:** it was a good idea to implement this user story to use memento design pattern for better understanding of its utilization.



Lesson Learned

1. There will always be problems: we shouldn't fear from the unknown domain because there is time to learn new things

2. Time Management : This project allowed me to manage my time more effectively and efficiently allowing me to study and tackle the challenges of this project at the same time.

3. Applying what we learned : it was important to have a practical implementation of what we have studied in class.