PROBLEM 2. **Jingya Pan**
SOEN 6011 **40044079**
SOFTWARE ENGINEERING PROCESSES Due Date: 7/12/2019
Github address : https://github.com/panjingya/SOEN6011.git

1 Requirements and corresponding properties

ID: FR5 - $\Gamma(x)$

(1)R1

When the user entered the parameter x, [Subject] the calculating system shall [Action] verify the validation of the parameter. If it is not valid, show up the error message and give the tip and instruct the user to enter the value with correct format.

- Version number: 1.0
- Owner: Jingya Pan
- Priority: High
- Rationale: For the gamma function, 0 and all the negative integers are not defined. Let us use $\Gamma(0)$ as an example. $\Gamma(0) = \int_0^\infty x^{-1}e^{-x}\,dx$. The problem is that this is not integrable. While it decays very rapidly for large x, for small x it looks like 1/x. The details are :

  $\lim_{a\to 0}\int_a^1 x^{-1}e^{-x}dx \geq \frac{1}{e}\lim_{a\to 0}\int_a^1 \frac{dx}{x} = \lim_{a\to 0} -log_a = \infty$

  Thus $\Gamma(0)$ is undefined, and hence by the functional equation it is also undefined for all the negative integers.
- Difficulty: Easy
- Type: Functional requirement

(2)R2

When the parameter x for the gamma function is received,[Subject] the calculating system shall [Action] process the gamma function with the received parameter x [Constraint] within 2 or 3 seconds.

- Version number: 1.0
- Owner: Jingya Pan
- Priority: Medium
- Rationale: For the calculating system, after user clicking the button or using other ways to trigger the action, the system need to give a reaction, so that the user will feel engaged in otherwise it will be confusing.
- Difficulty: Nominal. May have some additional hardware requirements.
- Type: Functional requirement

(3)R3

The result of the calculating system shall be accurate and correct after user giving a valid input.

- Version number: 1.0
- Owner: Jingya Pan
- Priority: High
- Rationale: For the calculating system, the primary concern is to get an accurate result conveniently, which made this requirement imperative.
- Difficulty: Difficult, correct algorithm is needed.
- Type: Functional requirement

(4)R4

The calculating system shall be maintainable.

- Version number: 1.0
- Owner: Jingya Pan
- Priority: High
- Rationale: The calculating system, is not a comparative complex system, but as the system involves, many other parts may need to be included. Therefore seperating the modules before actual implementation is rather important, which made the system be manageable and well-organized.
- Difficulty: Nominal, the module for the system need to be seperated reasonable, otherwise as the system involves, it will be hard to manage and maintain.
- Type: Quality (Non-Functional) Requirements

2 References

W. (n.d.). GammaAndStirling. Retrieved from https://web.williams.edu/Mathematics/sjmiller/public_html/372Fa15/addcomments/GammaAndStirling.pdf

29148-2018 — ISO/IEC/IEEE International Standard – Systems and software engineering – Life cycle processes – Requirements engineering. (2018, November 30). Retrieved from https://standards.ieee.org/standard/29148-2018.html