Software Engineering Process: Problem 2 **Amit Sachdeva**
Topic: Functional Requirements of Gamma Function **40084627**
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1 Introduction

Gamma Function: It is commonly referred as factorial function for complex numbers.
It is derived by Daniel Bernoulli.

2 Overall Description

This is a project based on gamma function in which we are making calculator for gamma value. User can insert any real value and expect real value except on boundary conditions.

3 Stakeholders

Users 1: This function is mostly used in physics calculations. So, most important stakeholders are scientists for their calculations.
Users 2: This function is also used in basic maths calculations or any analytically field.

4 Related to Function

4.1 Formulas

- **Formula1:** $\Gamma(x) = \int_0^\infty s^{x-1}e^{-s}ds \ \forall \ Re(x) > 0$
- **Formula2:** $\Gamma(1/2) = \sqrt{\pi}$
- **Formula3:** $n! = n * (n-1)!$
- **Formula4:** $\Gamma(x) = x\Gamma(x-1)$
- **Formula5:** $\Gamma(0) = undefined$

4.2 Domain of Function

$\forall$ Real numbers excluding all negative integers
$(-\infty, \infty) - Z^-$

4.3 Co domain of Function

- It ranges from $(-\infty, \infty)$
- For positive integers, we returns integer value as normal factorial
- For other real numbers, we use integral function.

5 Requirements/Constraints of Function

5.1 Requirements

- **Req1**: For **Large input** in positive value, it will return infinity as a language constraint.
- **Req2**: For **negative input** $\forall x < 0$, **Function** will return **undefined** response, keeping in mind input type
- **Req3**: For $x = 0$, **Function** will return **undefined**, keeping in mind input type
- **Req4**: For $Re(x) > 0$, **Function** will return positive real value, keeping in mind input type

5.2 Constraints

- **Const1**: For Input, types can be Integer, Double, Float data types
- **Const2**: We cannot **input** value of **non negative integers**
- **Const3**: We cannot input the value large number as it will return

6 References

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4247832/